Legal Training, Property Rights and Agricultural Production: The Effect of Land Settlements on Agricultural Land Use*

Róbert Venyige†

November 25, 2021

Latest version available here.

Abstract

This paper tries to answer how the disappearance of feudal property right institutions and the emancipation of serfs affected agricultural land use and income. Using a dataset of the Hungarian land settlements from the beginning of the 19th century until 1865, I examine how land use and income was affected by the creation of modern property rights. I use the fact that contemporaries and historians argue that the local knowledge of officials and lawyers were crucial in the speed of land settlement negotiations. Using the variation in the access to lawyers at this time proxying by the distance to the village's distance to the closest law school in the first part of the 19th century, I find that the process of land settlement that separated formal seignoral and serf lands and made commons private properties had contributed to the decrease of grazing lands. At the same time, the increase of the share of vineyards points in the direction of increased investment in land and the shift to higher value added land use. I also find that while the land income did not increase, the income per arable land did.

*Preliminary draft, please do not cite without permission.

†University of Michigan. Department of Economics. venyiger@umich.edu

1 Introduction

There is a long scholarly debate on how the transition from common to private ownership affects economic outcomes. On one hand, the concept of the tragedy of the commons warns about the possible overexertion of land without clear property rights. On the other hand, Ostrom (1990) showed that if the commons and the open fields are governed by informal institutions and norms, then private property rights may not be necessary to achieve efficient use.

Historical research regarding the transformation of the commons to privately owned land is also primary focused on England and the English enclosures. In this case, Allen (1982) shows that in some parts of England there was no increase in yields after the enclosures, but more recent research finds different results (Heldring, Robinson and Vollmer, 2020)

While there is more research on the productivity gains stemming from converting commons to private property, we have less knowledge on how it affected land use. Furthermore, the most researched historical phenomenon is the English enclosures, while other regions typically get less attention. In this project, I examine the effect of the land settlements process in the 19th-century Hungary. These property settlements, similarly to the English enclosures ended the common ownership of pastures, but they also separated the previously integrated landlord and serf economies. Moreover, the feudal institutions were still more prominent in the Kingdom of Hungary in the first half of the 19th century, hence the process of land settlement also meant the abolition of serf-landlord relationships.

In this paper, I combine village level data on land settlements conducted between 1805 and 1865 with information on land use and agricultural income covering the Kingdom of Hungary in 1865 to estimate the economic effects of the abolition of the feudal property rights. The OLS estimates show that villages where land settlements happened by 1865 had a higher share of arable lands and lower share of forests, while we can also find a higher share of vineyards as well. These findings are in line with the argument that common property rights inhibited the more extensive use of land and the investment in higher value added production.

However, there is a possibility that villages with already higher arable land share were more prone to conduct land settlement. Moreover, the lower share of forest potentially could also be a sign of smaller reliance on commons. It is also possible that land settlement and agricultural land use is affected by the same, omitted variable. The suitability of land for cereal production or the ruggedness of the terrain could potentially affect both land use and the probability of land settlements. Because of this, I include control variables in the estimation like the prevalence of the fertile black soil and the elevation of the village.

To handle the issue of other sources of potential endogeneity or omitted variable bias, I conduct

an instrumental variable analysis as well. I use the fact that lawyers, judges and local officials participated in the land adjudication process, and Für (1965) argue that the local knowledge of lawyers or the local officials and their familiarity with the local conditions contributed to a quick and peaceful land settlement.

Hence, I argue that villages with better access to lawyers with local knowledge went through land settlement process faster. I proxy the access to lawyers with local knowledge by the distance of a village to law schools that existed in the first half of the 19th century. Using the student database of one specific law school from this time, I show that indeed, there was a positive relationship between the geographic proximity to this law school and the probability and number of students attending that law school. In this sense, this instrument is similar to that of (Card, 1995), who used the distance to school as an instrument to test the effect of educational attainment on income. In historical settings, Cantoni and Yuchtman (2014) showed that the distance to medieval universities contributed to the creation of new markets and they argue that the reason for this was the legal training provided by the universities that were important in medieval trade. Furthermore, this database also helps me test directly that if a student attended the law school there is a higher probability if land settlement in the village. When I focus on villages where nobody attended this law school but compare them based on whether someone attended the law school from their neighboring villages, I still find a positive effect of this. Furthermore, I can also test the effect of someone attending theology at the same institution. In this case, I find no effect.

Because of the instrument, the secondary purpose of this paper is to shed light on the role of legal capacity played in creating secure property rights and how it contributed to the end of the feudal system.

Using this instrumental variable approach, I find that the land settlement actually decreased the share of arable lands, while the effect on forests and vineyards remains the same. This results point into the direction that villages with large arable land might have been more prone to land settlements. Looking at agricultural income, I find that income per total agricultural land was not affected while income per arable land increased. Following up on the results of Heldring, Robinson and Vollmer (2020) on the effect of enclosures on inequality, I find that the share of small landowners did not increase as a result of land settlements. I find that it was primarily determined by the number of serfs before the abolition of serfdom.

I also conduct several checks to test the robustness of my results and to examine the possible mechanism. I show that the effect of law schools works not only through the availability of lawyers in general, but also through a student from the village attended these schools. I also find that the effect of access to lawyers with local knowledge is not restricted to their role in the access to the credit

markets. This is because I find that land use changes are not related to access to credit institutions in the observed time period. Moreover, I also show that the proximity to law schools is not simply a proxy to the access to urban markets, because when I include the distance to the largest urban markets, my results still hold.

In the next section discusses the related literature. In section 3, I discuss the historical and institutional of background of the feudal land system in Hungary and the land settlement process. In Section 4, I go over the datasets collected and used in this paper. In Section 5, I introduce the research design and the intuition behind the instrument. Next section presents the main OLS results and the instrumental variable results. Section 7 discusses the robustness checks while the last section concludes.

2 Related Literature

My research is related to the literature on the English enclosures that focuses on the effects of converting commons to private owned land. While traditionally historians argued that the English enclosures led to an increase in productivity and investment, Clark (1998) pointed in the direction that the effect of enclosures were modest. Similarly, Allen (1982) showed that in some parts of England there was no increase in yields after the enclosures. From a theoretical point of view, this is supported by Ostrom (1990), who showed that if the commons and the open fields are governed by informal institutions and norms, then private property rights may not be necessary to achieve efficient use.

However, more recently, Heldring, Robinson and Vollmer (2020) found that the enclosures did affect the agricultural activity in England. Villages that were enclosed subsequently had a lower fraction of agricultural but higher fraction of industrial workers. Also, these villages had higher agricultural yield and a higher probability of having smallholders. In theory, more secure property rights decrease the effort the owners spend on protecting their lands and it frees up resources for production (Besley and Ghatak, 2010). Moreover, Besley (1995) and Goldstein and Udry (2008) show that an improvement in property right security can lead to more investment in land and can change agricultural practices regarding land use.

