

# WORKING PAPER

## LAND RIGHTS, LOCAL FINANCIAL DEVELOPMENT AND INDUSTRIAL ACTIVITY: EVIDENCE FROM FLANDERS (19<sup>TH</sup> – EARLY 20<sup>TH</sup> CENTURY)

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# Land rights, local financial development and industrial activity: evidence from Flanders (19th – early 20th century).

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## **Abstract:**

In this paper we investigate the hypothesis that the economic divergence across Flemish localities between 1830 and 1910 is explained by the theory of Hernando de Soto. We hypothesize that the uniform land rights installed after the French revolution provided borrowers with an attractive form of collateral. Conditional on the presence of local financial development provided by a new government-owned bank this eased access to external finance and fostered industrial and commercial economic activity. Using primary historical data of about 1179 localities in Flanders we find that the variation in the local value of land (collateral) and the variation in local financial development jointly explain a substantial amount of the variation in non-agricultural employment accumulated between 1830 and 1910. By 1910 industrial and commercial economic activity was more developed in localities where both early (1846) rural land prices were high and early (1880) local financial development was more pronounced, which is in line with the “de Soto” hypothesis.

## **Keywords:**

de Soto, financial institutions, industrial development, land prices, Flanders, 19<sup>th</sup> - 20<sup>th</sup> centuries

**JEL: N93; O43; R11; R12.**

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## 1. Introduction

The relative impact of geography, institutions and culture on economic development is hotly debated in the economic literature. In this paper we study the combined effect of land rights and local financial development on economic activity. We give special attention to the theory of Hernando de Soto who hypothesizes that modern land and property rights in general lead to economic development. They allow owners to put up land and other property as collateral and thereby increase the owners' access to finance (de Soto 2000). Collateral indeed has the potential to strengthen the incentives of a borrower to expend the necessary effort to make best use of the loan and thus alleviate moral hazard (Stiglitz Weiss, 1981). If de Soto is right, it are not so much higher initial land values or the exogenous variation in local financial development that spark economic development, but rather the interaction of both. Indeed, the corollary of de Soto's theory is that, present uniform modern land rights, localities that enjoy both higher land prices and a higher local financial development will in the long run, through improved access to credit, also enjoy higher levels of economic activity. In this paper, we put the theory of de Soto to a historical test by analyzing the early 19<sup>th</sup> century history of Flanders, which provides an excellent testing ground to disentangle the effects of improved homogeneous property rights, land values and local financial development on local economic development.

From the middle of the 18<sup>th</sup> century onwards most countries in North-Western Europe experienced a gradual decline of the importance of the agricultural sector and the ascent of industrial and service sectors. Following the United Kingdom's industrial development after 1750, Belgium was at the helm of this transition in continental Europe. France, the Netherlands and Germany experienced similar processes, albeit during a later wave of the industrial revolution. Divergence in the adoption rate of new mechanized modes of production emerged not only between, but also within nation-states. By the end of the 18<sup>th</sup> century the northern most region of what was soon to be Belgium had little organized industrial activity (Mendels 1971). During the long 19<sup>th</sup> century the newly independent Belgium became one of the frontrunners of the continental European industrialization (Mokyr 1974, 1976 and 1977, Horlings et al 1997). Within Belgium, industrial activity initially remained centered in the resource-rich Walloon area. The textile centers of Ghent and Alost notwithstanding, Flanders retained its rural and proto-industrial character throughout the first half of the 19<sup>th</sup> century. From the second half of the nineteenth century onwards, the secondary and tertiary sectors became increasingly important in certain areas of Flanders. By 1910 Flanders was characterized by vibrant commercial and industrial economic activity that was unevenly distributed across localities. We want to test whether de theory of de Soto, i.e. the combined effect of uniform land rights and local financial development, can contribute to understanding why some Flemish localities were more industrialized than others in 1910, despite having little discernable differences in industrialization in 1830. Since the presence of land rights and local financial development are prerequisites for the existence of a de Soto- effect, we discuss them shortly below.

Recently, Acemoglu et al. demonstrated the positive impact of the institutional reforms brought along by the French Revolution on the long-term economic growth in those parts of Germany with a Napoleonic government at the dawn of the nineteenth century (Acemoglu et al 2011). Similar to Germany prior to the French Revolution, the Southern Low Countries were dominated by three classes, the clergy, the landed nobility and the urban bourgeoisie. With some regional variation, these three social groups were able to hold on to large swaths of rural and urban property (Van Bavel et al 2010). The specific institutional layout of the pre-modern society enabled these social groups to siphon off substantial amounts of capital (crops, cattle or cash) from the productive sphere (North 1971, 1981, Brenner 1981). During the aftermath of Napoleon's invasion, much of the entry barriers and prerogatives that provided sources of rent for the privileged groups as well as the patchwork of idiosyncratic (property) rights were replaced by a system of modern homogenous property rights (Garaud 1959, Yernault 2011). In parallel, a relatively modern banking system emerged between 1820 and 1848. These first banks were predominantly geared towards the large-scale and capital-intensive industrial enterprises in the ore- and coal-rich Walloon area. Modern financial institutions with a local and/or rural focus were virtually nonexistent in Flanders. Only with the foundation of the government-led *Algemene Spaar- en Lijfrentekas / Caisse Générale d'Épargne et de Retraite* (ASLK) in the 1860's, a modern savings bank system with a nation-wide reach was established. As the large majority of early ASLK branches were set up through the post-offices and since the location of these post-offices was unrelated to economic perspectives in terms of commercialization and industrialization, the location of ASLK branches in 1880 can be considered as approximately random with respect to potential economic development. We will therefore adopt the presence and depth of an ASLK branch in the Flemish localities as early as 1880 as a source of approximately random variation in local financial development to identify the “de Soto” effect.

The introduction of secure and uniform property rights has beyond reasonable doubt assured investors of their property rights and may therefore have stimulated Flanders' investment demand and economic development in several ways. The “de Soto”- effect, which is only one of the possible mechanisms by which property rights may affect economic outcomes, entails that a system of fully-fledged modern land rights increases a firms' access to credit because the land can now be put up as collateral at a reasonable transaction cost. The presence of a “de Soto” effect is therefore conditional on the presence of local banking services. A number of contemporary studies have confirmed positive effects of land rights developing countries, including Thailand (Feder et al., 1991), Peru (Field et al 2003), Kenya (Place et al 1998), Paraguay (Carter et al 2003), etc. Several papers however also fail to find clear evidence of the de Soto effect, usually because the studied subjects (poor farmers, urban squatters) operate in an environment without modern banks, making credit an expensive and unofficial business anyhow, regardless of the presence of property rights (Galani et al 2010). Recently, a positive causal effect of land rights on credit access was found for large Russian industrial firms (Karas et al 2015). Here, banking services were present before uniform land rights were created. Hence, the identification relied on the regional variation of land rights in Russia in the presence of modern banking. Contrary to recent Russian history, uniform and homogenous property and land rights were present the Southern Netherlands before the creation of the Belgian state in 1830. Access to modern banking however,

was still largely missing until the final quarter of the nineteenth century. To ascertain the existence of a “de Soto” – effect in nineteenth century Flanders we therefore do not rely on the local variation in land rights, but rather on local variations in land (collateral) values and approximately random variation in early local financial development in the presence of uniform land rights. Hence, the identification strategy used in this article can be considered a complement to the one elaborated by Karas et al. (2015).

We thus hypothesize that the uniform land rights installed after the French revolution provided borrowers with an attractive form of collateral that, subject to the approximately random presence of local financial development provided by government-owned ASLK, eased access to external finance and fostered non-agricultural economic investment and employment. Studying more than 1200 localities in Flanders we find empirical evidence that the variation in the local value of land (collateral) and the variation in local financial development indeed jointly explain a substantial amount of the variation in non-agricultural employment accumulated between 1830 and 1910. By 1910 industrial and commercial economic activity was more developed in localities where both early (1848) rural land prices were high and early (1880) local financial development was pronounced, which is in line with the de Soto hypothesis. In this sense we not only contribute to the finance growth-nexus with 19<sup>th</sup> century data in the spirit of Bodenhorn and Cuberes (2014) but also shed light on one of the mechanisms through which bank finance has historically affected industrial growth and development in the presence of well-established land rights.

The remainder of this paper is organized as follows. In the next section we assess the economic development of Flanders during the nineteenth century, focusing on the differentiated industrial and entrepreneurial activity, the development of the transportation network, the emergence of uniform property rights, and the variation in the value of agricultural land. The third section turns to the development of modern banking in Belgium. The data are overviewed in section four. In sections five and six discuss the identification strategy and the evidence. A conclusion is provided in section seven.

## 2. Economic development of Flanders (1750-1910).

### 2.1 Transitioning from an agricultural to an industrial society.

From the late eighteenth to the early twentieth century, all countries in continental Europe experienced a gradually declining importance of the agricultural sector, to the benefit of the industrial and manufacturing sectors of the economy (Karel et al 2012, Mendels 1972, Craeybecxk, 1963). In the process, the Malthusian trap that had governed economic and social life for centuries, give way to seemingly sustained economic growth (Clark 2008). There were however, stark differences across nations in the speed and depth at which this process of industrialization unfolded (for a recent overview see Broadberry et al 2010). The economy in the Low Countries was no different in experiencing significant change during this period.

In the first half of the nineteenth century Belgium played a pioneering role in the takeoff of the industrialization on the European continent. Up until the Second World War, it was the 6<sup>th</sup> largest producer of coal, steel and a variety of chemicals, only trailing behind much larger nations as the UK, Germany, France and the USSR (Buyst et al 2010). While being commonly known as the first industrializing country after Great Britain, this stage of the industrial transition showed stark regional and local differences. While the first large-scale mechanization occurred in the Walloon area around the start of the nineteenth century (Pasleau 2001, Gaier 1973), industrial production in Flanders remained limited to old textile centers like Ghent and Aalst (van Der Wee 1985). Whilst the south of Belgium experienced economic growth through a rapid industrialization, overall (proto-) industrial activity declined in the Flemish countryside due to a combination of bad harvests and a steadily declining interest in proto-industrial flax and linen industry (Dejongh et al 2001). Up until 1850 the bulk of the population in Flanders secured their livelihood with a combination of agricultural and proto-industrial activity (Gubin 1983, Jacquemijns 1928, Sabbe 1975, Dejongh et al 2001, Vanhaute 2007), but this specific type of agriculture, ‘Flemish husbandry’, gradually broke down in the subsequent decades (Vanhaute et al 2012). By the middle of the nineteenth century, this evolution is clearly reflected in the employment figures. As table 1 shows, around the middle of the nineteenth century (first reliable data) industrial activities occupied a comparable, yet limited share of the total work force throughout Flanders. As a corollary, around the middle of the nineteenth century, employment in the agricultural sector reached an all-time high.

