

# Jurists, Clerics and Merchants<sup>1</sup>

## The Rise of Learned Law in Medieval Europe and its Impact on Economic Growth

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### Abstract

Between the years 1200 and 1600 economic development in Catholic Europe gained momentum. By the end of this period per capita income levels were well above the income levels in all other regions of the world. We relate this unique development to the resurrection of Roman law, the rise of Canon law and the establishment of law as a scholarly and scientific discipline taught in universities. We test two competing hypotheses on the impact of these processes on economic growth in medieval Europe. The first conjecture is that the spread of substantive Roman law was conducive to the rise of commerce and economic growth. The second and competing conjecture is that growth occurred not as a result of the reception of substantive Roman law but rather because of the rational, scientific and systemic features of Roman and Canon law and the training of jurists in the newly established universities (*Verwissenschaftlichung*). This gave the law throughout Europe an innovative flexibility, which also influenced merchant law (*lex mercatoria*), and customary law. Using data on the population of more than 200 European cities as a proxy for per capita income we find that an important impact for economic development was not primarily the content of Roman law, but the rise of law faculties in universities and the emergence of a legal method developed by glossators and commentators in their interpretation and systematization of the sources of Roman law (*Corpus Juris Civilis*, Digests) and Canon law. The endeavor to extract general normative conclusions from these sources led to abstraction, methodology, and the rise of law as a scholarly discipline. Wherever law faculties were founded anywhere in Europe jurists learned new legal concepts and skills which were unknown before and conducive for doing business.

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## I. INTRODUCTION

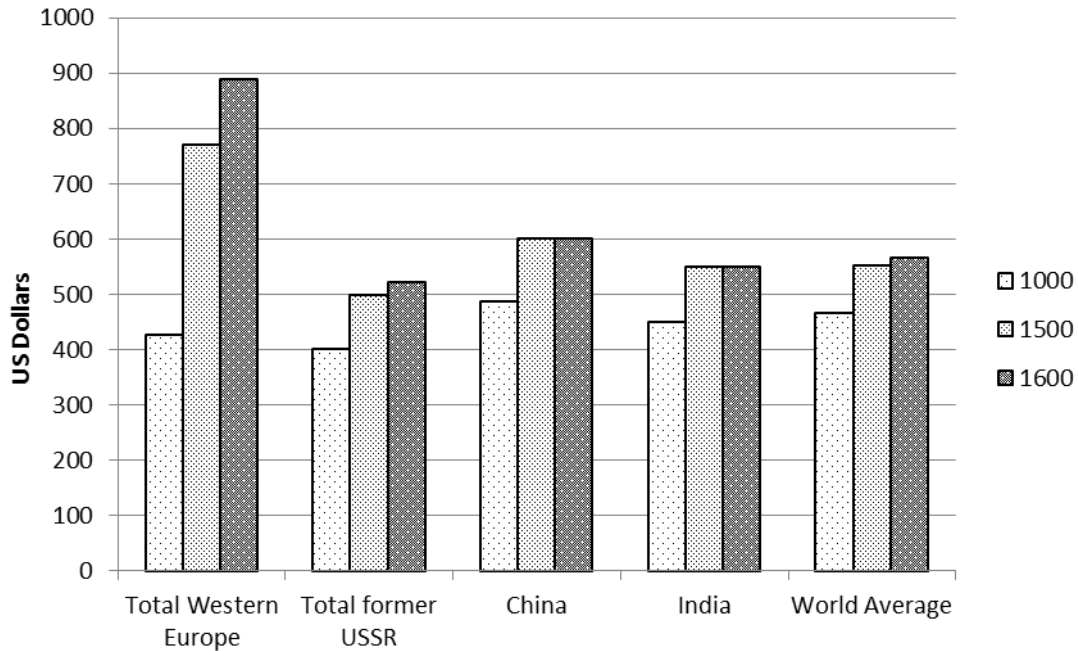
Has the unique legal development, which began around the year 1080 at the University of Bologna and changed the concept of law throughout Europe, had an impact on economic growth? Some legal historians regard this process, which culminated in the establishment of a systematic, rational and sophisticated body of law, as one of the greatest cultural achievements in Europe.<sup>2</sup> It gave rise to the resurrection and reception of Roman law in some countries and to the establishment of an equally sophisticated system of Canon law in all of Catholic Europe and later its development to a *jus commune*. Little is known, whether and to what extent this cultural achievement contributed to the economic growth over the same period, in which Western Europe became the most opulent world region, long before the growth processes in the 18<sup>th</sup> century, which culminated in the industrial revolution.<sup>3</sup>