There is also a theoretical debate whether property rights are determined by the long history of legal institutions or differences in natural resources and climate affected institutions that eventually shaped property rights (Levine, 2005). The legal system (courts, procedures and institutions) has the ability to enforce property rights, but they may have limited ability or willingness to enforce them. Besley and Ghatak (2010) also argue that the enforcement of property rights are the function of investment in state and legal capacity. While there is more research on the role of common law

and Roman law heritage of a country (Levine, 2005), we know less on the role of sub-national institutions. Similarly, while the legal system was the same everywhere in the Kingdom of Hungary, there was a variation in the access of lawyers and government officials who had the training and the local knowledge to facilitate the process of land settlement. In this sense, may paper is also related to the role of legal capacity in the protection of property rights and economic development. For example, Cantoni and Yuchtman (2014) find that the creation of new universities in Medieval Germany contributed to the creation of new markets. Related to this, there is an emerging literature on the role of universities in the development of state capacity. Hollenbach and Pierskalla (2020) argue that the existence of universities were associated with better state capacity both in administrative dimensions and as legal statecraft. The main benefit of universities were access to trained legal experts. Hence, this research is also related to the literature explaining the variation in property rights, where my paper points to the direction of access to legal training and universities. In this case, I show that for the proper functioning of the legal processes it was important to invest in education. The creation of higher educational institutions by the ruler and churches contributed to the number of lawyers that were crucial in the legal process. Moreover,I show that the access to legal training contributed to the dismantling of the feudal economic system.

My research is also related to the literature on the economic effect of abolition of serfdom. The effect of the emancipation of the serfs is less studied, but Markevich and Zhuravskaya (2018) find that in the case of the emancipation of the Russian serfs there was an increase in yields and a change in crop choice. The process of the abolition of serfdom, however, were different in the two countries. In Russia, emancipation did not change common ownership of the village, while in Hungary, the serfs became private owner of their land. Hence, the Hungarian case provides a setting where I can examine the effect of more complete transformation of the feudal economic system to a modern one.

3 Background

4 Feudal Land system in Hungary

In the feudal land system of Hungary, the demesne and serf lands were scattered around each other in the village, that made it difficult to use efficient technologies and protect the output. In the crop rotation system used in manorial economies, part of the land - the fallow - was left resting regularly to regain its fertility. Fallows were also often used to graze animals. A more efficient way of using fallows could have been planting legumes or fodder crops that could have helped the soil to regain the nutrients. Abandoning fallows, however, was difficult in the feudal land system, since the

grazing animals of peasants could destroy the crops on the landlord's land before the harvest. Hence, the open-field system meant that the agricultural production had to be synchronized between the landlord and the serfs. The partition of the landlord and peasants land hence could lead to a change in the land use that was previously forced to the sides because of the open-field system.

Hence, change in land use provides information on both the investment undertaken on a given land and also on the perception on risk of appropriation. First, the crops have a higher probability to be damaged on an unenclosed land. Hence the enclosures should increase the land devoted to agricultural activity more sensitive to trespassing, as arable farming. Furthermore, land use changes have large costs and they provide information on investment from the owner. Land use change is a good indicator of investment in agricultural land. Clearing the forest to provide grazing land for animals, plowing the pastures to transform it to arable land or planting grapes for vineyard are all costly activities.

4.1 Land Settlements

The process of land settlements included the surveying of the village and determining the exact location and size of the demesne and the urbarial lands before the partitioning. The next step then involved the creation of larger, continuous blocks of the landlord's property and dividing of the common pastures and forests. An example of the outcome of a land settlement is illustrated in Figure 3.

The first land settlements happened at the beginning of the 19th century but the process sped up after the emancipation of serfs in 1848. The most important question related to the land settlements were the actual size of urbarial land and the divisions of common pastures. Former serfs, cultivating urbarial lands became the owner of their plot, with the state compensating the landlords for their loss. Hence, the proof of the status of their land was essential for the peasants. Furthermore, common pastures and forests were divided between the landlord and the former serfs based on the amount of urbarial land. (Für, 1965). At the same time, many of serfs cultivated land with similar terms as those owning urbarial plots. These tenancy relations also often stretched over several decades and generations. If the cultivated land was, however, part of the landlords' demesne, these tenancy contracts were considered private in nature. Even after the emancipation, the serfs did not gain property rights of these plots. The peasants had to compensate the landlord for these lands if they wanted to keep them, but mostly it was the landlord's discretion to accept the compensation.

While serfs were emancipated in 1848, this did not mean automatically that peasants' economies became separate from the manor. In order to speed up the process of land and to avoid long legal battles between the landlords and the serfs, the emperor issued a decree (urbéri pátens) in 1853 to

give guidance on how to define the size of the urbarial land and how to separate the common forests and pastures. The decree used the 1767-1773 survey of serf land (the Urbarium) as the basis for these decisions. At the lowest level, the county authorities were responsible to facilitate the process. If the landlords and the former peasants could not agree and the local authorities were not successful in the mediation, the case moved to regional authorities and then to the central authority. In order to ease the burden on the counties, in 1856, the state also created a system of special courts with the primary role to handle the land settlements. The court at the first level (*úrbéri törvényszék* or in German *Urbarial Gericht*) usually served a county with an appointed judge as a head. The second level was the system of regional courts (úrbéri főtörvényszék *Urbarial Obergericht*), while the highest court was in Vienna.

The land settlement put administrative burdens on both sides. Legal documents that could prove the urbarial or non-urbarial status of a land must have been collected. Engineers had to be hired to survey the land of the villages. Lawyers represented both the landlord and the peasants during the process. Since the land settlement were mostly initiated by the landlords, they bore a large part of the administrative burden (Simonffy, 1960). Moreover, to convince the serfs to accept the offer of settlements, the landlords often offered better quality land to the peasants (**?**). The land settlement sometimes happened in a few years but if the sides could not reach an agreement, it could last for decades. This happened if the peasants argued that the size of the urbarial land is larger than what was found by the surveyors of the landlord. The serfs often argued that they paid more tax to the state than the size of the offered land would suggest. Other times, the sides couldn't agree on the partition of the common pastures or forests. In the end, the lengthy legal process meant that property rights on the lands could not be established and it often halted any attempt to invest in the land.

4.2 Law education in Hungary

In the early 19th century, there were several institutions where student could study law. The most important one was the University of Pest that was the only university in the Kingdom of Hungary at that time. Five royal academies of law were created in the 18th century and also several religious educational institutions of the Catholic , Lutheran or Calvinist church provided law education (Ámán, 2019). Figure 1 shows the higher educational institutions that provided courses in law in 1848.