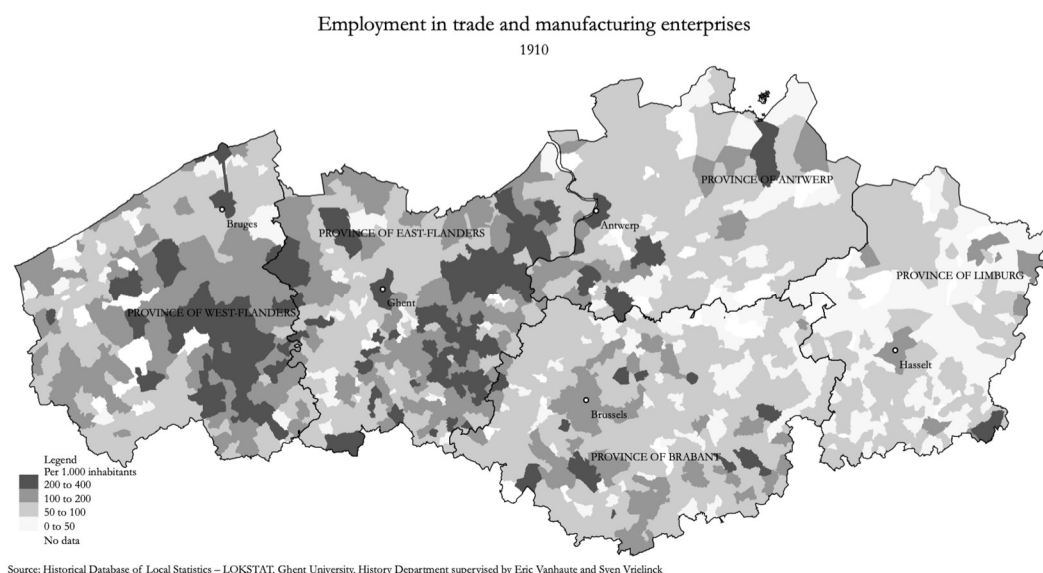
Table 1: Industrial employment as percentage of total workforce<sup>1</sup>

	Antwerp	Brabant	West-Flanders	East-Flanders	Limburg
1846	9,04%	7,70%	11,11%	8,95%	7,01%
1896	10,39%	12,85%	8,04%	12,73%	6,64%
1910	12,20%	13,98%	11,12%	15,43%	7,67%

<sup>1</sup> Source: G. De Brabander. *De regionaal-sectoriële verdeling van de economische activiteit in België (1846-1979): een kritische studie van het bronnenmateriaal*. Leuven, 1984

However, given the higher rural population growth during the nineteenth century in combination with the partible inheritance system and low levels of migration, farm sizes became increasingly smaller as farm rents rose to exceptional levels. At the individual level this created the need for new revenue streams, at first in proto-industrial activities but increasingly as a part-time artisan or tradesman. The increasing rent revenues themselves sought a productive allocation as well and consequently substantial amounts of rent-revenues were reinvested in the countryside through credit. As Vanhaute noted, these areas (inland East- and West-Flanders, South Brabant) were confronted with an accelerated commercialization of rural life and an upsurge in second-tier and third-tier towns (Vanhaute 2007). Artisans, tradesmen and small businesses gradually developed in the countryside fueled by the aforementioned rising flows of money. As such a gradual deruralisation took place in the Flemish countryside during the long nineteenth century. Whilst overall population pressure remained high, an increasingly smaller portion of them earned their income through agricultural activities. During the same period, substantial interregional differences in industrial manufacturing employment developed. This regional divergence was recently illustrated by Buyst (2011). His analysis shows that in 1896, Limburg and West-Flanders accounted for substantially less of Belgium's GDP than Flanders' central provinces. On the eve of WWI, Brabant and to a lesser extent Antwerp and East Flanders had substantially increased their share of industrial employment (table 1). In Limburg and West-Flanders on the other hand, industrial employment remained stagnant between 1846 and 1910. A more granular presentation of industrial employment per locality is provided in figure 1. Around the start of the twentieth century, industrial and manufacturing activity in Flanders is clustered around two centers, respectively in the South of West-Flanders and the eastern half of the province of East-Flanders.

Figure 1: Employment in industry and manufacturing.<sup>2</sup>



<sup>2</sup> Source: Historical Database of Local Statistics – LOKSTAT, Ghent University, History Department supervised by Eric Vanhaute and Sven Vrielinck.

Within the literature, several explanatory models have been developed to explain the variation in the adoption rates of industrialization in Northwestern Europe and Belgium. Nef for example, emphasized the unique and (in his view) revolutionary technological breakthroughs that resulted in an increased labor output and a new industrial mode of production (Nef 1943). Recently Acemoglu et al. focused on the discriminating effects of the Napoleonic rule on long-term economic development during the long nineteenth century (Acemoglu et al. 2011). Another strand of literature cites the persistence of regional proto-industrial activities and their transformation to an industrial scale. In his studies on protoindustrialization in Flanders, Mendels stresses the phase of proto-industrialization which constituted a ‘preparatory stage’ for the large-scale industrialization of the nineteenth century (Mendels 1972, 1975). He considered two elements to be of importance, first, the accumulation of capital by merchants and entrepreneurs and second, the severing of the family-land bond (by making rural inhabitants almost exclusively dependent on their paid-labor incomes). As a result of these insights, several scholars have acknowledged the regional differences in labor-supply (for example the presence of landless laborers or ‘cottars’) and the type of agricultural production as driving forces behind an industrial takeoff (Craeybeckx 1963, Goldin et al. 1982, Sokoloff 1997.). During the past decades, the path-dependency between protoindustrialization and industrial economic development as suggested by Mendels has gotten renewed interest. Dejongh et al (2001) for example, recently suggested a distinct relationship between population growth and higher arable productivity and a development path of the industrialization process. These models however struggle to provide an explanatory model for the observed local differentiation in industrial and manufacturing development in Flanders. A first effort to bridge this gap was made by Rayp and Ronse. Using an empirical version of the Middelfart- Knarvik (MK) model, they showed that, for the first half of the twentieth century, location of economic activity can primarily be explained through market potential (Rayp and Ronse, 2016). With regards to the transitional nature of the economic structure of Flanders during the second half of the nineteenth century, Vanhaute pointed towards the increased capital investments as a possible explanation for the increasing commercialization and industrialization of Flanders (Vanhaute 2007). We aim to clarify what enabled these increased capital investments. By focusing on the interaction between the value of potential collateral and local financial development in the form of formal banking services in the presence of enforceable property rights, we investigate to what extent a de Soto effect (through improving access to finance) accelerated economic development in manufacturing and industry during the second half of the nineteenth century and at the same time explains the local differentiation in the presents of the secondary sector in Flanders at the advent of WOI.

## **2.2 Expanding transportation networks.**

Preceding the process of industrialization, the transportation network in Flanders grew substantially. Traditionally, toll roads and waterways played an important role in transporting goods in the Early Modern period. Especially the former can be considered the focal point of early governmental policy. During the second half of the Eighteenth century, the road network nearly quadrupled in size, from 681 to 2.223 kilometers (Dejongh et al 2001). After a short intermission between 1795 and 1830, development of new roads picked-up again after Belgium’s independence. As part of broader infrastructure policy, the road network

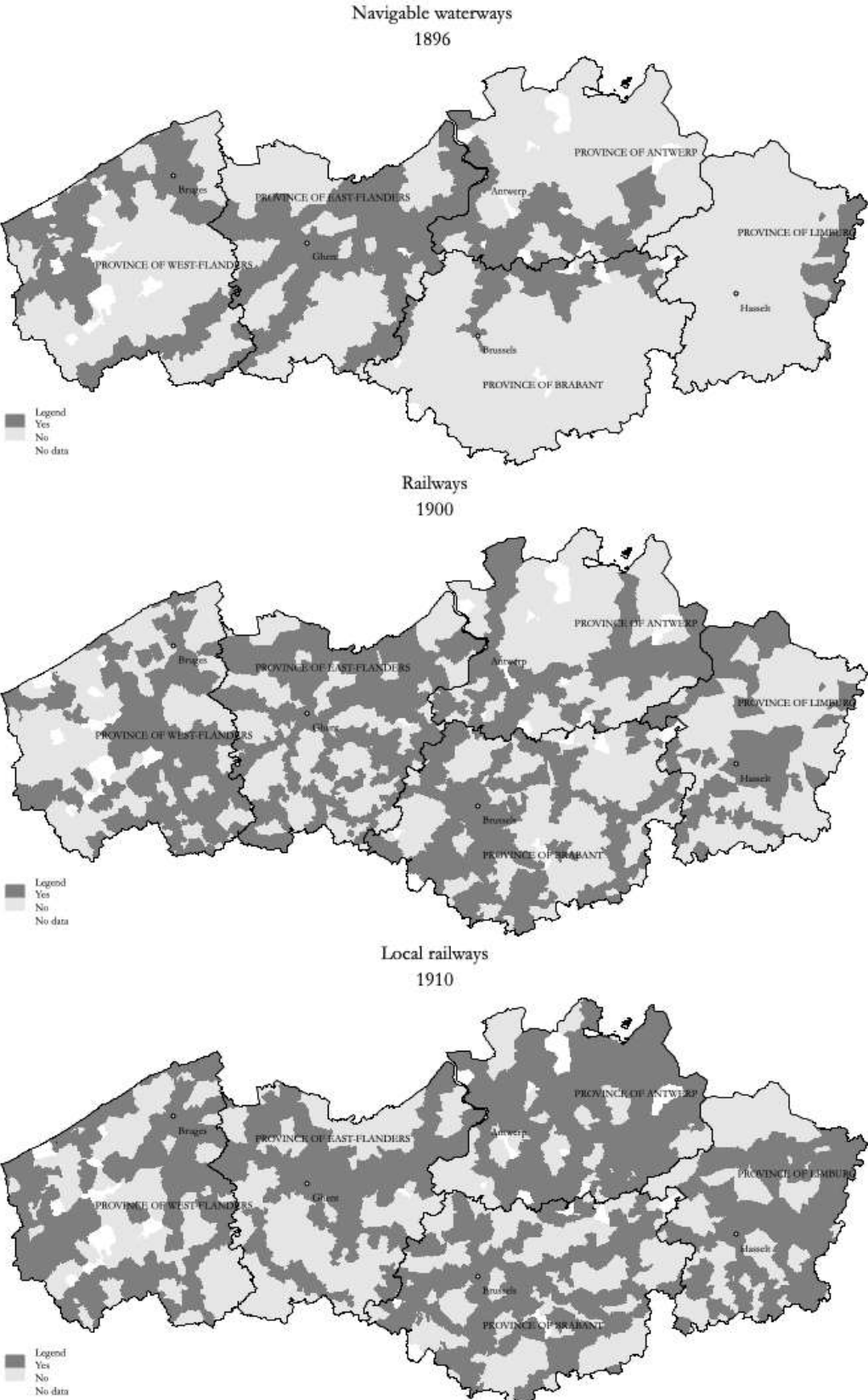


expanded once again from 3.500 to 6.230 kilometers. Unlike earlier however, development focused on the eastern parts of Belgium, particular the province of Limburg and the Campine area in the north-east of the province of Antwerp (Dejongh et al 2001). These efforts resulted in a dense and relatively equally distributed road network. Unsurprisingly, by the middle of the nineteenth century Belgium's road-density (0.21km per km<sup>2</sup> square km) was comparable to that England (0.22km per km<sup>2</sup>)(Dejongh et al 2000, Guldi 2012).

