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Dynamics of Interventionism and Economic Development in Quebec before 1854

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Abstract

The theory of interventionism argues that government interventions are inherently destabilizing, which in turn helps explain the growth of government. I argue that the theory of interventionism is also useful for explaining the process of economic growth. At first, an intervention reduces living standards as a level change. However, because the intervention alters entrepreneurial incentives, there is a second effect that decelerates economic growth (Czeglédi 2014). The theory argues that any additional intervention to deal with the distortions generated by initial interventions merely accentuates these two effects. Thus, the dynamics of interventionism entail a cumulative process of divergence. To illustrate this argument, I use the example of milling regulations in colonial Quebec. Directly, these regulations reduced the quantity and quality of milling services. However, indirectly, they altered long-run specialization patterns, notably in dairy production. As dairy exports later boomed due to exogenous factors, this alteration eventually led to greater divergence.

JEL Classifications: N51, N41, B53.

Key Words: Quebec, Canada, Dynamics of Interventionism, Austrian economics, Dairy Sector, Milling, Agricultural economic history.

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Introduction

The theory of the dynamics of interventionism is a special item in the quiver of Austrian economics and for good reason. The theory suggests that interventionism creates instability by distorting market signals. In turn, this distortion hampers entrepreneurial efforts to discover and exploit profit opportunities or it redirects entrepreneurial efforts to less productive (or even superfluous) domains. Once a policy is adopted, it sets into motion a series of effects that create outcomes which even the initial policymakers would have deemed undesirable. These outcomes spark a second round of interventions that will themselves lead to unforeseen consequences so that a vicious cycle emerges (Chris Coyne, Russ Sobel, and John Dove 2010; Sanford Ikeda 2002, 2004; Israel Kirzner 1985; Ludvig von Mises 1940 [2011]; Mark Pennington 2004; Murray Rothbard 1970). The theory has been presented mainly as one that pertains to how regulations breed further regulations. It is essentially a theory regarding the growth of government.

However, the dynamics of interventionism also speak to economic growth and development over time as a form of path dependency (Pal Czeglédi 2014). Once an intervention in the market begins, the economic costs compound themselves.[1] The first order effects of the intervention are those associated directly with the regulation. However, by altering the behavior of entrepreneurs in the future as well, the intervention has second order effects on specialization choices. In other words, the intervention initially reduces the level of income relative to the counterfactual of where it would have been absent the intervention, but it also sets the economy on a slower growth path. Any additional intervention to deal with the problems of the first intervention only reduces the level and rate of change of incomes further. As such, the dynamics of interventionism can be used to analyze economic development and the cumulative process of divergence between nations.[2] Given that economic history's biggest "prize" is to explain why certain nations became rich faster than others, this is not a trivial extension of the theoretical reach of the dynamics of interventionism.

The empirical evidence for the dynamics of interventionism is limited. Most of it consists of case studies that contain little to no econometric evidence. Some articles do employ empirical analysis but they are largely about leveraging the theory to explain the growth of government (see notably Robert Higgs 1987). These are not geared towards answering questions regarding how the dynamics of interventionism speak to economic development in the long run (with the notable exception of Czeglédi 2014).

To help fill this gap in the literature and illustrate the potency of the theory of interventionism, I present a case from Canadian economic history: the price controls on milling and entry barriers into the milling trade in Quebec that were enacted when it was a French colony in the seventeenth century and which continued during the first half of the nineteenth century after the colony had been conquered by Britain. In the next section, I explain how the milling regulations illustrate how the dynamics of interventionism can speak to a cumulative

[1] For the remainder of the article, I make reference to interventions that are construed as responses to market failures (for example, public goods problems, externalities). While I am personally skeptical of the relevance of the concept of market failures (Rosolino Candela and Vincent Geloso 2020), I concentrate on the types of interventions more frequently included in the literature on the dynamics of interventionism (for example, price controls, quotas, tariffs, licensing, subsidies etc.) which are interventions commonly depicted in microeconomics textbooks as having adverse effects. I thank Jason Taylor for highlighting the need for this important nuance regarding my claim.

[2] This cumulative process can be imagined where living standards are expressed on the y-dimension of a graph and time on the x-dimension. The effect of the initial intervention is to reduce the intercept on the y-axis. The cumulative effect emerges by altering the slope of the relationship between time and living standards so that, over time, a gap emerges between the potential living standards that *could* have been absent the intervention and those that are actually observed. That gap represents the cumulative process.

process of divergence. In that section, I break down the effects into first order (i.e. the level change) and second order (i.e. the slowing down of the growth rate). In the following section, I explain how these controls had a first order effect in terms of deterring the construction of flour mills in the seventeenth century while also reducing the quality of the flour produced. In the subsequent section, I highlight how the second order effects on economic growth materialized by altering specialization patterns, most notably specialization in dairy production.

I then propose an econometric strategy to measure these second order effects, relying on a legal boundary to where the milling regulations applied. The areas in Quebec that were not subjected to the price controls show early signs of specialization in dairy production relative to comparable areas subjected the price controls. When technological innovations (for example, refrigeration, steam, railways) in the late nineteenth century turned dairy products into major export goods, the areas that had not been historically subjected to price controls were able to partake in the "dairy boom". In the final section, I discuss and conclude how further efforts could be deployed to use the dynamics of interventionism to speak to development.

Milling Regulations and the Dynamics of Interventionism

The price controls on milling in Quebec were part of the institution of seigneurial tenure which legally determined the relationship between a *seigneur* and a *censitaire* (landlord and peasant). The institution, formally transplanted to the colony in 1627, was essentially a much-weakened version of French feudalism. The institution was gradually phased out, starting in 1854 (the endpoint of the present article). The crown conceded an estate to a *seigneur* who had to freely concede plots to *censitaires*. However, the latter would never become an owner. *Censitaires* paid duties in perpetuity and also provided *corvée* (working for the *seigneur* for three days a year with the option of an opt-out payment of three times the daily wage).[3] Once settled, a *censitaire* could not legally leave his plot—a *de jure* restriction which complemented the *de facto* restriction that required the *censitaire* to sell the improvements to the plot and pay the *lods et ventes*.[4] However, the most liberal estimate of these duties suggest that they were far less burdensome than for French feudal farmers in the mother country: roughly 5 percent of incomes as opposed to between 9 percent and 18 percent in France (Geloso 2020).