The requirement of exam to become a lawyer was introduced in 1769 in Hungary by Empress Maria Theresa, while the Ratio Educationis (1777), an educational reform, created a comprehensive regulation of education in the Kingdom of Hungary. One of the main goals of the state at this time was to regulate how one could become a lawyer. They required 2 years of general, liberal art education and an additional 2 years of law education. Only the university and the royal academies were allowed

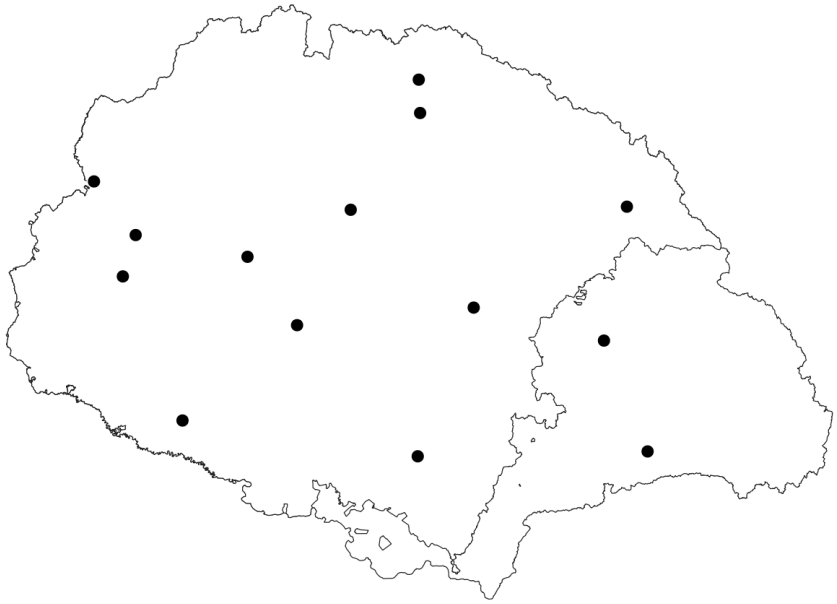

Figure 1: Higher education institutions providing education in law in the first half of the 19th century in the Kingdom of Hungary and Transylvania

to hold exam to become an attorney. After 4 years of education, legal practice at one of the main courts of the country was require to make a person eligible to practice law as an attorney (Szabó, 2001). From 1830s it became also more common that the heads of the district level administrations (főszolgabíró) had law degree.

The government invested heavily in the law academies because it needed trained experts in the expanding state administration. For the same reason, the ruler tried to regulate the training of lawyers and made sure that their education is focused on the need of the state administration (Juhász, 2016).

5 Data

5.1 Land Settlements

In 1864, the Statistical Department of the Hungarian Academy of Science requested information from the government on the process of land settlements. This information was collected and subsequently published by **?** in the new annual Statistical Review of the Academy. The digitization of this data consists the main outcome variable I examine in this paper. I observe the year when the land settlement was finished in a given village up to 1865. In most of the cases, the data give the information whether the settlement happened by "peaceful agreement" between the landlord and the peasants or as a result of a court trial.

Table 1: Higher education institutions providing education in law in the first half of the 19th century in the Kingdom of Hungary and Transylvania

royal law academies in 1830	law academies in 1830	law academies in 1848	law schools in 1848
Pest	Pest	Pest	Pest
Győr	Győr	Győr	Győr
Kassa	Kassa	Kassa	Kassa
Nagyvárad	Nagyvárad	Nagyvárad	Nagyvárad
Pozsony	Pozsony	Pozsony	Pozsony
Kolozsvár	Kolozsvár	Kolozsvár	Kolozsvár
	Eger	Eger	Eger
	Eperjes	Eperjes	Eperjes
	Nagyszeben	Nagyszeben	Nagyszeben
		Pécs	Pécs
		Kecskemét	Kecskemét
		Pápa	Pápa
		Máramarossziget	Máramarossziget
		Temesvár	Temesvár
			Sárospatak
			Debrecen
			Marosvásárhely

The earliest agreement in the datasets is from 1805, while the latest agreements are from 1864. Several cases were in progress in this year. The process of land settlement has been started or finished in 3000 villages by this year.

The map of Figure 4 shows the area of townships (villages and small towns) that are in my sample. The missing townships are non-feudal villages (like housing projects around a mining site), or royal villages and other privileged areas like the autonomous territory of the Jászság and the Kunság.

5.2 Control Variables

Queen Maria Theresa issued the regulation of the landlord-serf relationship, the so-called *Urbarium*. This maximized the feudal duties (money, in-kind payment and labor service) that the landlords could request from their serfs. Since both the feudal duties and the state tax paid by the serfs were based on urbarial serf plots, the regulation included a survey (between 1767 and 1774) of the number of serfs and the number and size of urbarial serf land in each village. The survey included the number of villeins (serfs with land), the number of landless serfs with a house (inquilinus), and landless serfs without even a house (subinquilinus). The number of serf plots and area of these plots are also recorded in every village that was included in the survey. This data on village-level was published in **?**. The number of villages in this survey is around 9000. Several municipalities might have not been included in this survey. Royal cities and other municipalities with privileges were excluded. Other villages did not exist at this time and had been settled by peasants after the survey. Other villages had different, non-feudal relationship with their landlord. To test the effect of land settlements on

land use-change, I use the 1865 data on land use (The territory of Hungary according to land use and income, 1865) digitized by the Gistory project of the Hungarian Academy of Science [1].

I have used the data from Ámán (2019) to collect information on law schools operating in the Kingdom of Hungary at this time. regarding the student attending law school in Győr, I use the database published in Juhász (2017).

I have used data on population of the 10 largest cities based on the census of 1850. List of municipalities with population over 2,000 has been published in Dányi (1993) and Dávid (1994). Information on banks that existed in 1850 is from the survey of banks in 1909.

5.3 The Role of Lawyers in the land settlement process - The Intuition Behind the Instrument

Cantoni and Yuchtman (2014) show that medieval universities played an important role in expanding economic activity. By providing legal training, universities reduced uncertainty related to trade in the Middle Ages and contributed to the establishment of new markets in areas closer to them. Historians agree, that trained lawyers with local knowledge had a crucial role both in supporting the interests of the serfs and contributing to the peaceful agreement between the peasants and the landlords (Für, 1965) (Szabad, 1957). The role of the local authorities in facilitating the agreements are also emphasized. Zlinszky also argues that land settlement trials consisted a large part of the lawyers' job at this time.