Waterways formed a second important mode of transportation before the Industrial Revolution. While by 1700 the Dutch Republic had a substantial (exceeding 650 km) network of navigable waterways, financed and owned by local entities, a similarly dense network of navigable waterways was lacking in the Southern Low Countries. Particularly the absence of government-led initiatives during the Austrian regime (unlike provincial roads) (De Vries 1978) with investments largely depending on local private initiative explains this marked difference (van der Herten 2000). In later stages, and especially during the period of the United Kingdom of the Netherlands (1815-1830), substantial investments were made by the state (for example the substantial expansion of the port of Antwerp after 1865), provincial governments and private individuals (canals and waterways). By 1850, Belgium had the highest density of navigable waterways in Europe (0.05 km per square km) closely trailed by England and the Netherlands (0.029 and 0.04 respectively) and followed at a distance by France and Germany (0.006 and 0.005) (Bogart et al. 2010). Figure 2 shows that especially West- and East-Flanders were particularly well connected to navigable waterways at the end of the Nineteenth century, as was the border region between Antwerp & Brabant. Limburg particularly stands out by its lack of connection to the main transportation arteries and the major cities in the West of Flanders.

Whereas the road and waterway network remained the dominant mode of transportation during the first half of the nineteenth century, the economic importance of (local) railways expanded dramatically after 1850. Just five years after independence (in 1835), Belgium was one of the first countries on the continent, only second to France, to offer regular rail service (Grafe et al. 2010). By 1840 most major Belgian cities were connected by railroad (Pounds 1990). As a result of private initiative combined with substantial state investments, Belgium had the densest railroad network in Europe by 1870 (0.095 km per square km), outperforming even the UK (0.081) and France (0.080) (Bogart et al. 2010). Initially, the motivation behind this enormous capital investment was to ensure military effectiveness and maintain independence from the Netherlands (Bogart et al. 2010). Soon however, the railways proved to play an important role in redistributing industrial labor from the north to the South of Belgium. By the end of the nineteenth century, either through (national) or local railways, most localities were integrated within and larger transportation network (figure 2), allowing for the bulk transport of raw materials and finished products over greater distances. In Leuven's countryside (a city of circa 35.000 inhabitants located 25 kilometers east of Brussels) for example, local industrial activity picks up significantly during the final quarter of the nineteenth century, partly due to the mobility improvement as a result of the construction of a local railway line (Lefebvre 2003).

Figure 2: Transportation network in Flanders.



Source: Historical Database of Local Statistics – LOKSTAT, Ghent University, History Department supervised by Eric Vanhaute and Sven Vrielinck

As a whole, Belgium's transportation network expanded significantly from 1750 onwards. Before and during the first years of its independence, subsequent government investments focused predominantly on provincial roads and waterways (Dejongh et al 2001). From 1850 onwards investments were rerouted to the development of a vast local tramway and railway network. In time, the success and importance of this multifaceted transportation network created a symbiosis with the industrial sectors. As the development of a well-functioning transportation network fostered industrial development, the enduring industrialization itself constantly pushed for new and more efficient means of transportation (van der Hertten 1995, Dejongh et al 2001).

### **2.3 Property rights and land prices.**

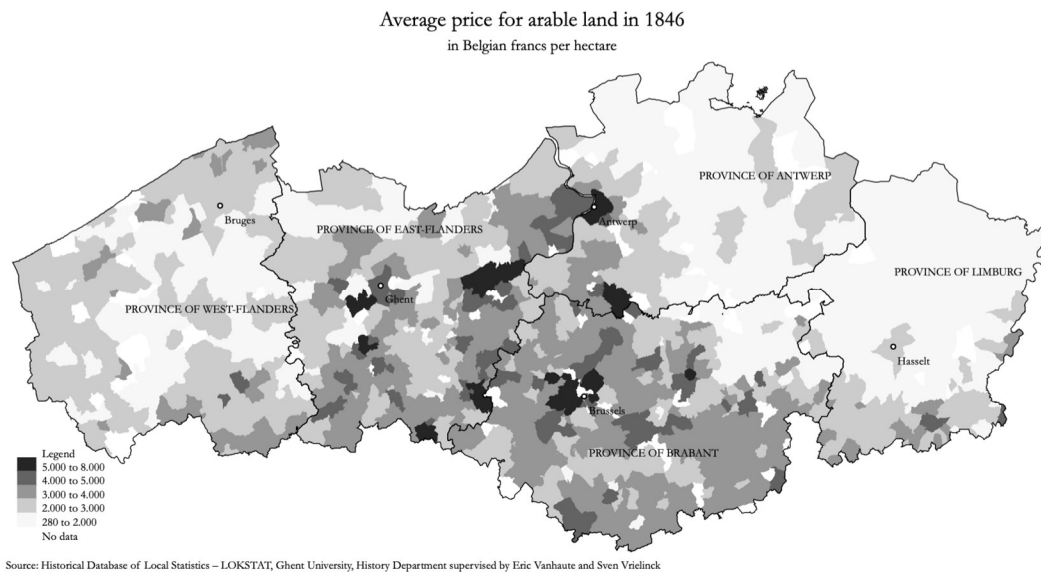
By the time the Revolutionary Armies left the Southern Low Countries after being defeated in the battle of Waterloo in 1815, the region had been bequeathed with a new institutional framework, including a system of modern land of property rights. In essence, land rights regulate the allocation of the remunerations that arise from the use of a specific piece of land (Deiniger 2003). Hence, property and property rights are a social construct; a consensus within society on how certain types of assets should be used, held and transferred (de Soto, 2000). Several elements have been associated with prevalence of stable and secure property rights, ranging from the exclusive assignments of land rights and a distinct demarcation of the parcels to the presence of institutions to resolve legal disputes concerning conflicts and the evolution of land rights in response to changing relative scarcities (Deiniger 2003). The later element is in essence a reformulation of an observation made by Ester Boserup in her work on agricultural growth (1965). Herein, she showed that whenever land was abundant, the need for (in)formal institutions to enforce ownership rights remained limited. However, as soon as population growth made fertile land less readily available, property rights were needed to subdue social and political conflict.

Large parts of Western Europe possessed property rights from the Middle Ages onwards. In Continental Europe this evolution was fragmented, mirroring the scattered political and institutional contexts. In broad terms, common law was established in France and Low Countries somewhere during the thirteenth and fourteenth century. Key elements in this evolution were the gradual disappearance of the feudal system, the amelioration of the social and judicial position of the peasantry after the Black Death and the gradual urbanization (Van Den Berg 1988; Howell 2010, Huppert 1986, Verhulst 1958). By the fifteenth century, property rights were institutionalized within larger legal frameworks. Both land and credit could be transferred through respectively land and credit markets (Van Bavel et al 2010). Sale deeds were frequently officialized either by notaries, aldermen benches or the manorial court. In densely populated areas, such as certain sub-regions of the Southern Low Countries, official surveyors even set out to trace the exact boundaries of each plot, but this depended on the initiatives of local lords. Despite the institutionalization of property rights and the emergence of active land markets, a universal system of land title registration remained absent at regional, let alone the national, level. Furthermore, property rights themselves were not necessarily exclusive. Since

different rights over land could coexist, several people often held rights on the same plot. The monarch could give a domain in fief to his vassal, who could then exploit part of it as copyhold. The copyholder would manage the land as if it were his exclusive property. Without the lord's consent, he could sell, mortgage or lease out the plot as he pleased. Since there was no central registration office, land was being resold and/or remortgaged several times while officially still being the property of the lord. The formal annexation of the Southern Low Countries to France in 1795 induced a profound reconfiguration of this legislative framework (Garaud 1958, De Reu 2011). Soon after the invasion of the French, the former prerogatives of the nobility and the church were abolished, as were the 'old' structures through which land was transferred. The wide variety of often overlapping rights that could be exercised on a single lot prior to the French Revolution was replaced with a straightforward division between freehold and usufruct. Furthermore an official Land Registry Office was established as early as 1796, which after some initial organizational problems, was operational from 1802. This administration not only registered the ownership mutation of each plot but were responsible for the surveying and valuation of all plots (Hannes, 1967, De Reu 2011). Parallel to the foundation the cadaster a mortgage registry was founded in 1796, to which every mortgage transaction had to be reported. The mortgage register made it furthermore possible for creditors to appeal to the sale of a property. Finally, recent research on the rural land market in Flanders during the final decades of the eighteenth century and the dawn of the nineteenth century have shown that transaction costs around the 1780's were approximately 110 percent higher than during the first quarter of the nineteenth century (De Reu et al 2014). By the time Napoleon's armies were defeated in the battle of Waterloo, an age-old system of institutions, social conventions and mores had been uprooted and replaced by a new framework. As a result, property was transferred and mortgaged much easier than before, at lower transaction costs. Consequently, the first condition of the Hernando de Soto's model, homogenous and free property rights, was in place.

With regards to rural land prices, significant differences can be observed at the interregional level (figure 3). While the value of land reflects the intrinsic quality of the land, these not only refer to the agricultural uses of the land (Peterson 1986, Menard et al 2005, Heffer 2010). The key characteristics that explain these substantial intraregional differences are intrinsic soil quality, the ratio between buyers and sellers, access to navigable waterways and the presence of (nearby) urban markets to sell surplus production (De Vijlder 2018). Within the scope of this article we are interested in the variation of average arable land prices, rather than in explaining their values. As can be seen in figure 3, average land prices in West-Flanders were rather elevated along a thin stretch of coastline, (the polder region) but were amongst the lowest in the center of the province. As a whole, land values were substantially higher in East-Flanders, Brabant and Antwerp. Especially within the triangle formed by the major cities Antwerp, Ghent and Brussels average prices were substantially higher. In the vicinity of urbanized areas, values gradually diminished the further away for the central hub. Note however that intrinsic soil fertility continued to play a major role. Around Antwerp for example, prices gradually diminished along concentric circles around the city. To the west and the east this development was gradual. To the east (and to a lesser extent the north), values plummeted as soon as the dry and sandy Campine area began.

Figure 3: The average value of arable land per locality.



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### 3. Credit and banking development in the Southern Low Countries and Flanders

The high level of urbanization in combination with the early development of factor markets had, by the middle ages, created an environment within the Southern Low Countries wherein the use of money, credit and bills of exchange became a widespread and well-established phenomenon. In most of the Southern Low Countries informal rural credit markets arose from the late thirteenth century (Thoen et. al 2009, Van Bavel et al 2010). Using annuities, defined as periodical and redeemable payments in money of a fixed sum mortgaged on immovable property, credit could be secured by both smallholders and yeoman alike (Lambrecht 2009). Rural credit became increasingly widespread in Flanders and Brabant during the sixteenth century as interest rates developed a downward trend (Limberger 2009, Van Bavel et al 2010). In Flanders, interest rates on perpetual annuities declined from 8 per cent during the middle of the fifteenth century to between 4.5 and 5 per cent during the eighteenth century. Furthermore, as real rural land prices rose during the early modern period in response to a gradually expanding population, credit became a fundamental characteristic of both rural and urban practice during the early modern period, either to buy land, redeem older debts or purchase capital goods (Lambrecht 2009).