The key elements of interest here are not the duties imposed by the *seigneurs* but rather the series of monopoly rights they gained with a *seigneurie.* When granted his estate, the *seigneur* received a monopoly right on milling. He alone had the right to operate a mill for the purpose of producing flour. He also had a right to reserve for himself key plots of land for the establishment of his mill and had control over riverways which could be used to power the mill. The *censitaires* could not bring grain to any mill other than that of their *seigneur*. The *seigneurs* were very active in having these rights recognized: competing mills were torn down and peasants were punished for going to another estate. However, the *seigneurs* were legally mandated to build a mill (Gaston Deschênes 2009, 159), and the milling fee (the *banalité*) was

[3] For the *corvée, s*ome sources point to numbers as high as six days per year (Morris Altman 1983, 341-342). The fine was sixty *sols* which was the equivalent of three times the daily wage rate observed at the time (Geloso 2020).

[4] The *lods et ventes* is a key feature of the system. The dual existence of seigneurial and non-seigneurial tenures in Quebec would have induced internal migration. However, the tax meant that there was a considerable barrier to migration as one would have to a) find a buyer in an era where new migrants (coming from England mostly) could simply settle new lands implying that land markets were relatively thin; b) experience the tax as a reduction in the returns from migration. This is why most of the internal migration in Quebec occurred when children were leaving their parents' households to start their own in non-seigneurial areas rather than whole households packing up to move to non-seigneurial areas. Geloso, Vadim Kufenko, and Alex Arsenault-Morin (2023) argue that it was the key condition to the preservation of the institution in the presence of an institutional competitor.

set permanently at one out of every fourteen units of grain brought to the mill. This rate was kept fixed from the seventeenth century until 1854 (Geloso and Alexis Lacombe 2016, 185-186). Prices for manufactured flour were also regulated unless they were destined for export (Geloso and Lacombe 2016). Combined, these interventions into the operation of the market for flour are the main object of the present article.

To properly connect the case of milling to the dynamics of interventionism, I break down the effects of the milling regulations into the first order effects and second order effects. This is done to parallel Czeglédi (2014), the sole attempt in the literature to highlight how the dynamics of interventionism inform the study of the divergence in living standards. Czeglédi (2014) argues that the dynamics of intervention create different effects on living standards in two ways. The first is that because price signals are distorted, the efficient allocation of resources is a more arduous task which pushes living standards down. However, once economic actors in the regulated sector have adjusted, a new equilibrium is reached and the path of future growth is unaltered.[5] This is what I label in this article as the "first order effect". In the case of milling regulations, the first order effect applies to changes on the milling market.

However, the dynamics of interventionism are about how that first intervention spills over into other markets. It is that spillover which Czeglédi (2014) argues leads to growth slowdowns and can be used to explain growing income disparities between countries since some countries intervene far less in markets. Czeglédi (2014) argues that the initial intervention changes the focus of entrepreneurial activities.[6] The first intervention lures entrepreneurs into devoting resources to political entrepreneurship to obtain favorable regulations that mitigate the costs to them of the first intervention. More important is the fact that the distortions to the price system make it more difficult for market (i.e. productive) entrepreneurship to exploit profitable opportunities. In other words, "the intervention that is enacted (…) will prevent market entrepreneurs from discovering those profit opportunities that they would have discovered without the intervention" (Czeglédi 2014, 247). This latter effect is the one that causes deceleration in economic growth and which Czeglédi tied to the divergence between countries since the nineteenth century. I label this the "second order effect", which I illustrate by evidencing the spillover of milling regulations into other sectors.

First Order Effects of the Milling Regulations

The first order effects of the intervention in the milling market are relatively straightforward. Table 1 below shows a comparison of milling fees—which were generally charged as a share of the grain brought to the mill. The rate in Quebec was 7.14 percent—a level that was in line with that of France. However, France is not the relevant comparison. Ontario and Colonial America are the relevant comparisons, as these economies were more similar to Quebec than France because capital was scarce relative to labor. Most of the elements needed to build a mill needed to be imported into these New World economies so the costs of building and operating mills were far greater than in Europe (Deschênes 2009; Geloso and Lacombe 2016, 187). The price of milling was set so low that it was exceeded by the marginal cost in all but the most populous *seigneuries* (Richard Harris 1966 [1984], 78; François Rousseau 1983, 121).[7]

[5] Czeglédi (2014, 247) calls those "static costs" as opposed the "dynamic costs" described below.

[6] Mises (1940 [2011], 79) made a similar argument when he pointed out that price controls "paralyze the working of the market economy" because they "divert production from the ways which lead to the best and most efficient satisfaction of the consumers' demand" and "cause waste of both capital and labor (…) [and] permanent mass unemployment".

[7] According to Harris (1966), the break-even point was 120 individuals per *seigneurie.* However, he relied on relatively limited price information and assumed constant marginal costs. Moreover, what he describes is *average* cost rather than marginal cost. Updating his calculations with higher quality

Table 1
Comparison of Milling Fee Rates

Areas	Milling fee rate on average (%)
New France (1627 to 1854)	7.14
France (late Middle Ages)	8.33 to 10
Upper Normandy (late 18th century)	6
Ontario (late 18th century)	8.33
Colonial America (late 17th century)	15 to 16.67

Source: Geloso and Lacombe (2016, 185).

This rate-setting had three immediate adverse effects, all of which reflect rational behavior by *seigneurs*. The first is that they frequently delayed the construction of flour mills despite a 1686 edict that legally obligated their construction. According to Altman (1983, 364; 1987), only 57 percent of *seigneuries* had a mill by 1739 (when most *seigneuries* exceeded 500 inhabitants). By the Conquest, nearly all *seigneuries* had one. This meant that milling was mostly done at home—with poor results—or that people had to shift to other crops such as oats. The smaller *seigneuries*, faced with less favorable cost structures, were those where the *seigneur* did not bother building one.[8] The story of the 1686 edict is particularly relevant. When the edict was passed, the *seigneurs* who were part of the colony's executive and legislative council (the *conseil souverain*) never publicized the edict so that, even though they voted for it, it was never formally promulgated. It was only promulgated and publicized in 1707 after the arrival of a new governor (Deschênes 2009, 153).