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<sup>2</sup> Berman, H.J. *Law and Revolution. The Formation of the Western Legal Tradition*. Cambridge: Harvard University Press, 1983; Stein, P. *Roman Law in European History*. Cambridge: Cambridge University Press, 2009; Repgen, T. "Ius Commune", in: Haferkamp, H. P. & Repgen, T. (eds.). *Usus modernus pandectarum. Römisches Recht, Deutsches Recht und Naturrecht in der Frühen Neuzeit. Klaus Luig zum 70. Geburtstag*. Köln: Böhlau, 2007, 157-173.

<sup>3</sup> The GDP per capita estimates since the year 1 A.D. by Angus Maddison show that during the Middle Ages western Europe, especially Northern Italy and Flanders broke out of the general world development and that most regions of Western Europe achieved per capita income levels well and significantly above all other world regions in the year 1500. See Maddison, A. *Historical Statistics*. Paris: OECD, 2003.

**Figure 1: Per Capita GDP 1000-1600, in 1990 Dollars**



SOURCE: Maddison, A. Historical Statistics. Paris: OECD, 2003

We show how the spread of Roman law and the spread of learned lawyers trained in universities influenced city growth. Our panel study spans from the year 1200 to 1600 and uses data on city population, the proliferation of universities with law departments in Europe and the extent to which Roman substantive and procedural law was received in the different European regions. It also includes other variables with an important effect on the population of cities such as for instance the population numbers in Western European countries and regions, the catastrophic bubonic plague in the 14<sup>th</sup> century and the degree of political and economic freedom in the different regions of Europe.

The article is organized as follows. First we present some well-established facts about the development of "learned law" in the newly established universities. We proceed to present hypotheses of legal historians on the impact of this development on the economy. The next section describes our model with the population number of cities as a proxy for per capita income as the dependent variable and with variables on the spread of Roman law and the spread of law faculties as independent variables. We also correct

for several other factors, which might have had an influence on city population in the relevant regions and periods. We then present the results of the study, in which we use among others a fixed effects model. The most important finding is a significant positive correlation between the number of citizens in a particular city and the number of universities in a circle of 300 kilometers around the city. In the last section we deal with the causal link between these two variables. We find some evidence that the arrow of causation goes from the rise of universities and learned law to the growth of cities - that is, for a supply side development. But a causal link in the other direction, driven by the demand of flourishing cities, can also not be excluded. The combined development of learned law and economic growth was arguably a kind of intertwined medieval Silicon Valley effect, with a demand for new law from the emerging merchant cities and a supply from learned lawyers, who provided new and formerly unknown legal products. This had an impact on the economic rise of Western Europe.

## **II. SOME FACTS ABOUT A QUIET CULTURAL REVOLUTION**

### *A. A New Law*

From the standard literature on legal history in medieval Europe we extract some facts, which are important for hypothesis building. During the early Middle Ages some Roman law survived in the kingdoms evolving on the territory of the West Roman empire and in the East Roman empire, but in a form, which was hardly conducive for economic growth. Roman Law however, did not disappear completely. It remained alive in Italy, around the Gulf of Lyon and parts of Iberia.<sup>4</sup> These states continued to use legal practices, which had evolved during the late antiquity, when the principate, introduced by the emperor Augustus had changed into a "dominate". The principate was still based on the republican roots with limited powers of the emperor and allowed a flourishing urban economy. The dominate of late antiquity destroyed this backbone of the Empire's