Despite the development of thriving land and credit markets, the complex regulatory framework of land ownership, the entanglement different mutually exclusive, rights and the absence of registration offices increased information costs dramatically. This severely restricted the working of credit markets during the Ancien Régime, with participation limited to locals or their relatives due to the otherwise high information costs (Nicholas 1971, Ogilvie 2001, Briggs 2009 Hoffman 2004, Rosenthal 1994). Given both the complex

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<sup>3</sup> Source: Historical Database of Local Statistics – LOKSTAT, Ghent University, History Department supervised by Eric Vanhaute and Sven Vrielinck.

system of property rights as well as the lack of local supply of capital to satisfy demand, an important role was set aside for intermediaries (either through kin-networks or semi-specialized professionals e.g. village clerks and notaries) to serve as proctors between borrowers and lenders (Lambrecht 2009). While these mechanisms enabled the extension of credit outside of the geographical boundaries of the village, credit networks hardly ever transcended the local sphere. More often than not they remained based on a personal connection between borrowers and lenders, whether or not facilitated by intermediaries (De Reu et al 2014). Consequently, factor markets were dominated by affluent locals (Lambrecht 2009, Limberger 2009, Brennan 2006, Schofield et al 2009). This effectively restricted the supply of credit to the local economy to their aggregated demand for profitable investments. The French annexation of the Low Countries and the subsequent formalization of a new institutional framework and the introduction of a new paper currency (*assignats*), heavily disrupted local credit markets. Several eyewitness accounts suggest the implosion of (informal) credit market during the final decade of the eighteenth and first decades of the nineteenth century (Lambrecht 2009). Informal credit extension somewhat recovered during the subsequent decades, but then withered away because of the competition from alternative investment opportunities offered by government and corporate bonds, equities and deposits.

During the first quarter of the nineteenth century, banking activities were predominantly conducted by local banking families and merchants providing banking services. Their activities were focused on the commercial sector and involved the extension of short-term credits and discounting drafts. These small-scale and locally operating institutions, often using the bankers' own funds as working capital, had limited capabilities to fund large industrial projects (Veraghtert 1978). To support the burgeoning industrial activities in the Southern Netherlands, Willem I of Orange founded the *Société Générale pour favoriser l'industrie national des Pays-Bas* (*Société Générale*) in 1822. Designed after the example of the by then nearly 140 years old Bank of England, the bank's objectives were fourfold (Neal 1994). The new bank's main objective was to promote the national industry of the newly formed United Kingdom of the Netherlands, through either the extension of credit or direct participation (Laureyssens 1972). Next to that, the bank acted as a dedicated savings bank, counting the urban bourgeoisie as its main target audience through a network of branches and subsidiaries in the largest cities. Thirdly, the *Société Générale* was licensed by the state to emit its own banknotes (Laureyssens 1986). Finally, it acted as the State's cashier, responsible for the administrative handling on the kingdom's debt emissions and the safekeeping of its tax revenues ((Laureyssens 1989, Veraghtert 1978, Houtman-De Smedt 1994). However, only after the Belgian Revolution of 1830 and the succeeding economic boom of the early 1830's, the bank managed to gain a substantial foothold in the heavy industry in the South of Belgium (Witte et al, 1986). Especially by participating in the firms' capital through the process of swapping long-term credit into company shares the bank's shareholdings grew significantly in the capital-intensive heavy industry in the South of Belgium. This expansion was partly financed through the *SG's* savings bank activities. It's immediate success amongst the urban elites illustrated by the exponential growth rate of its holdings, from 1 million BEF in 1831 to 40 million six years later (Veraghtert 1978).

The mid-nineteenth century economic downturn, which struck the export-oriented industry in Wallonia especially hard, severely impacted the country's nascent financial industry as well. As debtors pleaded for deferral of payments on their loans (Kurgan-Van Hentenrijk 1977) depositors sought to withdraw their deposits. Without additional liquidity, the financial system would grind to a halt. By late March 1848, in a desperate attempt to get the situation under control, the government stepped in. Since a bank run was lurking around the corner, they established a fixed exchange rate for banknotes issued by both the *SG* and its government-led counterpart La Banque de Belgique (*LBB*). In conjunction, they tried to control the money supply by imposing a maximum amount of 30 million BEF notes to be issued by both banks (10 million by *LBB* and the remaining 20 million by the *SG*). The crisis of 1848 had shown that a thorough reform of the banking sector was long overdue. By the middle of the nineteenth century, the *SG* and *LBB* had amassed a pivotal role in Belgium's economy, primarily through their combined activities as deposit and investment bank, their role as issuer of legal tender and their close intertwinement with the heavy industrial sector. As a first measure, the government relieved the *SG* and *LBB* of their right to issue banknotes and transferred this task to the newly created National Bank of Belgium. Secondly, the government decided that they would establish their own savings bank as an alternative to private banking institutions such as *LBB* and the *SG*. Whilst savings banks had existed from as early as 1836 (Tournai), the large majority of them were situated in the industrial centers in the South of Belgium, such as their naming suggest (e.g. 'La Banque de Huy', 'La Banque Liégeoise' or 'La Veille Montagne'). These private initiatives were established and managed with hardly any regulatory oversight and were characterized by a close intertwinement with local industrial activity. These institutions were owned and operated by local industrialists, the bulk of the savings came from local industrial workers and a substantial part of the bank's active were investments and credits to local enterprises (Kurgan-Van Hentenrijk 1977). As a result of their local focus, the impact and reach of these institutions was very limited. By 1864 Belgium's 13 biggest savings banks represented only 40,000 accounts (0,9 accounts per 100 inhabitants) and 25 million francs in savings (ASLK 1965), underlining the relevance for a savings bank with a wider (national) scope.

Whilst the crisis of 1848 made the necessity of a publicly –controlled savings initiative clear, the auspicious economic revival of the 1850's combined with an upswing of economic liberalism and anti-state interventionism especially from Catholic circles, delayed the establishment of a public savings bank significantly. In 1865 Belgium's first public savings bank, the *Algemene Spaar en Lijfrentekas* (ASLK), was established when the in 1850 founded *Lijfrentekas* (Pension fund society) expanded their business by offering savings accounts (Witte et al 1986). At first, the scope of the ASLK was limited to the main office in Brussels, which initially expanded quickly due to the fact that existing local savings banks as well as several *SG* subsidiaries in the Walloon part of Belgium (in Nivelles, Dinant, and Philipville to name a few) carried over their funds to the main branch of the ASLK. From the start, deposits could be made not only through the ASLK itself, but also through one of the 35 agencies of the National Bank of Belgium and the local offices the Registry Office, extending the geographical reach of the bank by the end of the 1860's to most first and second tier towns.

By 1880 the *ASLK* was active in more than 505 Belgian towns and villages, resulting in a nationwide coverage of approximately nearly one in eight of all communities. Table 2 shows that there was a substantial heterogeneity in the initial spatial coverage of the bank. In the industrialized south of Belgium, especially in the province of Liege and Hainaut, *ASLK* offices –some full-fledged subsidiaries and most post offices- were active in respectively 23 and 40 percent of all communities. However, as is the case in Hainaut, the high levels of territorial coverage did not necessarily imply a high adoption rate amongst the population. These rates (expressed as the ratio between the number of account holders and the overall population) varied widely, with 6,1 percent in Brabant being the absolute outlier (column 2 of table 2). In general, however adoption rates fluctuated between 1.16 and 2.95 percent. Especially between the first five provinces make up the area of our empirical analysis, clear-cut differences existed between the ‘central’ provinces of Brabant, Antwerp and East-Flanders and the peripheral provinces of Limburg and West-Flanders.

The driving force behind this significant expansion in geographical reach was the incorporation of local post offices as *ASLK* sales channel. In a move to expand the savings bank’s reach to as many inhabitants as possible the government, together with the management of the *ASLK* decided in 1870 to allow basic transactions to be made through the local post offices, similar to the recently established Post Office Savings Bank in England. However, the bank did not become a part of the post-office department, but remained an independent branch of the Government, controlled by the ministry of Finance (Buyst et al 2008). The location of the postal offices however was not related to economic perspectives of the locality but driven by the government’s desire to increase the population’s access to this public good (Van der Hertem 1995). The undisputed success of collaboration between the postal offices and the savings bank can be seen in table 3. By 1880, the activity through the post offices accounted for a quarter of both the deposits and accounts held at the *ASLK*. Twenty years after the collaboration, nearly 70 percent of all accounts and 58 percent of all deposits were generated through the Belgium’s post office network (De Belder 1986). The fact that the large majority of *ASLK* branches were set up through the post-offices and that the location of these post-offices was unrelated to economic perspectives in terms of commercialization and industrialization suggests that the location of *ASLK* branches or subsidiaries in 1880 was approximately random with respect to economic perspectives. The presence and depth (measured through the number of accounts per capita) of an *ASLK* branch in the Flemish localities will be adopted as an exogenous measure of local financial development in the empirical part of the paper. The exogeneity of this measure of early financial development to early economic perspectives is also suggested by the negligible correlation between early financial development and measures of economic perspectives, like the average house price of the locality or the distance to the major port Antwerp.



Table 2: ASLK branches, 1880.<sup>4</sup>

Province	Branch coverage (% localities)	Adoption rate (% population)	Avg. accounts per branch	Avg. savings per branch	Avg. account balance
West-Flanders	16%	1,16%	223	278.329 BEF	1.249 BEF
East-Flanders	16%	2,62%	550	198.372 BEF	361 BEF
Brabant	15%	6,21%	1226	806.857 BEF	658 BEF
Antwerp	19%	2,26%	616	551.929 BEF	896 BEF
Limburg	10%	1,70%	205	148.530 BEF	724 BEF
Hainaut	40%	1,86%	159	94.724 BEF	596 BEF
Namur	13%	2,15%	143	108.711 BEF	758 BEF
Liege	23%	2,95%	321	165.240 BEF	516 BEF
Luxemburg	13%	2,51%	145	116.898 BEF	807 BEF

Table 3: Savings accounts through post offices 1870-1910<sup>5</sup>

	Post Offices	Saving accounts through post offices	Deposits
1870	427	4.416	891.114 BEF
1880	765	54.464	30.176.984 BEF
1890	819	511.595	192.290.475 BEF
1900	1.085	1.390.047	503.665.348 BEF
1910	1.496	2.290.114	770.939.732 BEF

Despite the ASLK's extensive rural branch network, a governmental inquiry during the 1890's had laid bare that the established system of savings banks was unable to cater to the need of the rural peasantry. While a substantial part of the bank's clients indeed lived in the countryside, only few of them were farmers (De Belder 1986). Well-off artisans, merchants and civil servants made out the bulk of the rural clientele (Van Mole 1986). Furthermore, while both the ASLK and the savings branch of the SG managed to attract savings from the countryside, a significant part of these amassed savings was lent to industrial corporations. The complaint that the existing system drained too much capital from the agricultural into the industrial sector was not unheard of (Delfosse 1983). In response to this societal need and inspired by German and Dutch examples, the recently founded *Boerenbond* created a network of local *Raiffeisenkassen* to work in collaboration with the ASLK. These institutions sought to collect savings from local farmers and to reinvest these, either through the local *Raiffeisenkas* or through the lending activity of the ASLK, on the local level through loans and/or mortgages. With over 700 *Raiffeisenkassen* spread throughout the Belgian countryside in 1910, roughly one in four of all parishes had a local cooperative, averaging 40 members per branch (Van Mole 1986). Although the venture

<sup>4</sup> Source: Brussel, BNP Paribas Fortis Historical Centre, Archives de la Caisse Generale D'epargne et de Retraite (CGER) 1850-2000, no. 8, Rapports Annuels CGER 1865-1885.

<sup>5</sup> Source: Brussel, BNP Paribas Fortis Historical Centre, Archives de la Caisse Generale D'epargne et de Retraite (CGER) 1850-2000, nos. 8-12, Rapports Annuels CGER 1865-1910.

was primarily focused on farmers and their families, in practice men and women of all sorts of backgrounds committed their lifesavings to their local *Raiffeisenkas*. Between 1895 and 1910 non-farmers amounted to 15% of the depositors and even less of the deposits, since they saved on average less than farmers. At the same time the non-farmers also received over 30 percent of the loans extended by the *Raiffeisenkassen*, borrowing on average between 50 and 100 percent more than the farmers (Van Mole 1986). We will use the local presence of the *Raiffeisenkassen* as an alternative, albeit less exogenous and less equally spread, measure of early local financial development.