The second effect is that when mills were finally built, cheaper windmills were privileged over more expensive watermills, even though Quebec has many rivers with rapid flows. Watermills require larger upfront costs but tend to have lower marginal costs that increase more slowly than those of windmills as volume increases. This is largely because millers using waterways can control the water flow to maximize the rotations of the millstones that grind grain and thus keep volume constant. Windmills would face numerous interruptions in operation and the sails could rip if winds were too strong (Deschênes 2009, 148). This preference for windmills over watermills by *seigneurs* cannot be attributed to some unappreciated feature of windmills, as Deschênes (2009, 148) pointed out. As we will see below, when the British took over Quebec in 1760, they preserved the institution of seigneurial tenure. In 1791, they froze the geographical boundaries of the institution so that all new settlements opened would operate under British freehold tenure where price controls and monopoly rights did not exist. Essentially, this created an institutional demarcation line (which I will exploit below to showcase the second order effects of the interventions in the milling market). On the side where the price controls and monopoly rights did not exist, watermills were the dominant type of mill. By the censuses of 1831 and 1851, there were also more mills per capita on the non-seigneurial side than on the seigneurial side (Geloso et al. 2023). In other words, the presence of the price controls and regulations determined not only the type of mill but also their extent.

price data (Geloso and Peter Lindert 2020), and the historical finding that marginal costs were decreasing mildly up to a certain population size and increasing thereafter (Corrine Beutler 1983), suggests that the break-even point was higher. Marginal revenues (i.e., the milling fee and other derivative revenue discussed later) exceeded marginal costs for *seigneuries* with populations between 120 and 500. However, within that range the revenues were not sufficient to cover fixed costs. As such, *positive* economic profits occurred clearly in *seigneuries* with more than 500 individuals, a number exceeded in nearly all *seigneuries* by the end of French rule in 1760.

[8] By 1760, all the *seigneuries* had a mill.

The third effect was that the quality of the flour was reduced—a byproduct of the monopolist's attempt to cut costs. Normally, the first step of the milling process, known as *criblage,* consisted in cleaning the grain to remove dirt. This is necessary to produce fine flour (for white breads and other baked goods), but it is less of a problem with coarser flour (Louise Dechêne 1994, 33). As such, the flour consumed in the colony tended to be "rather coarse and dark" because of the dirt that was still included (Legislative Council of Lower Canada, 1826). This had adverse health effects and many people noted the "dietically injurious" nature of the dark and sour bread made from Quebec flour (Legislative Council of Lower Canada 1826).

Taken together, these are non-negligible costs in an economy where wheat and flour constituted, according to one set of estimates, 17 percent of consumer expenditures (Geloso 2019a). However, they do not speak to the dynamics of interventionism as a cumulative process leading to greater divergence. Once the regulations were enacted, people were made poorer (i.e. a level change) but it is not immediately clear how milling regulations could have led to a deceleration of the rate of economic growth. In the next section, I highlight how these regulations yielded second order effects that decelerated economic growth.

Second Order Effects and Dairy Specialization

The first order effects described above do not necessarily entail a slowdown in economic growth. They only entail a "one-time" drop in the level of living standards. Yet, the data show a strong difference in Quebec's growth rate from that of the rest of North America. While Quebec had historically been poorer than the rest of North America (Geloso 2019b), this gap widened over the course of the first half of the nineteenth century (Geloso and Gonzalo Macera 2020).

Even *within* Quebec, the gap widened. When they conquered the colony in 1760, the British kept French seigneurial laws intact until 1791 when the influx of loyal British subjects caused mounting pressures against seigneurial tenure. The British preserved the institution but froze its boundaries to those of the estates already conceded by 1791. All new settlements would be opened under British freehold tenure. Under freehold tenure, none of the features of seigneurial tenure applied (no duties, no monopolies, no price controls—see Geloso et al. 2023). Yet, because of important legal barriers to migration, the two institutional systems existed side-by-side for several decades and important differences in socio-economic outcomes emerged (Altman 1998; Arsenault-Morin, Geloso, and Kufenko 2015; Geloso et al. 2023; Geloso and Macera 2020; Paul Phillips 1974). Most telling are the widening differences in agricultural productivity. Geloso, Michael Hinton, and Kufenko (2017) and Rank Lewis and Marvin McInnis (1980) provide data on farming total factor productivity (TFP) differences in 1831 and 1851 for seigneurial and non-seigneurial areas.[9] For 1831, Geloso et al. (2017) found that TFP differences were minimal: somewhere between -4 percent and -1 percent (against French-speaking farmers). For 1851, Lewis and McInnis (1980) found differences ranging between -7 percent and -14 percent. While there is a range of uncertainty, most of the potential errors understate the gap between non-seigneurial and seigneurial areas (see Geloso 2019c; Geloso et al. 2023). Geloso and Macera (2020) also suggest that the wage premium in non-seigneurial areas increased between 1831 and 1842, implying that small initial differences were gradually increasing over time, and by the late nineteenth century, the gap

[9] While both studies were interested in cultural differences in farming between French-Canadians and English-Canadians in Quebec, some scholars have taken the productivity differences to be very approximations of the differences between the two institutions (see notably Michael Percy and Rick Szostak 1992). The present author is skeptical about the synonymity between "cultural" and "institutional".

had widened further (Geloso, Kufenko, and Klaus Prettner 2016; Kris Inwood and Jim Irwin 2002).

During the 1870s, a boom in dairy production occurred worldwide due to improvements in shipping and farming technologies (Ingrid Henriksen, Morten Hviid, and Paul Sharp 2012; Henriksen, Markus Lampe, and Sharp 2011 and 2012; Henriksen, Eoin McLaughlin, and Sharp 2015; Sofia Henriques and Sharp 2016; Lampe and Sharp 2014 and 2015). Small open economies like those of Denmark and Canada became major exporters of dairy products such as butter and cheese. By 1900, Canada produced 55 percent of the cheese imported in Britain (William Fream 1910, 758-759) with Quebec producing the bulk of those imports (Ruth Dupré 1990, 1999; Richard Lavertue 1984; Régis Thibeault 1996). Within Quebec, production was disproportionately concentrated in areas that had historically not been subjected to milling regulations (Fernand Ouellet 1988, 326). On the unregulated side, long-term investments in dairying techniques were made long before the "dairy boom" and an entrepreneurial culture of dairy farming emerged (Ouellet 1988, 326). These initial investments were made in large part to meet the food demand of growing urban populations (in both numbers and share of total population). When the boom occurred, these initial investments proved more profitable than expected as the increase in foreign demand was added to the urban demand which had initially motivated the investments. Thus, unregulated areas were better positioned to seize opportunities and partake in new ones.