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<sup>4</sup> We thank a referee for this information.

wealth by a ruthless system of taxes, services, regulations and requisitions for the main purpose of maintaining the bureaucracy and the army.<sup>5</sup>

After the migration period (Germanic invasions) in almost all of Europe the predominant law became customary law - for instance, the law of Germanic tribes. Even though during the late antiquity and early Middle Ages the Roman legal heritage had still some practical importance<sup>6</sup>, these laws, (for instance the Salic law of the Frankish empire) concentrated rights and duties at the community level demanded clan loyalty, solidarity and fellowship and had no elaborated concept of individual will or responsibility<sup>7</sup>.

Starting in the late 11<sup>th</sup> century academic lawyers at the University of Bologna and later in many other newly established universities' law faculties organized after the Bologna model in and outside Italy developed the Roman (Justinian) compilation of the late antiquity into a comprehensive system of legal scholarship. The process, called "reception" was a century long process of legal education<sup>8</sup> and development and a quiet infiltration of pre-existing law. Legal scholars started teaching the Corpus Juris Civilis together with glosses and comments written by a group of Italian law professors in the newly founded universities. A similar development occurred with Canon law. By the end of the 16<sup>th</sup> century, Roman law had gradually influenced courts down to the lower levels, as academically trained lawyers took over almost all legal professions in almost

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<sup>5</sup> Wieacker, F. "The Importance of Roman Law for Western Civilization and Western Legal Thought", *Boston College International & Comparative Law Review*, 4, 1981 (2), 257-281, esp. p. 273 and Wieacker, F. *Privatrechtsgeschichte der Neuzeit unter besonderer Berücksichtigung der deutschen Entwicklung*. 2nd reprint of the 2nd edition. Göttingen: Vandenhoeck & Ruprecht, 1996.

<sup>6</sup> Repgen, 2007, op. cit. p. 160.

<sup>7</sup> Wieacker, F. *A History of Private Law in Europe. With Particular Reference to Germany*. Oxford: Clarendon Press, 1995, p. 17 and Brants, C. "Legal Culture and Legal Transplants. Netherlands National Report", *ISAIDAT Law Review*, 1, 2010 (2), 1-117, p. 10. The following quote by Brants relates to the Netherlands but seems to be a concise general description: "Each sub-community or clan solved any breach itself, its members collectively liable for reconciliation through compensation of goods or life and limb. If no such peaceful solution could be reached, only 'blood vengeance' could restore the situation. The right and duty to compensation or vengeance for the consequences of the deed functioned to compensate the clan for the material, and the tribe for the immaterial consequences of the breakdown of social relations. Actions threatening the tribe as such were punished by death or banishment from the community order. This may resemble individual punishment, but the ethical element derives not from a sense of individual guilt, but from a need to restore the self-evident order of the tribe".

<sup>8</sup> "Bildungsprozess" in the words of Repgen, 2007, op. cit. p. 157.

all European countries. Especially, judges became academically trained (in Roman and Canon law).

The new law was abstract, rational, systematic and overarching regional and tribal custom.<sup>9</sup> It could therefore make coherent or remove the "thicket of custom", of which much of the traditional law consisted. Academic legal scholars, writing in Latin, permanently systematized the body of law and eliminated contradictions. James Gordley gives the following account of their work:<sup>10</sup>

*"The concern of the medieval jurists was not solely to apply their texts to situations that the texts did not expressly cover. They also wanted to explain each text of the Corpus juris in terms of every other. That effort led them to impose an order on the texts that the Romans had not contemplated. (...) Their goal was to assign to each text a place in the scheme of things by relating it so far as possible to every other text. (...) The end result was a chain of interconnections among texts in which each text was supposed to shed light on the meaning of every other."*

This led the learned jurists to new conclusions and insights, which were not or only implicitly contained in the Roman legal texts.<sup>11</sup> The written form of the law eased its use.<sup>12</sup> The resurrected Roman law concentrated rights and obligations at the individual level, not at the level of family, group or clan. The Christian idea of man as an image of god and the idea of the freedom of the person, inherited from classical Roman law shaped a private law based on private autonomy. This holds especially for contracts<sup>13</sup> and property.<sup>14</sup> The vision of property was an absolute right, concentrating all potential use of a resource undivided at the individual level and not a privilege or "investiture" to

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<sup>9</sup> Zimmermann, R. "Römisches Recht und Europäische Kultur", *JuristenZeitung*, 62, 2007 (1), 1-12, p. 10.