Table 4: Savings banks in Belgium – 1910<sup>6</sup>

Institution	Number of accounts	Overall deposit balance (in million BEF)
ASLK	2,808,549	964.668
ASLK (Youth savings)	462,356	15.940
Raiffeisenkassen	27,334	10.001
Société Générale	21,123	38.237
Municipal savings bank Tournai	14,284	4.695
Banque Liégeoise	5,015	0.942
Savings banks of industrial companies	3,234	8.442
Municipal savings bank Nivelles	2,343	5.273
Municipal savings bank Aalst	809	0.677
Banque De Huy	189	0.248
Total	3.345,236	1.049,134

Between the founding of *Société Générale* and 1910, when (savings) banks were first incorporated in the industrial census, the financial landscape was altered profoundly, as illustrated in table 4 above. By 1910, there were a total of 3,3 million saving accounts with an aggregated deposited amount of over a billion BEF, on a total population of 7,4 million. The monopolistic position of the *SG*'s savings-branch which remained untarnished until the crisis of 1848, had completely faded away by 1910. The market was clearly dominated by the government-led ASLK with over 2,8 million depositors and outstanding capital of 964 million BEF. At the start of WOI, the deposits of the ASLK even surpassed the banknotes in circulation (1.123 billion as opposed to 1,004 billion (ASLK 1965). The commercial *SG* trailed from afar, with several municipal savings banks (not unexpectedly situated in the industrial hubs of the era) and banks set up by industrial companies and *Raiffeisenkassen* following closely.

In response of the growing deposits as well as its changing socio-economic role, the investment focus of the ASLK gradually shifted between 1865 and 1900. During the initial phase of the development of

<sup>6</sup> Source: Houtman-De Smedt, H., 1994, Belgium, In: Handbook on the History of European Banks, London, 47–90.

the bank from its inception in 1865 up to about 1880, funds would mainly be invested in the short term bills of exchange (both domestic and foreign, to the amount of 55 to 60 percent of the capital). The remaining 40-45 percent would be invested in the longer term, in government bonds (30-35 percent) as well as loans and credits to businesses (10 percent) (Witte et al 1986). As its balance grew, the importance of short-term investments would decline significantly, in favor of long-term corporate bonds (often mortgage bonds collateralized with land) and government bonds (both local and national), as can be seen in table 5.

**Table 5: the ASLK portfolio in 1913<sup>7</sup>**

Investment of the ASLK in 1913	Amount (in million BEF)	Share of total
Government bonds	355	25,85%
Corporate bonds	351	25,56%
Provincial and municipal bonds	243	17,69%
Bills of exchange (foreign)	165	12,01%
Mortgages through social housing initiatives	96	6,99%
Bills of exchange (domestic)	73	5,32%
Loans	42	3,06%
Mortgages	33	2,40%
Loans to agricultural sector	15	1,09%
Miscellaneous	0,4	0,03%

Furthermore, the so-called sociale beleggingen, i.e. social investments came to be a significant part of the ASLK's portfolio. Through building societies acting as middlemen, artisans, craftsmen and laborers would be enabled to borrow substantial amounts at below-market interest rates, using property as the main collateral. The success of this initiative was immediate. Between 1890 and 1895 more than 8 million BEF in credits were extended. By decision of the board of directors, the maximum amount of each loan was set a 5,000 BEF suggesting that at minimum 1,600 households have obtained a mortgage during those first couple of years. However, as evidence suggests, most loans were well beyond this threshold. Another major type of early social investments made by the ASLK consisted of agricultural loans. While not an instant success story as the mortgage business (between 1884 and 1890 only 3 million BEF worth of loans were extended) activity picked up significantly after 1897, when yearly on average loans to the amount of 1 million BEF were extended to farmers (ASKL 1965). Consequently, by the end of the nineteenth century, what had started as a straightforward government-led savings bank had become deeply rooted within the socio-economic structure of fabric of Belgium. A substantial number of inhabitants in both urban and rural communities, either by opening up a savings account or applying for a loan or mortgage, had become exposed to a new type of financial intermediary. As Frère-Orban, one of the driving forces behind the creation of the ASLK, so aptly stated: "It is the ASLK which therefore really gives birth to new resources. It endows society with hitherto inert and useless forces, because they were scattered, divided, or placed in disempowered hands" (Witte et al, 1986).

<sup>7</sup> Source: Brussel, BNP Paribas Fortis Historical Centre, Archives de la Caisse Generale D'épargne et de Retraite (CGER) 1850-2000, no. 13, Rapports Annuels CGER 1911-1920.

## 4. Empirical strategy and data:

### 4.1. Identification of the de Soto effect

We want to verify whether the combination of higher land prices and the presence of local financial development is related in a causal way to the later emergence of non-agricultural economic activity in Flanders, controlling for basic characteristics like access to waterways or railways, the ownership concentration, the type and the usage of the land and the local house prices, distance to Antwerp and county dummies. Before the French revolution the proto- industry was small and equally developed across the Northern part of the Southern Lower Countries (currently Flanders). We explained before how the industrialisation started off in the Southern part of the Southern lower countries already in the 1830's, but the industrial development of the Northern part was largely absent till after the 1848 crisis. We can therefore use the level of non-agricultural economic activity in 1910 as a measure of the accumulated net growth of non-agricultural economic activity between 1830 (independence) and 1910. Employment is our preferred measure of economic activity because it is widely available early on through industrial censuses of the new Belgian state. We model economic activity per locality  $Y_i$  in 1910 as (1):

$$Y_{i,t} = \alpha_0 + \alpha_1 P_{i,t-2}^{land} + \alpha_2 Bank_{i,t-1} + \alpha_3 P_{i,t-2}^{land} * Bank_{i,t-1} + \alpha_4 Z_{i,t-2} + \alpha_C + \varepsilon_i$$

Where  $P_{i,t-2}^{land}$  is the average land price of the locality in 1846,  $Bank_{i,t-1}$  denotes early local financial development,  $Z_{i,t-2}$  is a vector of local control variables, usually also measured in 1846 (or 1865 in one case), and  $\varepsilon_i$  is a disturbance term. If de Soto is right, property rights on valuable land will have especially beneficial effects on economic activity through the improved access to credit, and financial development will have more beneficial effects on economic activity if collateral is present in the form of valuable land that can be pledged. This implies the empirical hypothesis that  $\alpha_3 > 0$ .

### 4.2 Dependent variables

We consider approximately 1179 localities in the northern part of nowadays Belgium (the provinces of West-Flanders, East-Flanders, Antwerp, Limburg and Brabant), following the administrative division of 1910. Specifically the measures of economic activity  $Y_i$  are 1)  $Y_{E1}$  the number of people employed by establishments in the secondary sector (industry) and tertiary sector (mainly trade) in 1910 per 1000 capita, 2)  $Y_{E2}$  the number of people employed by establishments in the tertiary sector (mainly trade) in 1910 per 1000 capita and 3)  $Y_{E3}$  the number of people employed by establishments in the secondary sector (industry) in 1910 per 1000 capita. This data is drawn from the HISTAT database that was manually compiled from official government statistics based on censuses.<sup>8</sup> Although general censuses of industry and trade exist from the late eighteenth century

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<sup>8</sup> See table 1 for an overview of the used variables, as well as their respective sources. For an overview of the literature concerning (historical) trade, agricultural and manufacturing censuses see: *De algemene tellingen van de bevolking, de handel, de nijverheid en de landbouw sedert 1846 in België gebouwen*. In: Algemene volks-, nijverheids- en handelstelling op 31 december 1947. Deel I. Brussel,

onwards, only few offer a detailed perspective on the occupational structure of all the localities. During the nineteenth century for example, several censuses were carried out, but all of them focused on either specific sectors, omitted rural regions or had a limited reliability.<sup>9</sup> The census of 1910 on the other hand, provides us with information on the industrial (both secondary and tertiary sector – excluding governmental organizations-) activity and employment on the level of the locality. The Central Bureau of Statistics, aided by the local authorities, led the practicalities of the undertaking. Each locality had to detach several clerks to perform the actual count. Each one of these clerks was responsible for an operating area populated by no more than fifteen hundred people. The original data provides information on the type of establishment and their employment, using an intricate classification system. In total, this list entailed some 1272 industrial and approximately 153 commercial branches. We aggregated this data at the municipal level, as to obtain an indicator for the degree of local non-agricultural economic employment.

### 4.3 Main explanatory variables

The key question we wish to study is whether local financial development and the local average agricultural land price interact in their effect on industrialization. We prefer agricultural land prices from 1846 as our measure of ( $P_{i,t-2}^{land}$ ), to make sure our land prices predate the industrialisation on the Flemish countryside, but still occur after the agricultural crisis of the early 1840-ies. The correlation with 1830 land prices is very high though and our results are robust for using 1830 instead of 1846 land prices (these results are available on request). The data for the 1846 land prices stems from two agricultural censuses and are expressed in Belgian francs per hectare.

Unfortunately, no data on lending facilities is available pre-1910. Therefore, we employ a measure of approximately random early local financial development  $Bank_{i,t-1}$ , namely the number of *ASLK* deposit accounts per capita of the locality in 1880. These data were constructed based on the annual reports of the *ASLK*.<sup>10</sup> Since obtaining a loan from the *ASLK* implied owning or opening a deposit account and since the internal flow of funds inside the *ASLK* was still very constrained by technical hurdles by 1880, the number of *ASLK*-accounts can be considered as a robust proxy for local lending activity. Since the establishment of the early branch network was based on existing post offices, whose location was unrelated to economic perspectives, we argue that early financial development as measured by *ASLK* branch activity offices is approximately random with respect to economic perspectives. In addition, the correlation between our measure of early financial development and measures of market potential, like the average house price of the locality or distance to Antwerp, is almost negligible, again stressing the randomness of the early financial

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1949, pp. 41-44; G. De Brabander. *De regionaal-sectoriële verdeling van de economische activiteit in België (1846-1979): een kritische studie van het bronnenmateriaal*. Leuven, 1984, pp. 145-156. (Interuniversitair Centrum voor Hedendaagse Geschiedenis . Bijdragen 97) N. Bracke, Bronnen voor de industriële geschiedenis: gids voor Oost-Vlaanderen (1750-1945). Gent, 2000, pp. 194-196; J. Buntinx, Nationaal Instituut voor de Statistiek: inventaris van het archief van de Economische en Sociale Telling van 1937 en vergelijkend onderzoek met de gepubliceerde resultaten. Brussel, 2003, 189 p. (Algemeen Rijksarchief. Inventarissen 345); P. Olyslager, De localiseering der Belgische nijverheid. Antwerpen, 1947, 285 p. (Reeks van de School voor Economische Wetenschappen 32)

<sup>9</sup> Respectively the industrial censuses of 1880 & 1846 and the trade census of 1830.

<sup>10</sup> Source: Brussel, BNP Paribas Fortis Historical Centre, Archives de la Caisse Generale D'épargne et de Retraite (CGER) 1850-2000, no. 8-12, Rapports Annuels CGER

development with respect to economic perspectives.