I use the 1860 list of active lawyers that provide information on the village or town they are based in. This provide information on the available pool of lawyers with local knowledge in the proximity of each village. People who wanted to pursue law degree had only one university but several, so-called academies of law (jogakadémia) that they could attend. Historical research (Juhász, 2016) shows that students at these schools tended to be from the region of the academy. To instrument the location of the active lawyers, I can use the distance of a village to the nearest legal academy. This is similar to Card (1995) argued that geographic proximity to school affects ones educational attainment. Cantoni and Yuchtman (2014) also use the distance to medieval German universities as a proxy for availability of lawyers. Figure show that location of law schools (black dots) operating at 1848 and the distance of each municipalities to the closest law schools. After 1850, the new requirement changed so that if someone wanted to become a lawy er he had to attend the University for further studies. Hence, the role of other law schools decreased for a while.

I justify the use of this instrument by using the collection of students who attended the law academy of Győr between 1802 and 1850 using the data from Juhász (2017). Figure shows the

[1] https://www.gistory.hu/g/hu/index

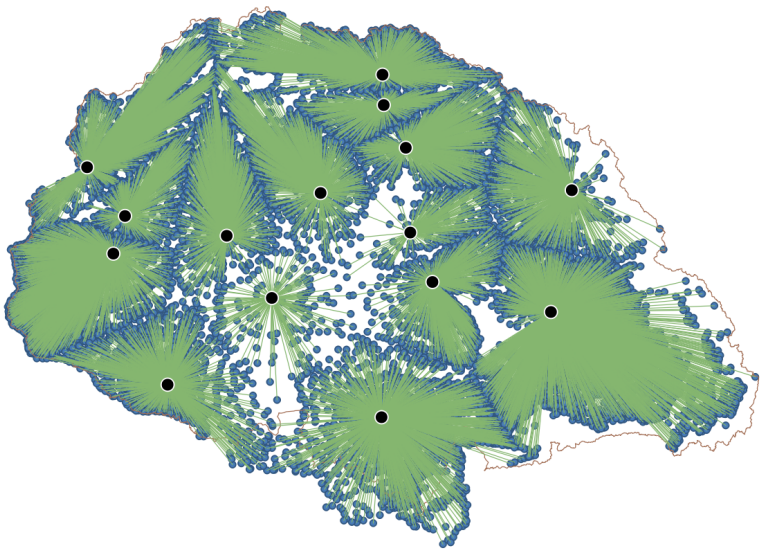

Figure 2: Distance of villages from the nearest law school in operation in 1830 from Hungarian municipalities

distribution of the student who studied law at the academy of Győr in absolute term, while Figure shows in in per capita term using 1869 population data. Table shows that the probability of attending the academy is decreasing by the distance to it.

Exclusion restriction would be violated if a village access to law school would affect land use and land income in other way than through land settlement. I argue that land settlement was by way the most important legal case. The interaction of the peasants with the legal institutions was sporadic, while the case of the land settlement involved the whole village. I conduct several robustness checks in section.

6 Estimating Equations

First, I estimate a simple OLS model where the right hand side variable is the dummy variable that takes the value 1 if the the land settlement happened by 1865 and 0 otherwise.

$$Y_i = \alpha_0 + \alpha_2 Land\ settlement_i + X_i' + u_i$$

The right hand side variable is the share of arable land, pastures, forest and vineyards in in 1865. I also estimate the result of land settlement on land income and the share of small landholders, to compare my results with that of (Heldring, Robinson and Vollmer, 2020).

A possible problem with this model is the existence of potential omitted variables. Land quality, for example, can potentially affect the incentives to go through land settlement and it can also determine

land use and land income. I include several additional variables in X_i', the share of chernozem soil, the log elevation of the village, the area of the village. I have data on the number of serfs in 1770 and the share of landless serfs at that time. In my other paper I looked at the effect on the market access to land settlement, hence In also include the log of the village's distance to Vienna.

The results of the OLS estimation related to the land use are in Table 3. We can see that in villages where the land settlement happened there is a higher share of arable lands and vineyards, while lower share of forests. The share of pastures are not significantly different from villages without land settlements. If we examine the other outcome variables (Table 4), we find that the income per acre is not significantly different, while the income per arable land is lower in villages with land settlements. At the same time the share of small landowners are also smaller in villages where land settlement happened.

If we look at the control variables, we find that villages farther away from Vienna had a lower share of arable lands while higher share of pastures. The positive relationship between the serf population and the importance of arable lands and pastures and the lower share of forests also makes sense. We would also expect that the elevation of the village would be positively related to the forest cover and negatively related to the arable land cover. On the other hand, we would expect that the prevalence of black soil would be a good indicator of the share of arable land in a village.

The positive relationship between the share of landless serfs and vineyards can be explained by the fact that in wine-producing regions the peasants often work only in their vineyards and did not have arable land at all.

In case of the income-related dependent variables, we find that villages farther away from Vienna had a lower income and higher share of small landowners. Villages with larger serf population had higher income and higher share of small landowners in 1865. This latter makes sense, since usually serfs became small landowners, but landless serf did not get land as a result of the emancipation, and that is why we see that the share of landless serfs did not affect the share of small landowners. The roles of elevation and black soil are similar to what one would expect: villages at higher altitude usually had low income, while areas with good quality soil had higher income.

7 Instrumental Variable Results

First stage:

$$Land\ settlement_i = \alpha_0 + \alpha_2 distance\ to\ law\ school_i + X_i' + u_i$$

The first stage results (Table 5) show that the status of land settlement is negatively correlated with the distance to lawschools even if additional explanatory variables and regional controls are

included. That is the probability of land settlement happening in a village was smaller if the village was farther away from a law school operating at this time.

Second stage:

$$Y_i = \beta_0 + \beta_1 Land\ Settlement_i + X_i' + u_i$$

Where the second stage outcome variables (Y_i) are the share of arable lands (sh_arable_1865), the share of pastures ($sh\_pasture\_1865$) and the income per acre in Hungarian forint (inc_acre).

I find that while the OLS results showed that in villages where land settlement happened the share of arable land increased, while the share of forests decreased. This is not true for the instrumental variable estimates (Table 6 and 7): while the land settlement decreased the share of arable lands, the share of forests increased. The magnitude of the IV estimates are also larger than that of the OLS estimates. On the other hand, the share of vineyards are positively correlated with land settlements in both the OLS and the IV settings, but the magnitude are again higher in case of the latter. The control variables had similar effects in both the OLS and the IV estimations.

One possible explanation is that some omitted variable is positively correlated with both land settlement and share of arable lands. It is possible that, for example, the access to markets positively correlated with land settlements as I showed in the previous chapter. The share of arable lands could be also positively correlated with the share of arable land, for example because of the higher transport costs of cereals compared to live animals. The estimated equation however already includes the distance to Vienna.

Compared to the OLS estimates, however, the effect of land settlements on land income is insignificant in case of the instrumental variable strategy (Table **??**). But I find that the share of small landowners is higher. This can be a sign that the land settlement did help some previously landless serf to gain property rights on some smaller area of land. Kleibergen-Paap test statistic for weak instruments is 9.311 that is slightly below the the critical value of 10 proposed by the literature.