These widening differences across institutional lines are tied by some (not all) Austrian economists to the dynamics of interventionism. As Czeglédi (2014, 247) points out, an initial intervention may slow down economic growth by discouraging profitable patterns of specialization and reorienting entrepreneurial efforts. This could technically happen within the sector initially subjected to the regulation, but it could also happen outside of that sector. Indeed, if the regulated sector produces an input crucial to other sectors there may be further depressing effects that slow growth.

This example of a crucial input is not a trivial one. Neither was my use above of the dairy boom. The combination of the monopoly rights and the price controls in the milling sector affected a key input in the dairy sector because of the jointness of the supply of high-quality flour and the supply of bran and middlings which was used to feed farm animals (Geloso and Lacombe 2016). To understand this connection, two important features of flour milling must be pointed out.

First, the process of milling flour requires the breaking of the wheat kernel to preserve only the endosperm, removing the bran and middling. To produce high-quality flour, considerable resources are required in sifting the flour to extract bran and middling. Thus, producing high-quality flour also means producing bran and middling which are ideal feed items for animals. Low-quality flour—which contains bran and middling—cannot be exported easily because of its low value and because it tends to sour rapidly and not survive the trip. Thus, only high-quality flour was meant for export. Seigneurial mills segmented their products. The low-quality flour was handed back to *censitaires.* The grain that was kept by the mills as their tolls was generally destined for high-quality flour that was exported.

Second, prices of bran and middling were uncontrolled. Because the milling rate was fixed at a very low level, the *seigneurs* used the bran and middlings to make up for any losses (see footnote 7 for how it is tied to profitability of mills) Bran and middlings are important because they are a key feed item for most animals: pigs, horses and cattle. The *seigneurs*' legal monopoly on milling essentially also gave them a monopoly on the supply of bran and middlings, which meant that they asked a higher price. Geloso and Lacombe (2016) provide evidence that the *seigneurs* did indeed possess a great degree of market power as the price of these potential inputs in pastoral productions was increasing relative to wheat prices for the period they studied. More importantly, they document that *seigneurs* were able to operate with strong market power on the bran and middling markets because of the monopoly rights on

milling.[10] In especially populous and developed *seigneuries,* the proceeds from the sale of bran and middlings were considerable.

For the *seigneurs,* these two features created a perverse set of incentives that generated the second order effect. Increasing the production of high-quality flour for export meant increasing the supply of bran and middlings, whose price would fall. Essentially, they would be cutting into their profits by producing more high-quality flour.[11] As such, *seigneurs* had incentives to limit the supply of bran and middling. However, because bran and middling were fed to animals, that incentive meant higher costs for pastoral productions such as dairy farming, horse raising and pig herding. By raising the marginal cost of pastoral productions, the milling regulations discouraged pastoral specialization.[12] In seigneurial areas, dairy production would be kept to a minimum. Thus, the effects of the regulations seeped into other sectors such as the dairy sector. When the dairy boom occurred in the late nineteenth century (after the institution had been abolished), only the unregulated areas that had specialized in dairy production could partake.

At first glance, it may appear that I am speculating about second order effects with limited information. However, the aforementioned 1791 decision of the British to freeze the geographical boundaries of the seigneurial regime permits investigation of any direct causal role of the milling regulations in dairy specialization. The demarcation line between the seigneurial and non-seigneurial regimes offers a way to test whether seigneurial tenure discouraged early dairy specialization.

Figures 1 and 2 show the geographical distribution of areas in Quebec in 1831 and 1851 (the years which will be used below). The dark lines show the boundaries of conceded seigneurial estates in 1791. The squares and circles denote the central point of each sub-district reported in the censuses of 1831 and 1851. The circles are non-seigneurial areas and the squares are seigneurial areas. Comparing *all* seigneurial areas with *all* non-seigneurial areas in these maps would be problematic as the former were conceded from the first available lands while the latter from land still available by 1791 (i.e. the most economically productive land was settled first). However, two distinct features generate a viable causal approach. First, after 1791 there were still new settlements being opened within already conceded seigneurial estates. For example, of the 92 sub-districts opened between 1791 and the census of 1831, 63 were settled under freehold tenure and 29 were settled under seigneurial tenure. Second, the demarcation line between seigneurial areas and non-seigneurial areas produces a sample of “geographic neighbors with different institutions”, likely settled around the same time. The institutionally different areas in close proximity to one another shared similar environmental constraints, allowing property owners to observe one another and learn by way of best practices. These features can serve to limit a sample to areas with shared “institutional borders” (i.e. where selection biases are less problematic—see Joshua Angrist and Jörn-

[10] Supply was locally fixed for two reasons. First, the only way that peasants could increase the supply of bran and middling was by sifting the flour using a bolter (a very costly item). Second, bran and middlings are of low value relative to volume which made them costly to transport within the colony before the emergence of railways so that supplies could not be easily moved across regions. These two factors cemented the market power of the seigneurs on the market for bran and middling.

[11] The logic of Geloso and Lacombe (2016) entails that because Quebec was a price-taker on world markets for flour (i.e. Quebec was a small open economy), *seigneurs* would only increase high-quality flour production for exports when the demand for bran and middlings within Quebec would increase.

[12] This effect would have compounded the fact that the taxes imposed by the *seigneurs* limited—in an era of imperfect capital markets (Lewis 2001)—the ability to make capital investments (i.e. most investments were self-financed via one’s own savings). Thus, the tax burdens discussed above made it harder to build up animal herds, especially milch cows, or acquire machinery and equipment. These elements, I argue, explain well why we ought to expect a depressing effect of seigneurial tenure on dairy specialization.