The welfare gains of the de Soto effect only accrue in part to the borrower provided if the lender has no substantial market power. In the reverse case lenders may use their market power to demand higher collateral and charge higher interest rate, with an overall negative impact on social welfare (Besley et al., 2012). Although the ASLK clearly had some market power, it was fortunately also a government-owned bank (part of the Ministry) with the explicit goal to help develop the local economy. Therefore, the objection of Besley et al (2012) that the de Soto effect may yield welfare losses in the case of credit market imperfections does not apply to our case. Since the quality of the financial services will be approximately identical across localities as they are provided by a centralised state bank and because one should not expect the monopolistic lending behaviour that may prevent the emergence of a de Soto effect from this state bank in the first place, our measure of financial development is especially well suited to test a de Soto effect. These arguments, together with the large time gap between the dependent variable and the main independent variables (respectively more than 60 years and 30 years) is our approach to ruling out reverse causality from industrial development to agricultural land prices and financial development, an issue to which we will return in the results section.

As a robustness check we also use the amount of savings per capita of the locality in 1880 as a measure of local financial development, although the presence of a few large savers in the locality could severely bias this measure. As a further robustness check, we also look into lending data from Raffeisenkassen. These are measured later (1910) and are much less complete than the ASLK data, but the advantage is they also include direct data on locally disbursed credits.

#### 4.4 Control variables

Our base model is augmented with several control variables. In order take into account local demand we include 1) local house prices ( $P_{i,t-2}^{house}$ ), which are calculated as the average cadastral value per home in the locality in 1865 (first registration) and 2) the distance of the locality to the port of Antwerp, which became one of the main engines of the Belgian economy after 1865 and remains so today. Similarly, since the spatial implantation of industrial activity depended in part on transportation facilities, we include in our model using three separate variables respectively for the presence of navigable waterways in 1896 (both rivers and channels), railway stations in 1900 and neighborhood railway stations in 1910 (unfortunately this is the first availability of reliable data on this variable). We also control for the soil quality, the total acreage of the locality, the usage of the soil, the concentration of land ownership and the percentage of the locality that was communal property and hence could not serve as collateral for private investment, all measured in 1846. Finally, our localities are spread over 20 counties, which differ to a major extent in the level of wealth (demand), the importance of agriculture, the level of education and social norms. To capture the effect of these otherwise unobserved factors we include a vector of county dummies  $\alpha_C$ . An exhaustive overview of all variables and their sources can be found in table 1 in the appendix.

## 5. Results

We lay out our estimates of (1) in tables 6, 7, 8 and 9, varying the scope of the dependent variable. We generally find that the land price of 1846 is positively related to later economic activity in all estimated specifications, in support of the theory that collateral played a role. There is evidence that local financial development may also be related to the subsequent growth of non-agricultural employment. This direct positive effect of local financial development however tends to disappear once we allow for the joint effect of land prices and financial development. Let us first focus on table 6, where the dependent variable is employment in industry and trade. In the first set of regressions of table 6, we employ our favoured measure of local financial development, namely the number of ASLK accounts per capita in 1880. We observe that the hypothesis that  $\alpha_3 > 0$  cannot be rejected at the 1% level. Local financial development indeed only affects industrialization and commercialisation positively in regions where historical land prices tended to sufficiently high, which provides strong evidence of a de Soto effect. In the remaining two sets of regressions columns we draw attention to our alternative measures of local financial development, namely local ASLK savings per capita (columns 4-6) and local Raffeisenkassen credit per capita by 1910 (columns 7-9). Our results are robust for the first alternative measure but, as expected, not for the second measure that is faced with a much weaker coverage of localities.

In spite of the large time gap between our dependent and our main independent variables (respectively 30 and more than 60 years), one possible avenue of reverse causality remains. It is still possible that localities with early high growth perspectives had an early higher demand for financial services and this drives our results. The finding however that the direct effect of early financial development reverses after including the interaction with early land prices ( $\alpha_2 < 0$ , once the interaction is included) indicates that there is no such reverse causality in our sample. Indeed, such reverse causality would imply  $\alpha_2 > 0$  in every equation, which can clearly be rejected. In addition, the demand for investment and hence possibly for financial services is controlled by including average local house prices in 1865 and the distance to Antwerp, the main port after 1865.

We proceed by considering employment in industry and trade separately in table 7 and 8, allowing for the fact that credit by the Raffeisenkassen, our alternative measure of local financial development, may be more important for financing in some sectors than in others. In table 7, where the dependent variable is employment in trade in 1910, we cannot any longer reject  $\alpha_3 > 0$  even for the Raffeisenkassen. Credits from Raffeisenkassen seem to be related to more employment in trade establishments especially in those localities where the land price was historically high. In table 8 we consider employment in industry in 1910 as the dependent variable. Here the positive effects of local financial development are limited to the presence of the ASLK accounts and savings. The presence and credits of Raffeisenkassen are not in any way positively related to industrial employment, whether land prices are high or not. It seems that the Raffeisenkassen therefore mainly played a role in financing smaller trade establishments, but not so much in financing industry.

To gain additional confidence that our results are not driven by the sheer presence of financial development but rather by differences in the extent of local financial development, we exclude from our sample all localities where we have zero ASLK deposit accounts in 1865, reducing our sample from the 1179 (1175) original localities to only 180 (176) localities. The results are strikingly robust. The estimations in table 9 reveal that, once we restrict ourselves to localities with non-zero financial development, the direct effect of financial development tends to turn insignificant ( $\alpha_2 = 0$ ), while the interaction effect between land prices and bank development remains consistently and significantly positive ( $\alpha_3 > 0$ ). This reinforces our previous results and implies we cannot reject the de Soto hypothesis: local financial development only leads to sustainable non-agricultural employment if land prices are high and vice versa.

Throughout table 3 to 6 we included house prices in 1865 as a control for local wealth and hence demand. House prices are in a few specifications positively and significantly related to non-agricultural economic activity in 1910. There is some relatively weak evidence therefore of a multitude of channels by which property rights may positively influence economic activity. The direct and sometimes positive effect of house prices suggests that, next to the very robust de Soto effect of land rights on economic development demonstrated in this paper, property rights on houses may also resort some positive effect on employment through channels that are more demand-driven. This indicates that the smoother and more homogenous property rights introduced by the French revolution may also have stimulated investment demand at large. A deeper analysis of this possible demand channel falls beyond the scope of this paper and is deferred to further research.

Not surprisingly, early access to railways very robustly related to higher employment by firms 15 years later, again illustrating the importance of market access for economic development. Indeed, having a local railway station increases the number of non-agricultural workers with about 15 per 1000 inhabitants. This a substantial number, since the average non-agricultural employment in total employment ranges from only from about 7% to more than 20% in 1910. This substantial effect of railways in early industrial development is perfectly in line with earlier literature in this field.

The percentage of communal land is always negative and sometimes significantly so. It seems indeed that communal land ownership did not contribute to boosting industrial development and if anything may have slowed it down on the margin. This does not rule out that communal land may fulfilled other functions, for example maintaining social stability and guarding equity among the villagers during industrialisation, but these roles fall far beyond the scope of this paper and are therefore deferred to further research.



Table 6 Local per capita employment in industry and trade 1910

	Number of ASLK deposits per capita in 1880			ASLK savings per capita in 1880			Raffeißen credit per capita in 1910		
Land price of locality in 1846 (in 000)	0.0140*** (0.003)	0.0123*** (0.003)	0.0125*** (0.003)	0.0141*** (0.003)	0.0130*** (0.003)	0.0131*** (0.003)	0.0146*** (0.003)	0.0143*** (0.003)	0.0138*** (0.003)
Local financial development	0.4855*** (0.098)	-0.4402* (0.233)	-0.4716** (0.237)	0.5725*** (0.145)	-0.6326* (0.335)	-0.6534* (0.339)	-0.0937 (0.946)	-1.5322 (2.147)	-1.4984 (2.147)
Land price x financial development		<b>0.4325***</b> (0.099)	<b>0.4528***</b> (0.102)		<b>0.6115***</b> (0.153)	<b>0.6265***</b> (0.157)		0.6355 (0.851)	0.6238 (0.851)
House price			-0.1619 (0.209)			-0.0882 (0.209)			0.2356 (0.204)
Ln(distance to Antwerp)	0.0214* (0.012)	0.0203* (0.011)	0.0205* (0.011)	0.0204* (0.012)	0.0187 (0.012)	0.0188 (0.012)	0.0244** (0.012)	0.0244** (0.012)	0.0239** (0.012)
Campine	-0.0343** (0.014)	-0.0321** (0.014)	-0.0324** (0.014)	-0.0309** (0.014)	-0.0294** (0.014)	-0.0295** (0.014)	-0.0311** (0.014)	-0.0304** (0.014)	-0.0299** (0.014)
Loam	-0.0176 (0.013)	-0.0194 (0.013)	-0.0198 (0.013)	-0.0176 (0.013)	-0.0181 (0.013)	-0.0183 (0.013)	-0.0209 (0.013)	-0.0209 (0.013)	-0.0203 (0.013)
Polder	-0.0259* (0.015)	-0.0293** (0.015)	-0.0295** (0.015)	-0.0274* (0.015)	-0.0328** (0.015)	-0.0330** (0.015)	-0.0258* (0.015)	-0.0259* (0.015)	-0.0259* (0.015)
Sandy_loam	-0.0018 (0.010)	-0.0034 (0.010)	-0.0036 (0.010)	-0.0011 (0.010)	-0.0020 (0.010)	-0.0021 (0.010)	-0.0039 (0.010)	-0.0040 (0.010)	-0.0037 (0.010)
Waterway access 1896	0.0044 (0.006)	0.0037 (0.006)	0.0040 (0.006)	0.0039 (0.006)	0.0036 (0.006)	0.0038 (0.006)	0.0044 (0.006)	0.0046 (0.006)	0.0040 (0.006)
Neighbourhood railway station 1910	0.0146*** (0.005)	0.0136*** (0.005)	0.0140*** (0.005)	0.0151*** (0.005)	0.0140*** (0.005)	0.0142*** (0.005)	0.0175*** (0.005)	0.0176*** (0.005)	0.0168*** (0.005)
Railway station 1896	0.0395*** (0.005)	0.0377*** (0.005)	0.0380*** (0.005)	0.0398*** (0.005)	0.0384*** (0.005)	0.0386*** (0.005)	0.0426*** (0.005)	0.0425*** (0.005)	0.0419*** (0.005)
Share fallow 1846	0.0001 (0.000)	0.0002* (0.000)	0.0002* (0.000)	0.0002 (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)
Share hay 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share grassland 1846	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001*	-0.0001**	-0.0001**	-0.0001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share garden 1846	0.0007***	0.0005***	0.0005***	0.0007***	0.0005***	0.0006***	0.0008***	0.0008***	0.0007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share desolate or heath 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share common property 1846	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(farming acreage)	-0.0138	-0.0267	-0.0274	-0.0177	-0.0226	-0.0228	-0.0277	-0.0275	-0.0270
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.038)	(0.038)	(0.038)
HHI of local land in 1846	0.0929	0.0805	0.0849	0.0986	0.0846	0.0871	0.1098*	0.1083*	0.1006
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.065)	(0.065)	(0.065)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,179	1,179	1,179	1,175	1,175	1,175	1,174	1,174	1,174
R-squared	0.453	0.462	0.463	0.449	0.457	0.457	0.442	0.442	0.443
Adjusted R-squared	0.434	0.443	0.442	0.429	0.437	0.436	0.422	0.422	0.422