8 Robustness Checks

8.1 Distance to the largest cities

One could argue that the distance to the closest law school is just a proxy to the closest large city and villages closer to them can differ in other way from other villages, like market access. Hence, in the next step I include the distance to one of the 10 and 20 largest city according to the 1850 census to see whether the coefficient on the distance to the closest law school remains significant. As Table 9 shows, I find that the coefficient is still significant after this.

8.2 Lawyers and access to credit

It is also possible that local lawyers could affect the landholders' access to credit. This could potentially increase resources used for agricultural investment and hence lawyers could contribute to the change in land use and income in other way than through their role in reaching agreement in land settlements. To see whether there is a relationship of land use and access to local lawyers through credit access, I include the distance to credit institutions that existed before 1850. Again, I find that the coefficient is still significant.

8.3 Access to lawyers versus access to law schools

One can argue that access of lawyers could be important in other ways. To differentiate the effect of access to lawyers in general from having access to lawyer with local knowledge, I use an 1856 calendar that contains the name of lawyers operating in that year with their official office location. I include the distance of a village to the location of the closest lawyers as a control variable and I also modify this distance with the number of lawyers available at the closest location. I find that the distance to the closest law school is still significant.

8.4 Village level data on students at the royal law academy of Győr

To show that a village distance to a law school is correlated with the probability of sending a student to a given law school, I use data from Juhász (2017) on the birth place of student attending the law academy of Győr between 1802 ad 1850. As column 1 in Table 10 shows, I find that the proximity of a village to Győr is positively correlated with the probability of the number of students attending the school in this period.

Since I have data on the birth place of the students in case of the law academy of Győr, I decide to look at this information. I restrict my sample to villages where Győr is the closest law school. To control for the size of the population I use the data on the serf population from the Urbarium of 1773. I find that the number of students in the law academy from a village is also positively correlated with the probability of land settlements as can be seen in column 2 of Table 10. this result hold if I include the distance to the proximity to urban centers in column 3.

Students studying Law or Theology

It is possible that villages that sent a student to higher education institution were more developed or more commercial even before the process of land settlement. This could result in a positive correlation between the probability of land settlement and the number of students from a village. Since I have data on whether student studied law or theology, I estimate the effect of the latter separately. I

find that unlike attending law, studying theology doesn't have a significant effect on land settlement probability (Column 4 in Table 10).

8.5 Comparing villages without students attending the law academy

It is possible that my control variables do not capture all the factors that could determine whether a villages sent a student to the law academy. Hence, in this section, I compare only villages that did not send students to the law academy of Győr during this period. I still find that having a neighboring village that sent a student to Győr, increased the probability of land settlement.

9 Conclusion and future research

In this paper, I combine village level data on land settlements with land use and agricultural income covering the Kingdom of Hungary in 1865 to estimate the economic effects of stable property rights. I observe land settlements from the early 1800s until 1865. The OLS estimates show that village where land settlements happened by 1865 had a higher share of arable lands and lower share of forests, while we can also find a higher share of vineyards as well. These findings are in line with the argument that common property rights inhibited the more extensive use of land and the investment in higher value added production.

To handle the issue of other sources of potential endogeneity or omitted variable bias, I conduct an instrumental variable analysis as well. I argue following Für (1965), that if lawyers or the local or court officials (participating in the land settlement process) had local knowledge and were familiar with the local conditions it contributed to a quick and peaceful land settlement. I use the distance of a village to the closest law school operating in the Kingdom of Hungary in the first half of the 19th century as an instrument for the probability of land settlement. Using this instrumental variable approach, I find that the land settlement actually decreased the share of arable lands, while the effect on forests and vineyards remains the same. This results point into the direction that villages with large arable land might have more prone to land settlements. Looking at agricultural income, I find that income per total agricultural land did not affected while income per arable land increased.

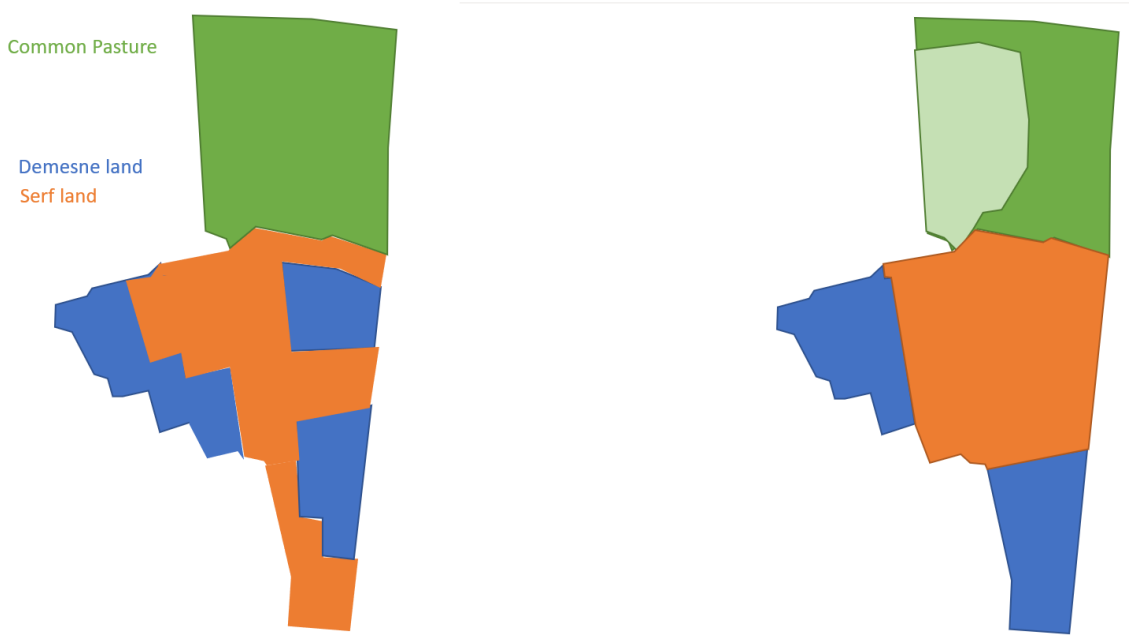

Figure 3: Students attending law school in Gyor from 1802 to 1850. Black dot is Gyor.