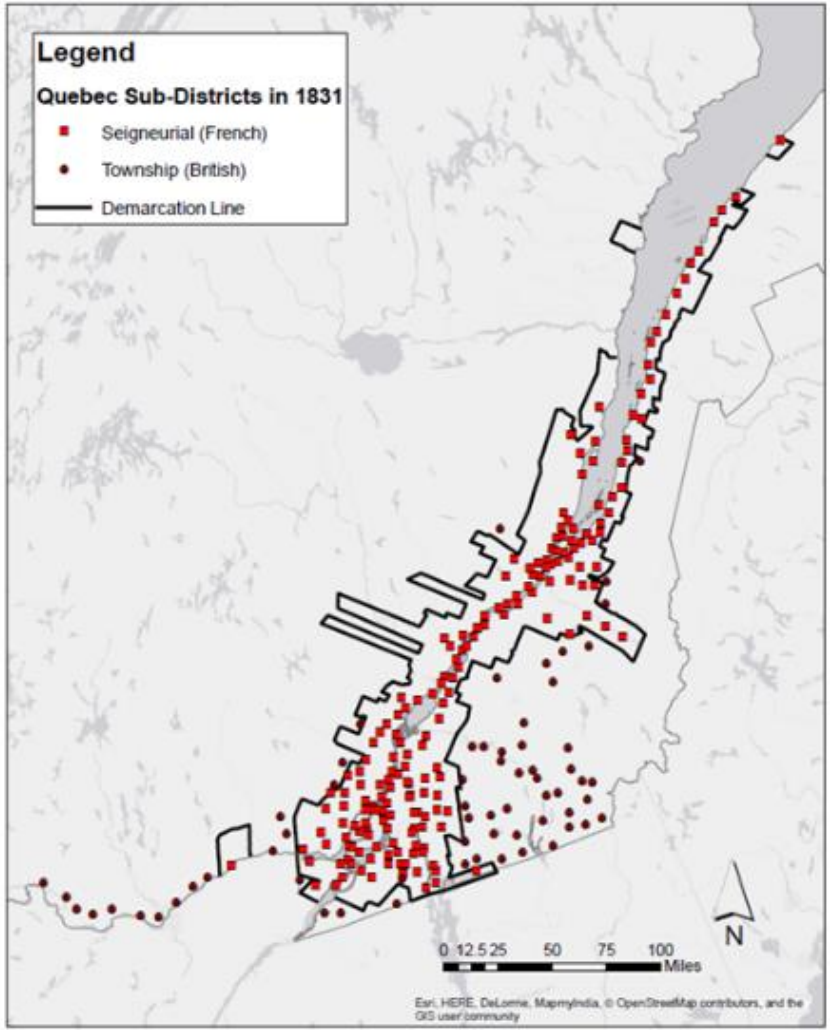

Figure 1

Map of Quebec with Institutional Demarcation Line, 1831

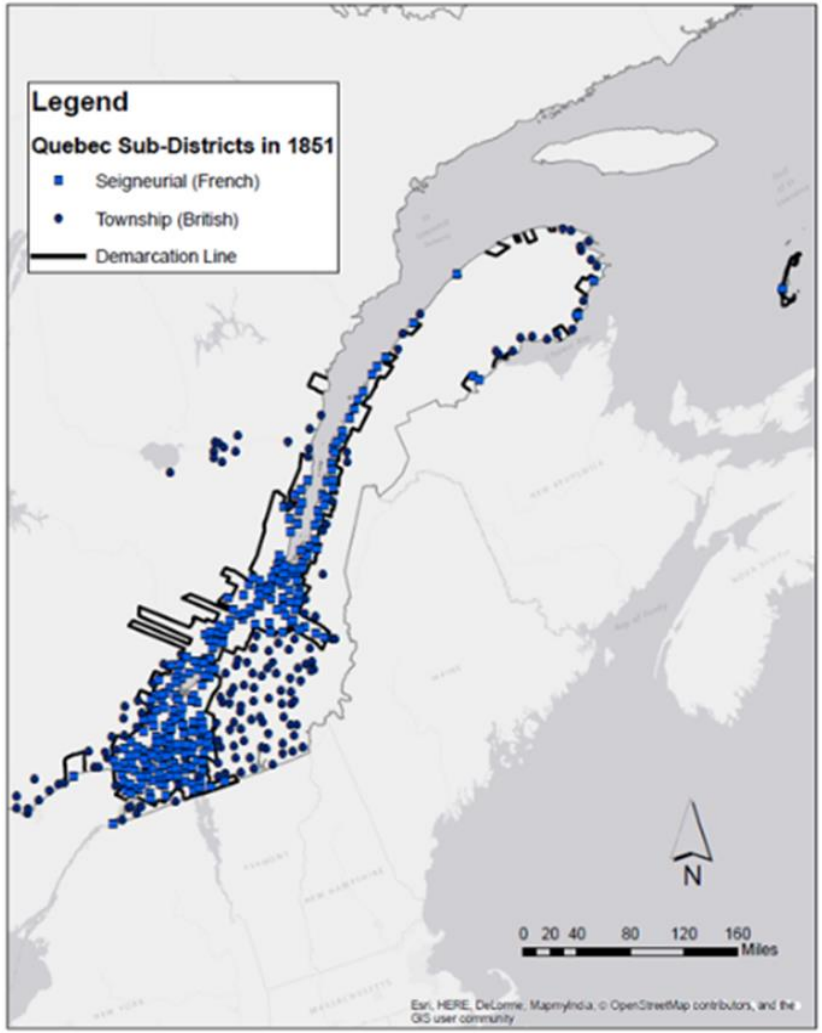

Figure 2

Map of Quebec with Institutional Demarcation Line, 1851

Steffen Pischke 2008; 2014) and allows a causal claim regarding whether seigneurial tenure deterred pastoral and dairy specialization.

Deterring Specialization

Data and Method

The data used in this article pertain to the censuses of 1831 and 1851. The year of 1831 is selected as the earliest point as it is the first full agricultural census following the Constitutional Act of 1791. The census of 1851 is the only other census providing full information about agricultural production prior to the abolition of seigneurial tenure in 1854. It is also the highest quality census available prior to the abolition in 1854.

Thanks to the works of previous Canadian economic historians, the roadmap to using these censuses is relatively easy and the data are now easily available (Altman 1998; Isabelle Cherkesly, Lisa Dillon, and Alain Gagnon 2019; Geloso 2019c; Geloso et al. 2017 and 2023; Geloso and Michael Makovi 2022; Lewis and McInnis 1980 and 1984; McInnis 1981). The censuses reported industrial plants and factories, agricultural production and population by the sub-district levels (known as either parishes or townships). There were 259 sub-districts available in 1831 and 460 in 1851. Each subdistrict is associated with row vectors of information regarding soil quality, length of the growing season and the presence of a postal office (a proxy for transportation and communication costs). I augment these data by creating a variable for "shared borders"—whether a given area shared a boundary with an institutionally different neighbor. This variable will be used to create a subsample of areas (71 for 1831 and 139 for 1851) straddling the demarcation line in Figures 1 and 2.