<sup>10</sup> Gordley, J. *The Jurists. A Critical History*. Oxford: Oxford University Press, manuscript, (2013) forthcoming.

<sup>11</sup> One outstanding example is the legal opinion, developed by Romanists and Canonists that any contract based on declarations of will is valid and enforceable, irrespective of the type of contract (*pacta sunt servanda*), an innovation without parallel in classical Roman law. See Gordley, 2013, op. cit.

<sup>12</sup> Zimmermann, 2007, op. cit. p. 10.

<sup>13</sup> Canon lawyers developed the very concept of a contractual obligation as resulting only from a mutual declaration of will of individuals in the Middle Ages. "*Pacta sunt servanda*" is a canonical addition to contract law and has no root in classical Roman contract law. See Berman, H.J. "The Religious Sources of General Contract Law. An Historical Perspective", *Journal of Law and Religion*, 4, 1986 (1), 103-124.

<sup>14</sup> Zimmermann, 2007, op. cit. p. 10.

be given and taken by a ruler. It regarded law as either an imperative act of the ruler or as a contract based on the will of individuals not as flowing out of custom. It rationalized legal procedure; claims had to be in written form for a proper study of the judge and the defendant. For the first time in history the law clearly differentiated legal rights and obligations from morality and custom, thus making it a separate category in society and giving it a relative autonomy.<sup>15</sup> Together with Christian theology it demanded that conflicts of a public nature were subject to the law, a unique Western development, which finally resulted in the rule of law.<sup>16</sup> The reception was not a legal transplant but a quiet infiltration of existing law and was accelerated by the ever increasing number of academic lawyers trained in a curriculum consisting of Roman and Canon law. Originally the rules of Roman law were only subsidiary, if local law had no rules or the Roman rules were rules of interpolation or of hierarchy between conflicting laws. Lawyers in comparison to mere practitioners had superior instruments for deciding hard cases and for using elements from a legal system to draft complex contracts, corporations and city statutes. Only much later the Roman rules began to replace the old local rules. In some European regions Roman law replaced the pre-existing customary law, in others the new law emerged from the old customary law. But in all of Europe the new system of law and its grammar became part of legal training and replaced old procedures and the style of legal argument.

### *B. The Legitimacy of the New Law*

From the beginning of its teaching in Bologna Roman law enjoyed the highest level of legitimacy as being the law for the whole of Catholic Christianity. The fact that a 550 year old forgotten legal text,<sup>17</sup> interpreted by professors in Bologna could serve as a starting point for a far reaching legal development cannot be understood without reference to generally shared medieval beliefs. The medieval "Rome idea" of a

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<sup>15</sup> Berman, 1983, op. cit.

<sup>16</sup> Wieacker, 1981, op. cit. p. 277.

<sup>17</sup> The digests were actually forgotten, whereas the Codex Iustinianus remained known and used. We thank a referee for this information.