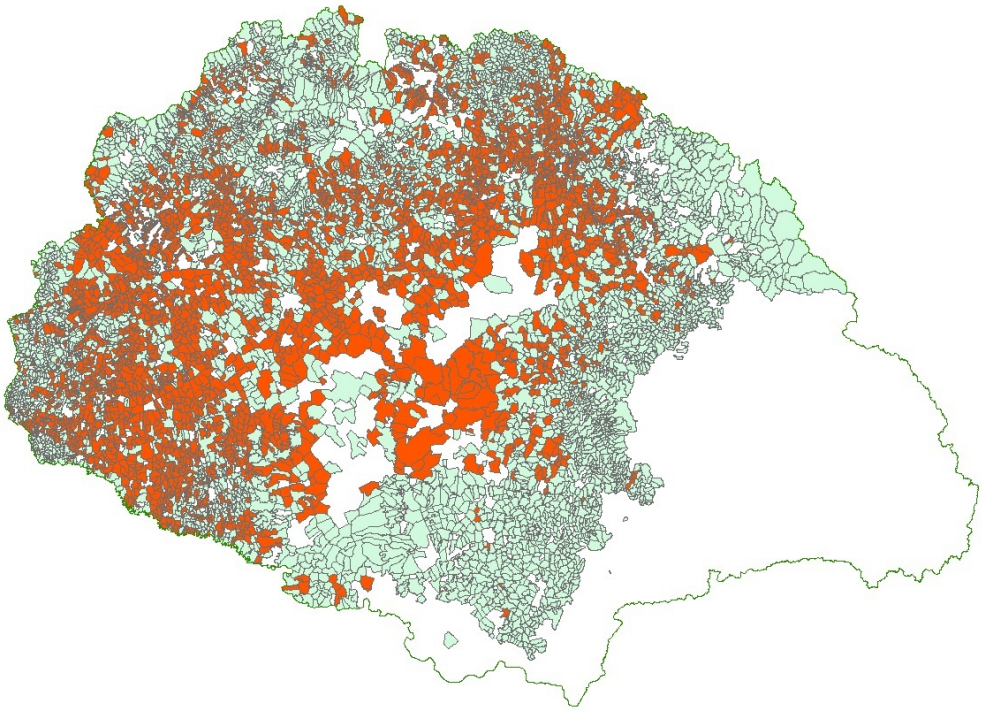

Figure 4: Students attending law school in Gyor from 1802 to 1850. Black dot is Gyor.

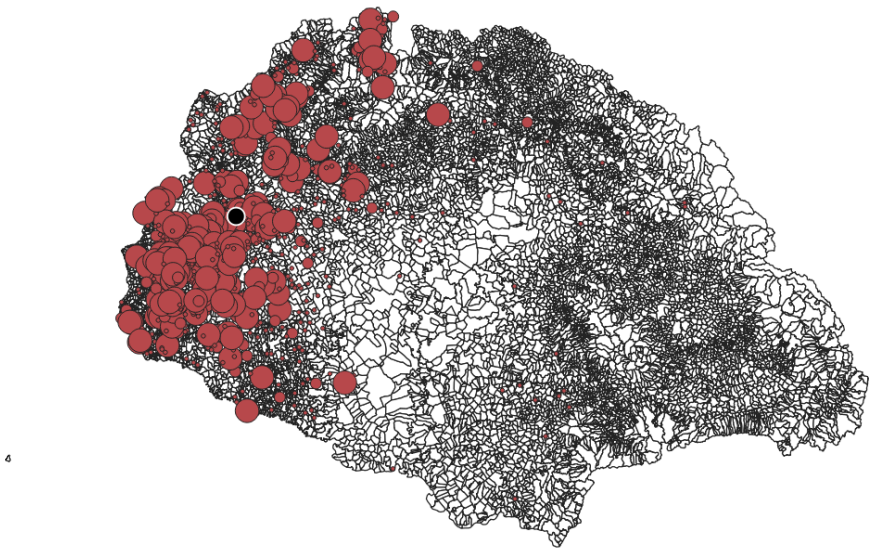

Figure 5: Students attending law school in Gyor from 1802 to 1850 divided by the population in 1869.

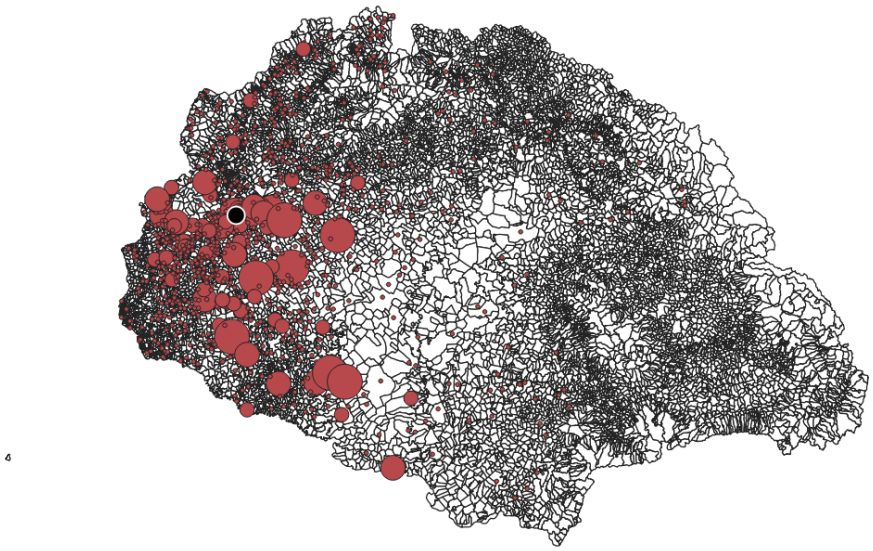

Figure 6: Students attending law school in Gyor from 1802 to 1850. Black dot is Gyor.

Table 2: Summary Statistics

	Mean	Std.Dev.	Obs	Min.	Max.
Outcome variables					
share of arable lands in 1865	0.41	0.19	9635	0.00	0.99
share of pastures in 1865	0.13	0.11	9635	0.00	0.80
share of forests in 1865	0.25	0.23	9635	0.00	1.00
share of vineyards in 1865	0.02	0.04	9635	0.00	0.83
income per acre	2.51	2.32	9636	0.00	151.55
income per arable land acre	8.41	74.77	9576	0.00	5699.00
share of small landowners	0.97	0.08	9563	0.00	1.00
Explanatory variables					
land settlements done by 1865	0.37	0.48	9580	0.00	1.00
black soil	10.33	7.71	12744	0.00	54.00
elevation in meters	272.84	195.37	9309	69.58	1481.17
total area in acres	3852.29	6332.30	9636	5.00	165615.00
total number of serfs	64.22	80.68	7033	0.00	1617.00
share of landless serfs in 1773	0.30	0.26	6781	0.00	1.00
distance to Vienna (km)	295.49	141.96	9576	31.09	623.81
distance to the 10 largest cities in 1844 (km)	99.07	44.28	10261	0.00	228.54
distance to the closest bank in 1848 (km)	47.13	32.56	10261	0.00	220.41
distance to all law schools operating in 1848 (km)	62.72	34.52	10261	0.00	187.96