However, the two censuses have different architectures regarding the formulation of questions pertaining to agricultural production. For estimations of overall productivity, this is not a considerable issue (Geloso et al. 2017; Geloso and Makovi 2022), but it is for the consideration of the more narrowly defined topic of dairy production. To create a proper measure of specialization, a discussion of differing census architecture is necessary.

For the census of 1851, there have been important debates regarding the measurement of dairy output. The census of 1851 does ask the quantity of butter and cheese produced in each subdistrict. However, in their pioneering work, Lewis and McInnis (1984, 74) argued that these data failed to "provide a satisfactory basis for estimating the output of dairy products" as it neglected production in the form of fluid milk which tended to be consumed on farms. To estimate dairy output, they used a fixed assumption per cow expressed in terms of butter (92 pounds per cow which equals 2300 pounds of milk (ibid., 74)) and altogether ignored the headings for butter and cheese.[13] For the purposes of the present article, the census-reported production of butter and cheese is the ideal measure. These outputs were the ones most transformed by farmers and were not meant solely for household consumption. As such they capture specialization in dairy production *and* transformation. Using prices from Geloso and Macera (2020) that propose butter and cheese prices for the decade leading up to the census, I create estimates of the value of the output of butter and cheese. I divide the value of this output by the gross farm output estimated by Geloso and Makovi (2022) giving a direct measure of dairy specialization for 1851.

The census of 1831 asked no question about dairy output, but asked only how many "horned cattle" a farm possessed. For this reason, Geloso et al. (2017) had to use a fixed assumption of dairy output per cow. It is possible to generate a measure of dairy specialization

[13] Altman (1998, 736-737) contested their estimates and pointed out that they fixed the proportions too high (yielding implausible consumption figures). He proposed revised estimates that preserved the headings for butter and cheese and he added estimates for milk production that depended on demographic features in each subdistrict.

for 1831, but it is of lesser quality than that for 1851. Indeed, by assuming a fixed output per cow, such a measure would let all the variations be due to the number of "horned cattle" and the total output from other farm produces. However, the census of 1831 possesses an advantage in that regard. Enumerators had to report how many households were primarily involved in agricultural production. This means that an estimate of the workforce is possible (Geloso et al. 2017) and that I can estimate how many cattle there were per farm worker.[14] This is a crude measure of specialization, but it is far superior to the alternative. Unfortunately, it is still imperfect. Furthermore, such a measure cannot be computed for 1851. The enumerators in 1851 did ask a question about occupations but the rolls for many subdistricts were lost and occupations were only reported in the census volumes at the wider county-level (which included generally more than 10 subdistricts).

There are a few other ways to estimate dairy specialization. The 1831 census asked questions only about land farmed and did not break it down between pastoral and non-pastoral uses. As such, we would inaccurately estimate specialization in dairy production if we focused on all lands (i.e. we would include crop-growing acres). On the other hand, the 1851 census provides a breakdown which can be used to provide a separate 1851 estimate for specialization in dairy production. However, even this measure must be interpreted cautiously. Pastoral land can be used for a multiplicity of purposes, including the very remunerative activity of horse-breeding for which French-Canadians are historically reputed (Lewis and McInnis 1984). The absence of a breakdown of pastoral land poses the problem for 1851 that we do not know how much pastoral land other animals were using. This gives three regressions that can be estimated, one for the 1831 census and two for the 1851 census:

$$(1)\ lncattleworker_{i,1831} = \beta_0 + \beta_1 SeigneurialTenure + \beta_2 X_{i,1831} + \epsilon_i$$

$$(2)\ sharetotaloutput_{i,1851} = \beta_0 + \beta_1 SeigneurialTenure + \beta_2 X_{i,1851} + \epsilon_i$$

$$(3)\ lncattlepastoralacre_{i,1851} = \beta_0 + \beta_1 SeigneurialTenure + \beta_2 X_{i,1851} + \epsilon_i$$

where our main variable of interest is *SeigneurialTenure*. X_i represents the relevant control variables, shown in Tables 2 and 3 below, assembled by Geloso et al. (2017) and Geloso and Makovi (2022). Each of the regressions can be estimated for the whole colony and for the subsample of areas that shared boundaries with institutionally different neighbors.

While the architecture of the 1831 and 1851 censuses yields some different possible controls, previous work does provide some common controls. Thanks to the work of Geloso and Makovi (2022), we possess information as to whether a subdistrict had a postal office, and from the work of Geloso et al. (2017), we possess time-invariant controls for land quality (i.e. growing season and soil quality). The growing season variable is the length, in days, of the grain growing season from 1961 to 2000 (averaged over the entire period). The soil quality variable is the share of land in the area of a district *i* that is of types 1, 2, and 3 (most suited for grain growing) according to the Canadian System of Soil Classification. All three variables would affect specialization in dairy production and transformation. Because the two land quality variables are collinear, I will use only one or the other as a measure of environmental conditions. However, there are other control variables which are more problematic.

First, Quebec was still a frontier economy in a certain sense and there were considerable quantities of wild and wooded upland which could be used to produce firewood, a valuable output especially given the boom of the shipbuilding, timber and urban firewood fuel industries (Pierre Dufour 1981; Arthur Lower 1973). Thus, the supply of firewood would affect the extent

[14] All that is needed is an adjustment to remove land clearing efforts (which is a form of capital investment whose value cannot be measured as output easily). We follow the method developed by Lewis and McInnis (1980).

of dairy specialization as a possible remunerative alternative. The census of 1851 provides us with a clear heading for “wild and wood land”. The census of 1831 provides us only with “land conceded” and “land improved” (and there is uncertainty whether pastoral grounds were consistently lumped with land improved or land conceded). Second, the census of 1851 provides us with a breakdown of farm sizes by increments which is crucially important (Serge Courville 1990 and 2008; McInnis 1981). Many “small farms” (10 acres or less) were plots farmed by workers to supplement market income from working in rising rural industries such as sawmills, textile factories, distilleries and tanneries. The census of 1831 does not provide us with such a breakdown. As such, the 1851 census includes more controls of greater quality than for 1831.