Standard errors in parentheses

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

Table 7 Local per capita employment in trade in 1910

	Number of ASLK deposits per capita in 1880			ASLK savings per capita in 1880			Raffeisen credit per capita in 1910		
Land price of locality in 1846 (in 000)	0.0026*** (0.001)	0.0022** (0.001)	0.0020** (0.001)	0.0026*** (0.001)	0.0024** (0.001)	0.0021** (0.001)	0.0028*** (0.001)	0.0025** (0.001)	0.0021** (0.001)
Local financial development	0.1703*** (0.030)	-0.0263 (0.071)	-0.0001 (0.072)	0.1462*** (0.044)	-0.1008 (0.102)	-0.0627 (0.103)	0.4302 (0.288)	-0.8090 (0.652)	-0.7770 (0.649)
Land price x financial development		<b>0.0919***</b> (0.030)	<b>0.0749**</b> (0.031)		<b>0.1253***</b> (0.047)	<b>0.0979**</b> (0.048)		<b>0.5474**</b> (0.259)	<b>0.5363**</b> (0.257)
House price			0.1353** (0.064)			0.1617** (0.063)			0.2227*** (0.062)
Ln(distance to Antwerp)	-0.0048 (0.004)	-0.0050 (0.003)	-0.0052 (0.003)	-0.0046 (0.004)	-0.0049 (0.004)	-0.0051 (0.004)	-0.0035 (0.004)	-0.0035 (0.004)	-0.0040 (0.004)
Campine	0.0001 (0.004)	0.0005 (0.004)	0.0008 (0.004)	0.0001 (0.004)	0.0004 (0.004)	0.0007 (0.004)	0.0012 (0.004)	0.0018 (0.004)	0.0022 (0.004)
Loam	0.0059 (0.004)	0.0056 (0.004)	0.0059 (0.004)	0.0061 (0.004)	0.0059 (0.004)	0.0063 (0.004)	0.0053 (0.004)	0.0052 (0.004)	0.0058 (0.004)
Polder	0.0043 (0.004)	0.0035 (0.004)	0.0037 (0.004)	0.0040 (0.005)	0.0029 (0.005)	0.0032 (0.005)	0.0046 (0.005)	0.0045 (0.005)	0.0045 (0.005)
Sandy_loam	0.0053* (0.003)	0.0050 (0.003)	0.0051* (0.003)	0.0056* (0.003)	0.0054* (0.003)	0.0055* (0.003)	0.0049 (0.003)	0.0048 (0.003)	0.0050 (0.003)
Waterway access 1896	-0.0029 (0.002)	-0.0030 (0.002)	-0.0034* (0.002)	-0.0028 (0.002)	-0.0029 (0.002)	-0.0033* (0.002)	-0.0027 (0.002)	-0.0026 (0.002)	-0.0031 (0.002)
Neighbourhood railway station 1910	0.0037** (0.001)	0.0035** (0.001)	0.0031** (0.001)	0.0040*** (0.001)	0.0037** (0.001)	0.0033** (0.001)	0.0046*** (0.002)	0.0046*** (0.002)	0.0038** (0.002)
Railway station 1896	0.0069*** (0.002)	0.0066*** (0.002)	0.0063*** (0.002)	0.0073*** (0.002)	0.0070*** (0.002)	0.0068*** (0.002)	0.0078*** (0.002)	0.0077*** (0.002)	0.0071*** (0.002)
Share fallow 1846	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)
Share hay 1846	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share grassland 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share garden 1846	0.0001**	0.0001	0.0000	0.0001**	0.0001	0.0000	0.0001***	0.0001***	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share desolate or heath 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share common property 1846	-0.0000**	-0.0000*	-0.0000	-0.0000**	-0.0000*	-0.0000*	-0.0000**	-0.0000**	-0.0000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(farming acreage)	0.0041	0.0013	0.0018	0.0029	0.0019	0.0023	-0.0011	-0.0009	-0.0004
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
HHI of local land in 1846	0.0024	-0.0002	-0.0039	0.0056	0.0027	-0.0019	0.0065	0.0052	-0.0021
	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,179	1,179	1,179	1,175	1,175	1,175	1,174	1,174	1,174
R-squared	0.231	0.237	0.240	0.216	0.221	0.226	0.210	0.213	0.222
Adjusted R-squared	0.203	0.209	0.211	0.188	0.192	0.196	0.181	0.184	0.192

Standard errors in parentheses

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

Table 8 Local per capita employment in industry in 1910

	Number of ASLK deposits per capita in 1880			ASLK savings per capita in 1880			Raffeißen credit per capita in 1910		
Land price of locality in 1846 (in 000)	0.0115*** (0.003)	0.0101*** (0.003)	0.0105*** (0.003)	0.0115*** (0.003)	0.0106*** (0.003)	0.0110*** (0.003)	0.0118*** (0.003)	0.0118*** (0.003)	0.0117*** (0.003)
Local financial development	0.3152*** (0.089)	-0.4138* (0.213)	-0.4715** (0.216)	0.4264*** (0.132)	-0.5318* (0.305)	-0.5907* (0.308)	-0.5239 (0.858)	-0.7233 (1.947)	-0.7214 (1.948)
Land price x financial development		<b>0.3406***</b> (0.090)	<b>0.3779***</b> (0.094)		<b>0.4862***</b> (0.140)	<b>0.5286***</b> (0.143)		0.0881 (0.772)	0.0874 (0.772)
House price			-0.2973 (0.191)			-0.2499 (0.190)			0.0129 (0.185)
Ln(distance to Antwerp)	0.0261** (0.011)	0.0253** (0.010)	0.0257** (0.010)	0.0250** (0.011)	0.0236** (0.011)	0.0240** (0.011)	0.0279*** (0.011)	0.0279*** (0.011)	0.0278*** (0.011)
Campine	-0.0343*** (0.012)	-0.0326*** (0.012)	-0.0332*** (0.012)	-0.0310** (0.013)	-0.0298** (0.012)	-0.0302** (0.012)	-0.0323** (0.013)	-0.0322** (0.013)	-0.0322** (0.013)
Loam	-0.0236** (0.012)	-0.0249** (0.012)	-0.0257** (0.012)	-0.0236** (0.012)	-0.0241** (0.012)	-0.0246** (0.012)	-0.0261** (0.012)	-0.0261** (0.012)	-0.0261** (0.012)
Polder	-0.0302** (0.013)	-0.0329** (0.013)	-0.0332** (0.013)	-0.0313** (0.013)	-0.0357*** (0.013)	-0.0362*** (0.013)	-0.0304** (0.014)	-0.0304** (0.014)	-0.0304** (0.014)
Sandy_loam	-0.0071 (0.009)	-0.0084 (0.009)	-0.0087 (0.009)	-0.0067 (0.009)	-0.0074 (0.009)	-0.0076 (0.009)	-0.0088 (0.009)	-0.0088 (0.009)	-0.0088 (0.009)
Waterway access 1896	0.0073 (0.006)	0.0067 (0.006)	0.0074 (0.006)	0.0068 (0.006)	0.0065 (0.006)	0.0071 (0.006)	0.0071 (0.006)	0.0071 (0.006)	0.0071 (0.006)
Neighbourhood railway station 1910	0.0109** (0.004)	0.0101** (0.004)	0.0109** (0.004)	0.0112** (0.004)	0.0102** (0.004)	0.0109** (0.004)	0.0130*** (0.004)	0.0130*** (0.004)	0.0129*** (0.005)
Railway station 1896	0.0325*** (0.005)	0.0312*** (0.005)	0.0317*** (0.005)	0.0324*** (0.005)	0.0314*** (0.005)	0.0318*** (0.005)	0.0348*** (0.005)	0.0348*** (0.005)	0.0348*** (0.005)
Share fallow 1846	0.0001 (0.000)	0.0002* (0.000)	0.0002* (0.000)	0.0001 (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)	0.0002** (0.000)
Share hay 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share grassland 1846	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share garden 1846	0.0006***	0.0004***	0.0005***	0.0006***	0.0005***	0.0005***	0.0006***	0.0006***	0.0006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share desolate or heath 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share common property 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(farming acreage)	-0.0178	-0.0280	-0.0292	-0.0206	-0.0245	-0.0250	-0.0266	-0.0266	-0.0265
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
HHI of local land in 1846	0.0905	0.0807	0.0888	0.0930	0.0819	0.0890	0.1033*	0.1031*	0.1027*
	(0.058)	(0.058)	(0.058)	(0.059)	(0.058)	(0.059)	(0.059)	(0.059)	(0.059)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,179	1,179	1,179	1,175	1,175	1,175	1,174	1,174	1,174
R-squared	0.449	0.456	0.457	0.448	0.453	0.454	0.444	0.444	0.444
Adjusted R-squared	0.429	0.436	0.437	0.428	0.433	0.434	0.423	0.423	0.422

Standard errors in parentheses

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

**Table 9 Robustness check, specifications of table 6, panel A, excluding localities with no financial development**

Dependent variable: local per capita employment in industry and trade in 1910	Number of ASLK deposits per capita in 1880			ASLK savings per capita in 1880		
Land price of locality in 1846 (in 000)	0.0252*** (0.009)	0.0189** (0.009)	0.0191** (0.009)	0.0251*** (0.009)	0.0198** (0.009)	0.0201** (0.009)
Local financial development	0.3127* (0.168)	-0.5136 (0.420)	-0.5384 (0.427)	0.3857 (0.240)	-1.0976* (0.631)	-1.1464* (0.644)
Land price x financial development		<b>0.3541**</b> (0.165)	<b>0.3682**</b> (0.171)		<b>0.6686**</b> (0.264)	<b>0.6972**</b> (0.273)
House price			-0.1267 (0.363)			-0.1565 (0.369)
Ln(distance to Antwerp)	0.0540* (0.030)	0.0492 (0.030)	0.0496 (0.030)	0.0516 (0.032)	0.0430 (0.031)	0.0437 (0.032)
Campine	-0.0290 (0.048)	-0.0064 (0.049)	-0.0069 (0.049)	-0.0174 (0.053)	0.0048 (0.053)	0.0032 (0.053)
Loam	0.0073 (0.040)	-0.0018 (0.040)	-0.0019 (0.040)	0.0096 (0.042)	0.0050 (0.041)	0.0047 (0.041)
Polder	-0.0557 (0.052)	-0.0610 (0.052)	-0.0607 (0.052)	-0.0614 (0.053)	-0.0902* (0.053)	-0.0913* (0.053)
Sandy_loam	0.0204 (0.028)	0.0141 (0.028)	0.0145 (0.028)	0.0238 (0.029)	0.0207 (0.029)	0.0212 (0.029)
Waterway access 1896	-0.0051 (0.020)	-0.0071 (0.020)	-0.0063 (0.020)	-0.0057 (0.021)	-0.0080 (0.020)	-0.0069 (0.021)
Neighbourhood railway station 1910	0.0337* (0.018)	0.0346** (0.017)	0.0362** (0.018)	0.0323* (0.018)	0.0304* (0.018)	0.0324* (0.018)
Railway station 1896	0.0767*** (0.022)	0.0738*** (0.021)	0.0744*** (0.022)	0.0724*** (0.023)	0.0676*** (0.022)	0.0685*** (0.023)
Share fallow 1846	0.0001 (0.000)	0.0000 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Share hay 1846	0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share grassland 1846	-0.0001	-0.0001	-0.0001	-0.0000	-0.0001	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share garden 1846	0.0002	0.0001	0.0001	0.0003	0.0001	0.0002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share desolate or heath 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share common property 1846	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(farming acreage)	0.1022	0.0761	0.0886	0.0684	0.1829	0.2051
	(0.210)	(0.208)	(0.212)	(0.217)	(0.218)	(0.225)
HHI of local land in 1846	0.3772*	0.4216*	0.4187*	0.4122*	0.4296*	0.4247*
	(0.217)	(0.216)	(0.217)	(0.224)	(0.220)	(0.221)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	180	180	180	176	176	176
R-squared	0.472	0.489	0.490	0.465	0.490	0.490
Adjusted R-squared	0.315	0.333	0.328	0.301	0.329	0.324