Table 3: OLS regressions - Land use

	(1) share of arable lands in 1865	(2) share of pastures in 1865	(3) share of forests in 1865	(4) share of vineyards in 1865
land settlements done by 1865	0.0235***	-0.00472	-0.0226***	0.00368**
	(0.00777)	(0.00426)	(0.00826)	(0.00177)
log distance to Vienna	-0.0514***	0.0286***	-0.0201	-0.00181
	(0.0125)	(0.00803)	(0.0125)	(0.00263)
ln(total number of serfs in 1773)	0.0296***	0.0231***	-0.0639***	0.00661***
	(0.00638)	(0.00399)	(0.00737)	(0.00168)
ln(total area of village)	-0.0808***	-0.0124***	0.103***	-0.00351**
	(0.00607)	(0.00455)	(0.00781)	(0.00154)
ln(elevation)	-0.0721***	-0.00894	0.164***	-0.00958***
	(0.0123)	(0.00721)	(0.0154)	(0.00177)
black soil	0.00550***	0.00218***	-0.00668***	-0.000197
	(0.000827)	(0.000449)	(0.000728)	(0.000147)
share of landless serfs in 1773	-0.0746***	-0.0218**	0.0661***	0.0153***
	(0.0166)	(0.0103)	(0.0221)	(0.00533)
Observations	6574	6574	6574	6574
R^2	0.288	0.059	0.385	0.054

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 4: OLS regressions - Income and ownership

	(1) ln(income per acre)	(2) ln(income per arable land)	(3) share of small landowners
land settlements done by 1865	0.0238	-0.0679**	-0.00327**
	(0.0291)	(0.0288)	(0.00147)
log distance to Vienna	-0.412***	-0.244***	-0.00453
	(0.0534)	(0.0520)	(0.00338)
ln(total number of serfs in 1773)	0.174***	0.0112	0.0106***
	(0.0203)	(0.0255)	(0.00328)
ln(total area of village)	-0.217***	0.103***	-0.00266
	(0.0213)	(0.0287)	(0.00276)
ln(elevation)	-0.586***	-0.282***	0.00174
	(0.0444)	(0.0503)	(0.00243)
black soil	0.0213***	0.00922***	-0.000112
	(0.00267)	(0.00286)	(0.000155)
share of landless serfs in 1773	0.0760	0.380***	-0.00461
	(0.0723)	(0.0756)	(0.00406)
Observations	6575	6552	6518
R^2	0.600	0.227	0.031

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 5: First Stage regression

	(1) land settlements	(2) land settlements	(3) land settlements	(4) land settlements
ln(proximity to schools providing law education)	-0.103***	-0.115***	-0.0817***	-0.0732**
	(0.0245)	(0.0236)	(0.0257)	(0.0283)
log distance to Vienna		-0.144***	-0.0686	0.00527
		(0.0363)	(0.0425)	(0.0592)
ln(total number of serfs in 1773)			-0.0535***	-0.0430***
			(0.0171)	(0.0148)
ln(total area of village)			0.0589***	0.0426***
			(0.0171)	(0.0150)
ln(elevation)			-0.178***	-0.181***
			(0.0374)	(0.0372)
black soil			0.00277	0.00583**
			(0.00275)	(0.00256)
share of landless serfs in 1773			-0.0359	-0.0184
			(0.0526)	(0.0434)
Observations	9567	9563	6573	4949
R^2	0.019	0.047	0.100	0.119

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 6: IV estimates - share of arable lands in 1865

VARIABLES	(1) share of arable lands in 1865	(2) First Stage	(3) share of arable lands in 1865
land settlements done by 1865	0.0231***		-0.295*
	(0.00762)		(0.161)
ln(proximity to law schools)		-0.0732**	
		(0.0283)	
ln(total number of serfs in 1773)	0.0279***	-0.0430***	0.0140
	(0.00715)	(0.0148)	(0.0119)
ln(total area of village)	-0.0745***	0.0426***	-0.0602***
	(0.00685)	(0.0150)	(0.0118)
share of landless serfs in 1773	-0.0692***	-0.0184	-0.0769***
	(0.0172)	(0.0434)	(0.0217)
log distance to Vienna	-0.0599***	0.00527	-0.0621**
	(0.0218)	(0.0592)	(0.0290)
ln(elevation)	-0.0669***	-0.181***	-0.130***
	(0.0126)	(0.0372)	(0.0371)
black soil	0.00595***	0.00583**	0.00806***
	(0.000796)	(0.00256)	(0.00145)
Constant	1.948***	1.527**	2.403***
	(0.286)	(0.722)	(0.434)
Observations	4,951	4,949	4,949
R-squared	0.274	0.119	-0.401

Robust standard errors in parentheses

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

Table 7: IV estimates - land use

	(1) share of pastures in 1865	(2) share of forests in 1865	(3) share of vineyards in 1865
land settlements done by 1865	-0.0166	0.386**	0.179**
	(0.0830)	(0.196)	(0.0811)
ln(total number of serfs in 1773)	0.0202***	-0.0448***	0.0142***
	(0.00442)	(0.0130)	(0.00478)
ln(total area of village)	-0.0123**	0.0831***	-0.0120***
	(0.00552)	(0.0138)	(0.00449)
share of landless serfs in 1773	-0.0193*	0.0578**	0.0245***
	(0.0108)	(0.0266)	(0.00820)
log distance to Vienna	0.0489***	-0.0356	0.0154
	(0.0103)	(0.0325)	(0.0121)
ln(elevation)	-0.0167	0.237***	0.0293*
	(0.0175)	(0.0461)	(0.0177)
prevalence of black soil	0.00173***	-0.00964***	-0.00118*
	(0.000574)	(0.00153)	(0.000633)
Observations	4949	4949	4949
R^2	0.109	-0.364	-5.000

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 8: IV estimates - land income

	(1) share of pastures in 1865	(2) ln(income per arable land)	(3) share of small landowners
land settlements done by 1865	-0.0166	1.159	0.0632*
	(0.0830)	(0.769)	(0.0383)
ln(total number of serfs in 1773)	0.0202***	0.0632	0.0144***
	(0.00442)	(0.0507)	(0.00356)
ln(total area of village)	-0.0123**	0.0131	-0.00589*
	(0.00552)	(0.0543)	(0.00352)
share of landless serfs in 1773	-0.0193*	0.442***	-0.00196
	(0.0108)	(0.0923)	(0.00498)
log distance to Vienna	0.0489***	-0.185	0.00366
	(0.0103)	(0.116)	(0.00511)
ln(elevation)	-0.0167	-0.0393	0.0180*
	(0.0175)	(0.170)	(0.00993)
prevalence of black soil	0.00173***	-0.00108	-0.000346
	(0.000574)	(0.00656)	(0.000271)
Observations	4949	4928	4898
R^2	0.109	-0.667	-0.283