Both the 1831 and 1851 censuses capture pre-dairy boom specialization patterns, but they do so in widely different ways. Using a single census runs the risk of arriving at a certain result because of the data structure. If, however, different control variables drawing from each of the censuses yield similar results, one can deem the results to be robust. Tables 2 and 3 show the descriptive statistics and explain the shape of each variable from both censuses.

Table 2

Descriptive Statistics, Shared Border Areas, Census of 1831

Variables	N	mean	sd	min	max
Non-seigneurial (dummy)	71	0.296	0.460	0	1
Postal office (dummy)	71	0.352	0.481	0	1
Growing season (days)	71	201.1	10.28	175.0	212
Land quality (top categories as share of total land)	71	0.397	0.286	0	1
Cows per worker (log), **dependent variable**	71	1.802	0.362	0.408	2.707

Table 3

Descriptive Statistics, Shared Border Areas, Census of 1851

Variables	N	mean	sd	min	max
Non-seigneurial (dummy)	139	0.374	0.486	0	1
Postal office (dummy)	139	0.597	0.492	0	1
Growing season (days)	139	197.06	12.40	170.10	212
Land quality (top categories as share of total land)	138	0.368	0.290	0	1
Wild and wood land (as share of land held)	139	59.77	21.60	7.462	98.78
Small farms (as share of all farms)	139	13.50	19.41	0	96.15
Output per acre (log of dairy output value in dollars per acre), **dependent variable**	139	-0.059	1.016	-5.160	5.121
Output share (dairy output as share of total output), **dependent variable**	139	7.525	5.501	0	31.76

Results

The regression results are provided in Tables 4 and 5 below. Results for both censuses are hard to compare because of the different census architectures. However, they point in the same direction. More importantly, the setup approximates a causal relationship because the sample has been limited to areas along the demarcation line. Crossing the line should not yield different outcomes in term of dairy specialization absent a causal effect of institutional differences on each side of the line.

Table 4
OLS Results for Shared Borders Areas, 1831

	(1)	(2)
Variables	ln (Cows per Worker)	ln (Cows per Worker)
Non-seigneurial	0.218**	0.230**
	(0.0935)	(0.0948)
Growing Season	0.00980***	
	(0.00302)	
Postal Office	0.236***	0.253***
	(0.0752)	(0.0777)
Land Quality		0.0638
		(0.115)
Constant	-0.317	1.620***
	(0.616)	(0.0631)
Observations	71	71
R-squared	0.257	0.183

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

All the models are run with robust standard errors to avoid problems of heteroskedasticity. Table 4 shows that non-seigneurial areas had significantly higher numbers of horned cattle per farm worker in 1831. The coefficients, significant at the 5 percent level in both specifications, suggest that non-seigneurial areas had 24.36 percent to 25.86 percent more cattle per worker than seigneurial areas.[15] This result suggests that there was an early specialization lead in pastoral production. I say pastoral production to remind readers that the way the census of 1831 was conducted means I am using “horned cattle” per worker. Thus, the results for 1831 must be taken as suggestive and with caution. Nevertheless, these results are strongly suggestive because of a biased assumption that I had to make. The implicit assumption in assessing all the cattle the same implies that seigneurial areas were equally productive per cow as non-seigneurial areas. All differences between the areas result from

[15] These coefficients may appear to contradict those in the table, but the coefficients in the table are in a log-dummy forms. To calculate the percentage impact, we must apply the correction of $100 \cdot [\exp(\beta_1) - 1]$ as per Robert Halvorsen and Raymond Palmquist (1980).

variations in the number of heads of cattle in farmers' herds. There is some empirical evidence (Altman 1998, 734-735) suggesting that non-seigneurial areas were also more productive per animal (consistent with better-fed cattle). This provides a certain confidence in the results obtained despite the methodological flaws discussed.

Table 5, which uses the 1851 census, reinforces the results obtained from the 1831 census. Three out of the four possible specifications show a significant effect of being under the non-seigneurial regime. The first and second columns of Table 5 show the regressions using the log of output per pastoral acre. This is the inferior measure from this census because "pastoral land" is not the most relevant proxy for dairy specialization; as explained above, it is impossible to know how pastoral land was divided between the different animals owned by farm households. Econometrically, this is a problem for two reasons. First, the mechanism described to explain why seigneurial tenure would have delayed dairy specialization would have also affected the ability to build up large herds. Second, the mechanism would have also altered the composition of animal herds. Including a measure for the number of other animals as a control variable would thus create a specification bias in the model. Thus, even if they are suggestive, these results must be considered cautiously.

Table 5

OLS results for Shared Borders Areas, 1851

	(1)	(2)	(3)	(4)
Variables	Output per acre	Output per acre	Output share	Output share
Non-seigneurial	0.309	0.330*	2.446**	2.583**
	(0.191)	(0.184)	(1.187)	(1.217)
Wild and wood land	0.00317	0.00404	-0.0262	-0.0370
	(0.00609)	(0.00612)	(0.0265)	(0.0247)
Growing Season	0.00164		0.0396	
	(0.00690)		(0.0434)	
Small farms	0.00609	0.00555	-0.00330	-0.00709
	(0.00582)	(0.00623)	(0.0380)	(0.0390)
Postal Office	0.218	0.162	1.004	1.226
	(0.189)	(0.180)	(1.046)	(1.077)
Land Quality		0.438		0.0671
		(0.354)		(1.603)
Constant	-0.898	-0.754	-0.181	8.100***
	(1.544)	(0.477)	(9.018)	(1.943)
Observations	139	138	139	138
R-squared	0.045	0.057	0.053	0.047

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

The conceptually superior measure of output share provides less ambiguous results: non-seigneurial areas specialized more into dairy production *and* transformation (as this includes only butter and cheese which are transformed not overall milk production which could be used for household consumption). In 1851, the share of total farm output represented by butter and cheese was between 2.45 and 2.58 percentage points higher in non-seigneurial areas along the demarcation line than in seigneurial areas along the demarcation line. The results are significant at the 5 percent level. This is also economically significant. Consider that, for the whole colony, butter and cheese output represented 6.2 percent of total gross farm output. The effect of being in a non-seigneurial area on farm specialization is thus equal to more than a third of the average level of farm specialization at the time.