Standard errors in parentheses

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



## 6. Long run spatial dependence

It is obvious that over such long time spans the economic activity in one locality may be influenced by the economic activity in its neighbours, generating spatial dependence in the simple regressions. The Moran I test (available on request) indeed revealed spatial dependence for our main regressions. Therefore, we proceed by estimating a spatially lagged equation where we allow the spatial dependence of economic activity of one locality on the activities of its neighbours:

$$Y_{i,t} = \alpha_0 + \rho WY_{i,t} + \alpha_1 P_{i,t-2}^{land} + \alpha_2 Bank_{i,t-1} + \alpha_3 P_{i,t-2}^{land} * Bank_{i,t-1} + \alpha_4 Z_{i,t-2} + \varepsilon_i \quad (2)$$

with  $W$  the contiguity matrix of spatial weights based on the Euclidean distance calculated from the longitude and latitude of the locality's centre. Specifically, the longitude and latitude coordinates of either the main church or town hall of each locality were used. Distances longer than 20 km. are disregarded in the calculation of  $W$ . A positive  $\rho$  indicates that localities with neighbours that are economically active can be expected to be also more economically active and vice versa.

We lay out our results in table 10, where we repeat our main regressions of table 6, but now allowing for spatial dependence. Our first observation is that we cannot reject  $\rho > 0$ . The employment in trade and industry per capita indeed depends on that in the neighbours. Specifically, a locality will add about one job per capita per two added jobs per capita in the spatially weighted neighbours. There is a multitude of possible channels to interpret this pattern of spatial dependence, like economic agglomeration effects, technology spillovers, trade spillovers, labour market spillovers, financial spillovers and many others. The analysis of these channels falls however far beyond the scope of this paper.

Our results from section 6 are very robust to controlling for spatial dependence. Early land prices still exert a positive influence on later development, but they mainly do so in combination with early local financial development. Indeed, the direct effect of early financial development disappears altogether. This clearly indicates that financial development is only related to later growth in combination with the presence of early valuable collateral, which is clearly in line with our de Soto hypothesis. The results also reconfirm the absence of reverse causality running from early good economic perspectives to higher demand for financial services and subsequent economic development. Indeed, if this were the case the main effect of local financial development on later employment in trade and industry would always remain significant, which is clearly rejected by the results ( $\alpha_2 = 0$ ). Railway stations are still strongly positively related to growth and communal property is still not a positive contributor to the creation of non-agricultural employment.

Table 10: Main results of table 6, controlling for spatial dependence

	number of ASLK deposits per capita in 1880	ASLK savings per capita in 1880
land price of locality in 1846 (in 000)	0.01*** (0.003)	0.01*** (0.003)
financial development	-0.16 (0.293)	-0.30 (0.312)
land price x financial development	<b>0.28**</b> (0.124)	<b>0.36**</b> (0.150)
average cadastral value of houses	0.05 (0.218)	-0.02 (0.192)
campine	-0.06*** (0.010)	-0.06*** (0.009)
loam	-0.03*** (0.009)	-0.02*** (0.008)
polder	-0.01 (0.015)	-0.03** (0.013)
sandy_loam	0.01 (0.007)	0.01 (0.007)
Waterway access 1896	0.01* (0.007)	0.01** (0.006)
Neighbourhood railway station 1910	0.01* (0.005)	0.00 (0.005)
Railway station 1896	0.04*** (0.006)	0.03*** (0.006)
fallow	0.13 (0.171)	0.20 (0.159)
hay	0.00 (0.045)	0.01 (0.042)
grassland	-0.11*** (0.036)	-0.10*** (0.031)
garden	0.79*** (0.210)	0.70*** (0.189)
desolate_heath	0.00 (0.025)	0.02 (0.023)
common	-0.08*** (0.026)	-0.07*** (0.023)
log(farming acreage)	0.02*** (0.004)	0.02*** (0.004)
HHI46	0.13* (0.077)	0.13* (0.070)
$\rho$	0,510 * 0,265	0,652*** 0,233
P(Wald test $\rho = 0$ )	0,054	0,005
P (Langrange multiplier test $\rho = 0$ )	0,035	0,003
Squared correlations	0,296	0,266
Observations	1,201	1,201
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

## 7. Conclusions

Between the French Revolution and WOI, Western Europe underwent profound socio-economic changes. While the speed and impact could differ, most countries were confronted with a declining importance of the agricultural sector, to the benefit of the quickly growing industrial and manufacturing sectors within the span of a century. Within the literature, several explanatory models have been developed to explain the inter-regional variation in the adoption rates of industrialization. Using the de Soto effect, we developed a model to explain local variation in economic development. We hypothesized that given the uniform property rights and the institutional framework provided by the Land Registry Office and Mortgage Registry Office, the price differential of collateral (land) across Flanders in combination with the unequal distribution of financial services would partially explain the unequal development of manufacturing and industrial enterprises in Flanders.

Using a combination of data collected by the HIS project and our own primary data collection from archives, we construct a dataset covering more than 1200 Flemish localities over a period of 64 years, from 1846 till 1910. Given uniform property rights, exogenous land prices and the near random allocation of A.S.L.K. branches (who became actively involved in extending mortgage-based credit as of the final quarter of the nineteenth century), we find strong support for our initial hypothesis. We show that there is substantially more industrial development in 1910 in those Flemish localities that were blessed both by higher land prices in 1846 and higher approximately random local financial development in 1880. Whereas in 1846 the level of industrial activity in these localities is low and comparable, the industrial take-up had developed unevenly by 1910. The observed local variation in industrial employment in 1910 can therefore serve as a good measure of the growth of the secondary sector between 1846 and 1910. The time gap between the dependent variable and the main independent variables already largely rules out reverse causality. However, it is still possible that localities with early high growth perspectives had an early higher demand for financial services. This demand effect is controlled for by including local house prices (measured in 1865) in the analysis. The observation that the direct effect of early financial development is no longer significant after including the interaction with early rural land prices, also indicates that there is no such reverse causality in our sample. We feel confident therefore in interpreting our finding as evidence of the de Soto hypothesis that, given uniform and enforceable property rights, higher land values will, through higher access to credit, lead increased economic activity in capital intensive sectors, in the case of nineteenth century Belgium manufacturing and industry. These findings improve our understanding of the locally differentiated scope, impact and speed of the industrialization in Flanders.

These insights from Flemish history are also interesting for the many countries today that maintain some form of hybrid or communal land right that falls short of full property rights. Indeed, while such partial or shared land rights may play an important role in maintaining equity among otherwise disenfranchised farmers and guard stability and local tradition, they also have limited collateral value for banks because freely selling the land is barred. Our results suggest that in those circumstances local financial development and land rights may fall short of realizing their full economic development potential.

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## 9. Data appendix:

Variable name	Variable	Operationalization	Source <sup>11</sup>
Employment ( $Y_{E1}$ )	Employment in trade and manufacturing enterprises per capita in 1910	Continuous variable divided by the locality's population in 1910	(1)
Employment ( $Y_{E2}$ )	Employment in trade enterprises per capita in 1910	Continuous variable divided by the locality's population in 1910	(1)
Employment ( $Y_{E3}$ )	Employment in manufacturing enterprises per capita in 1910	Continuous variable divided by the locality's population in 1910	(1)
Land Price	Average price for one hectare of freehold arable land in 1846	Original values divided by 1000, continuous variable per locality	(1)
Financial development measure 1	Number of ASLK accounts in the locality per capita in 1880	Continuous variable divided by the locality's population in 1880	(2)
Financial development measure 2	Amount of ASLK savings per capita of the locality in 1880	Continuous variable divided by the locality's population *1000 in 1880	(2)
Financial development measure 3	Number of Raffeisenkassen members in the locality per capita in 1910	Continuous variable divided by the locality's population in 1910	(2)
Financial development measure 4	Amount of Raffeisenkassen savings per capita of the locality in 1910	Continuous variable divided by the locality's population *1000 in 1910	(2)
Financial development measure 5	Amount of Raffeisenkassen credits per capita of the locality in 1910	Continuous variable divided by the locality's population *1000 in 1910	(2)
Land Price	Average market price for one hectare of freehold arable land in 1846	Original values divided by 1000, continuous variable per locality	(1)
House price	Average cadastral value of houses in the locality in 1865 (first data point)	Continuous variable, from individual cadastral values of houses in locality in 1865	(1)
Campine	Localities in the campine regions, with typical poor soil quality	Dummy =1 if locality in campine region	(1)
Loam	Localities that fall in fertile loam soil quality region	Dummy =1 if locality in loam region	(1)
Polder	Localities that fall in the very fertile soil quality polder regions	Dummy =1 if locality in polder region	(1)
Sandy_loam	Localities that fall in the moderately fertile sandy loam soil quality region	Dummy =1 if locality in sandy_loam region	(1)
Waterway access 1896	Locality access to a navigable waterway in 1896 (first data point)	Dummy =1 if locality has waterway access in 1896	(1)
Neighbourhood railway station 1910	Locality access to neighbourhood railway system through station in 1910 (first data point)	Dummy =1 if locality has neighbourhood railway station in 1910	(1)

<sup>11</sup> (1) Source: Historical Database of Local Statistics – LOKSTAT, Ghent University, History Department supervised by Eric Vanhaute and Sven Vrielinck

(2) Source: Brussel, BNP Paribas Fortis Historical Centre, Archives de la Caisse Generale D'Epargne et de Retraite (CGER) 1850-2000, nos. 8-12, Rapports Annuels CGER 1965-1911.

Railway station 1896	Locality access to railway system through station in 1896 (first data point)	Dummy =1 if locality has neighbourhood railway station in 1896	(1)
Fallow	Acreage of fallow land in 1846 as share of farming acreage	Continuous share, per locality	(1)
Hay	Acreage of hay land in 1846 as share of farming acreage	Continuous share, per locality	(1)
Grassland	Acreage of grassland in 1846 as share of farming acreage	Continuous share, per locality	(1)
Garden	Acreage of gardens in 1846 as share of farming acreage	Continuous share, per locality	(1)
desolate_heath	Acreage of desolate and heath land in 1846 as share of farming acreage	Continuous share, per locality	(1)
common	Acreage of communal land in 1846 as share of total locality surface	Continuous share, per locality	(1)
Log (farming Acreage)	Log of the number of hectares used for farming in the locality in 1846	Continuous variable, per locality	Own calculations using: (1)
HHI46	Herfindahl-Hirschman Index of land ownership concentration of the locality in 1846, from individual cadaster data	$HHI = s_1^2 + s_2^2 + s_3^2 + \dots + s_n^2$ (with $s_i$ = share of land plot $i$ in total acreage).	Own calculations using: (1)
Xcoord	Longitude	Continuous variable, per locality	(1)
Ycoord	Latitude	Continuous variable, per locality	(1)