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 9: Robustness checks, distance to urban centers

	(1) share of arable lands in 1865	(2) share of arable lands in 1865	(3) share of arable lands in 1865
land settlements done by 1865	-0.207	-0.213*	-0.150
	(0.126)	(0.127)	(0.110)
ln(distance to 10 largest cities in 1850)		-0.00561	
		(0.0138)	
ln(distance to 20 largest cities in 1850)			0.00998
			(0.0110)
ln(total number of serfs in 1773)	0.0178*	0.0165	0.0202**
	(0.0104)	(0.0105)	(0.00939)
ln(total area of village)	-0.0641***	-0.0650***	-0.0671***
	(0.0105)	(0.0105)	(0.00974)
share of landless serfs in 1773	-0.0754***	-0.0768***	-0.0740***
	(0.0195)	(0.0193)	(0.0180)
log distance to Vienna	-0.0616**	-0.0569**	-0.0645***
	(0.0258)	(0.0274)	(0.0241)
ln(elevation)	-0.112***	-0.112***	-0.102***
	(0.0323)	(0.0327)	(0.0289)
prevalence of black soil	0.00749***	0.00748***	0.00743***
	(0.00120)	(0.00122)	(0.00112)
Constant	2.277***	2.260***	2.199***
	(0.384)	(0.385)	(0.349)
Observations	4,951	4,947	4,943
R-squared	-0.078	-0.097	0.076

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

Table 10: Students attending the law school in Gyor

	(1) law students	(2) land settlements	(3) land settlements	(4) land settlements
ln(distance to Gyor)	-0.442***			
	(0.102)			
law students at Gyor		0.0240*	0.0230*	
		(0.0129)	(0.0133)	
theology students at Gyor				0.0191
				(0.0773)
ln(total area of village)	0.343**	-0.0101	0.00385	0.00938
	(0.153)	(0.0345)	(0.0321)	(0.0346)
log distance to Vienna	1.183*	-0.204	-0.0392	-0.0163
	(0.622)	(0.286)	(0.279)	(0.282)
ln(elevation)	-0.527	0.0973	-0.0252	-0.0422
	(0.507)	(0.220)	(0.190)	(0.189)
prevalence of black soil	-0.0162	0.00464	0.00400	0.00343
	(0.0167)	(0.00548)	(0.00540)	(0.00546)
share of landless serfs in 1773	0.621*	0.146*	0.142	0.152
	(0.308)	(0.0836)	(0.0841)	(0.0889)
ln(total number of serfs in 1773)	0.0949	-0.0632*	-0.0636*	-0.0610
	(0.146)	(0.0357)	(0.0362)	(0.0359)
ln(distance to the 20 largest cities in 1844)			0.155	0.159
			(0.128)	(0.132)
Observations	279	279	279	279
R^2	0.106	0.124	0.130	0.125

Standard errors in parentheses clustered at the district level

County fixed effect in model 2-4.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

References

Allen, Robert C. 1982. "The Efficiency and Distributional Consequences of Eighteenth Century Enclosures." *The Economic Journal* 92(368):937–953.

Besley, Timothy. 1995. "Property Rights and Investment Incentives: Theory and Evidence from Ghana." *Journal of Political Economy* .

Besley, Timothy and Maitreesh Ghatak. 2010. Property Rights and Economic Development. In *Handbook of Development Economics, Vol. 5*. The Netherlands: North-Holland: .

Cantoni, Davide and Noam Yuchtman. 2014. "Medieval Universities, Legal Institutions, and the Commercial Revolution." *Quarterly Journal of Economics* .

Card, David. 1995. "Using Geographic Variation in College Proximity to Estimate the Return to Schooling.". In *In Aspects of Labor Market Behaviour: Essays in Honour of John Vanderkamp*, ed. E. Kenneth Grant Louis N. Christophides and Robert Swidinsky. University of Toronto Press.

Clark, Gregory. 1998. "Common Sense: Common Property Rights, Efficiency, and Institutional Change." *Journal of Economic History* .

Dányi, Dezső. 1993. *Az 1850. és 1857. évi népszámlálás (The census of 1850 and 1857)*. Budapest: Központi Satisztikai Hivatal (Central Statistical Office of Hungary).

Dávid, Zoltán. 1994. *Az 1857. évi erdélyi népszámlálás (The census of 1850 in Transylvania)*. Budapest: Központi Satisztikai Hivatal (Central Statistical Office of Hungary).

Für, Lajos. 1965. Jobbágyföld-parasztföld (Serf land - peasant land). In *A parasztság Magyarországon a kapitalizmus korában (The peasantry in Hungary during capitalism)*, ed. István Szabó. Akadémiai Kiadó.

Goldstein, M. and C. Udry. 2008. "The profits of power: Land rights and agricultural investment in Ghana." *Journal of Political Economy* .

Heldring, Leander, James A. Robinson and Sebastian Vollmer. 2020. "The economic effects of the English enclosures.".

Hollenbach, Florian M. and Jan H. Pierskalla. 2020. "State-Building and the Origin of Universities in Europe, 800-1800." unpublished.

Juhász, Réka Ibolya. 2016. “A Magyar felsőoktatás egy fontos intézménycsoportja a királyi akadémiák forrásai és feldolgozásának lehetőségei (1777-1850). (An important institution group of the Hungarian higher education, the historical sources on the royal legal academies).” *Gerundium* .

Juhász, Réka Ibolya. 2017. *A győri felsőoktatás intézményeinek hallgatói 1719-1852 (Students of the higher education institutions of Győr, 1719-1852)*. Vol. 13.

Levine, Ross. 2005. “Law, Endowments and Property Rights.” *Journal of Economic Perspectives* 19(3):61–88.

Markevich, Andrei and Ekaterina Zhuravskaya. 2018. “The Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire.” *American Economic Review* .

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: .

Simonffy, Emil. 1960. Az úrbéri birtokrendezések Zala megyében a jobbágyfelszabadítás után (Urbarial land settlements in Zala county after the abolition of serfdom). In *Agrártörténeti tanulmányok (Agro-history working papers)*. Budapest: .

Szabad, György. 1957. *A tatai és gesztesi Esterházy-uradalom áttérése a robotrendszerről a tőkés gazdálkodásra (The transition of the Esterházy estate of Tata and Gesztes from the labor service system to capitalistic production)*. Budapest: .

Szabó, Béla. 2001. Jogászság és jogászképzés (Lawyers and law education). In *Bevezetés a jog- és államtudományokba*, ed. Miklós Szabó. Bíbor Kiadó.

Ámán, Ildikó. 2019. A felsőfokú oktatási igazgatás története Magyarországon, különös tekintettel a jogászképzésre (The administrative history of higher education in Hungary with special focus on the education of lawyers) PhD thesis University of Szeged.