Discussion and Conclusion

Taken together, the results from Tables 4 and 5 suggest that seigneurial tenure had an effect on early specialization patterns, an effect which I argue was channeled through the role of milling regulations that raised the cost of key inputs (bran and middling) in dairy production for regulated areas. Unregulated areas specialized in the most profitable forms of production and were able to exploit opportunities that can explain how small initial differences in agricultural productivity widened into larger productivity differences later.

The case study illustrates well the role that the dynamics of interventionism can play in explaining economic divergence. Under the logic laid down by Czeglédi (2014), if two similar areas facing the same market opportunities differ only in terms of a market intervention, there will be a difference in specialization pattern that leads to growing differences over time. In the present case, non-seigneurial areas were better able to seize the opportunities offered by dairy specialization even if seigneurial areas could have easily seized them as well had it not been for the milling regulations. In other words, absent the distortions to the price system seigneurial areas could have specialized productively in dairy farming. This effect was added to those of the milling regulations on the milling sector itself. This cumulation of economic costs over time illustrates the usefulness of the dynamics of interventionism for the study of divergence.

Even as these first and second order effects of intervention offer a strong tool for explaining divergence, they miss one further effect that further drives divergence. Most often, the dynamics of interventionism are used to explain growth in the size of government. An initial intervention foils economic calculation which induces further destabilizing, and futile, interventions. Mises used the example of milk prices to show how a price ceiling for milk destabilizes other markets (1979, 31-33). Once the ceiling is adopted, shortages ensue and governments must either respond by removing price controls or by adding other layers of intervention. For example, to keep down production costs for milk producers subjected to a price ceiling on milk, governments could impose price controls for the fodder fed to animals. Mises (1940 [2011]; 1979) argues that the lure to intervene further to resolve the distortions is greater than the lure of dismantling the initial intervention which is why many economists in his wake (Candela and Geloso 2020; Coyne and Abigail Hall 2018; Higgs 1987 and 2004) believe the dynamics of interventionism offer a potent explanation of the government growth.

A particularly important intellectual addition to this explanation has been provided by public choice theory. An interventionist system changes the incentives of entrepreneurs away from market-based entrepreneurship towards politics-based entrepreneurship—in other words, rent-seeking (Pennington 2004). Essentially, a rent-seeking contest emerges between political entrepreneurs to ensure that the next round of intervention is favorable to their interests. Czeglédi (2014, 426) points out that this rent-seeking not only explains how one how regulation leads to another, it also generates additional costs through the reorientation of entrepreneurial focus. Instead of looking for productive market opportunities, entrepreneurs

now focus on ways to secure rents. This is a cost that adds itself to those mentioned above. In the case of Quebec, this additional cost is hard to quantify, but two useful examples suggest that this cost was not negligible.

First, Geloso et al. (2023) point out that the *seigneurs* argued that their reservation rights to certain plots of land and riverways applied not only to flour mills but also saw mills (for timber), carding and fulling mills and tanneries. For example, one of the features of seigneurial tenure that protected the milling monopoly was the right of the *seigneurs* to reserve riverside plots for their flour mills. However, the *seigneurs* frequently used this right to restrict entry into the timber trade. As saw mills required water flows to operate, the reservation right initially justified for flour milling was repurposed to restrict entry in the timber trade, a market in which the *seigneurs* were heavily involved. In some instances, the *seigneurs* argued that their monopoly rights to milling applied to *any* form of milling—carding mills, wool mills, fulling mills, saw mills. Thus, by altering entrepreneurial focus towards securing rents, the intervention yielded adverse effects in non-farm industries like timber and textiles.

Second, the price control on milling fees meant that there existed important deterrents to investing in new milling technologies and in building more capital-intensive mills. Indeed, it would have been counterproductive to do so as increasing flour output meant increasing the output of bran and middlings which *seigneurs* had managed to monopolize. Over the course of the nineteenth century, important technological innovations were introduced to the milling sector and these were rapidly adopted in places like the United States (especially around Baltimore) which led to a boom in the export of flour to Britain and elsewhere (G. Terry Sharrer 1982). These technologies were not adopted on the same scale in Quebec. By the 1830s, it became apparent that Americans were able to produce flour at a lower marginal cost than in Quebec even though nothing in Quebec's geography suggests that it had an exogenous disadvantage in wheat farming and flour milling (Geloso and Louis Rouanet 2024; McInnis 1982). There is strong evidence that many entrepreneurial efforts were squashed by *seigneurs.* There was a minor exception in the obligation to mill grain at the seigneurial mill: bakers could mill whatever grain they purchased at whichever mill they wanted and it seems that they could also mill themselves (Geloso and Lacombe 2016, 186). This could have formed a breach through which bakers could have circumvented the regulations' effects. Bakers were in direct competition with *seigneurs* as they could *also* sell bran and middlings thus reducing the former group's market power. However, *seigneurs* managed to close that potential breach in two ways. In the seventeenth century, the *seigneurs* who were part of the colony's executive and legislative council (the *conseil souverain* mentioned above) passed regulations that prohibited bakers from sending out agents to buy wheat in the countryside (Pierre Fournier 2011, 147), limited entry into the baking trade (Fournier 2011, 230; Geloso and Lacombe 2016, 189), and imposed price controls on bread (Fournier 2011, 241, 259). In turn, this created recurrent complaints that there were too few bakers and too little bread available in cities (Frégault 1955, 64-65).

These two examples of the repurposing of entrepreneurial efforts can be taken as standard illustrations of how the dynamics of interventionism lead to government growth. They can also be understood as additional costs to those described above. In the logic of Czeglédi (2014), they serve to further slowdown economic growth that was already caused by the previous rounds of intervention.

Taken together, these elements suggest that the dynamics of interventionism can be used to speak to divergence. Initial interventions set the economy at a new level and by distorting price signals, they make it harder for entrepreneurs to seize opportunities which sets the economy on a slower path. The destabilization induced by that first policy can thus lead to divergence over time. Any additional interventions meant to remedy the destabilization of the first intervention merely add to the perverse effects. The destabilization thus generates a strong cumulative process that slows down economic growth.

The hope from the present article is that it will induce Austrian-friendly scholars to further expand the empirical body of literature illustrating the crucial relevance of the theory of interventionism to the study of development and divergence. Austrian economists have too long shunned econometric methods to document their claims and show their relevance. This paper shows that econometric methods can help provide more robustness to claims regarding the validity and the importance of the dynamics of interventionism in explaining development.

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