continuation and renovation of the classical Roman empire (renovatio et translatio imperii)<sup>18</sup> together with the curial concepts of the reform popes after Cluny gave Roman law the power of immediate legal force as the legitimate imperial law for the whole of Christianity. After its rediscovery it therefore enjoyed an almost sacred status, next only to the Holy Scriptures.<sup>19</sup> The medieval emperors supported this idea, which stabilized their legitimacy and power. It was also the common opinion of jurists. The idea of the continuation of the imperium gave Roman law and its teaching a legitimacy, which stretched beyond the actual zone of the emperor's power, whose superiority was not accepted in large parts of Western Europe, for instance by the kings of France, England or Poland. However the idea of an undivided imperium, which spanned the whole of Western Christianity, was so strong that lawyers could extend the reach of Roman law and at least the related academic training to other places where the emperor had no powers. They used the fiction that those kings, who do not acknowledge the emperor as their superior, are emperors in their territories (*superiorem non recognoscens rex imperator est in terra sua*), thus legitimizing imperial law even outside the Holy Roman Empire. This fiction together with the towering superiority of academic law over traditional customary law helped to promote the reception of Roman law and its later development to a "jus commune" in the whole of Europe. And even in those places, where rulers regarded substantive Roman law with suspicion as promoting imperial at the expense of royal powers, the new teaching of Roman and Canon law became pervasive in all European universities<sup>20</sup> whereas regional and local law was nowhere part of university education. The new academic law therefore deeply influenced the legal culture everywhere, also in France, the Netherlands, Poland and the Hanseatic

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<sup>18</sup> Wieacker, 1981, op. cit. p. 276.

<sup>19</sup> The almost sacred status of the *Corpus Juris Civilis* and its high degree of legitimacy is especially stressed by Wieacker. "For medieval man the civilization of antiquity provided a timeless standard which he had to follow. The ancient texts were beyond any questions valid and they had to be applied in everyday life (...). The clearest instance of this attitude is in the overwhelming power exercised over theology by Holy Writ, the councils and the Fathers of the Church, (...) the *Corpus Juris* of Justinian enjoyed this authority in the minds of all legal thinkers by reason of its sacred origin in the empire." Wieacker, 1995, op. cit. pp. 30-31. This view on the almost sacred status of the *Corpus Juris Civilis* is disputed among legal historians. However, it is undisputed that the *Corpus Juris Civilis* enjoyed a high level of legitimacy within the belief system of the Middle Ages.

<sup>20</sup> Zimmermann, R. *The Law of Obligations. Roman Foundations of the Civilian Tradition*. Oxford: Oxford University Press, 1996. "[T]he same textbooks were used at Pavia or Bologna as much as at Halle, Alcalá or Oxford", p. x.



cities and even in England, which did not or only much later -outside the time span of this study- accept Roman law. This development was supported by the Canon law, for which the ecclesiastical courts had jurisdiction in all Catholic countries. Canon law was of great importance not only for church matters as it included the law of marriage, succession, defamation and even breach of contract. And clerics with training in law played a pivotal role in the administration of the church, which often included the administration of counties and cities.<sup>21</sup> Only England and only with the Tudor Monarchy in the 16<sup>th</sup> century took a different path.<sup>22</sup> This development did however not influence Greece and Eastern Europe, including Bulgaria and Russia as well as the Muslim parts of Europe.

### III. HYPOTHESES ON THE ECONOMIC IMPACT OF THE NEW LAW

How could this legal development impact the forces leading to economic growth? Which particular hypotheses did legal historians develop?

#### *A. The Rise of Academic Law Cannot Explain Growth Patterns in Europe After the Year 1600*

We exclude the period from 1600 to 1800 from our empirical study for several reasons. First, starting with the late 17<sup>th</sup> century legal scholarship underwent substantial changes with the upcoming Dutch school of legal scholarship. It would be difficult to include this development into a Roman law variable. To model it appropriately, we would have to code the influence of this school in European universities. Second, the 17<sup>th</sup> century

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<sup>21</sup> Zimmermann, R. "Roman Law and the Harmonization of Private Law in Europe", in: Hartkamp, A. et al. (eds.). *Towards a European Civil Code*. 4 ed. Kluwer Law International: Alphen aan den Rijn, 2011, 27-53.

<sup>22</sup> The impact of Roman law and the academic school of law on English law seems now uncontroversial. Wieacker, 1981, p. 259 writes that "Common law and civil law did not wholly part company until after the Tudor period (1485-1603) that is, not after the Inns of Court had definitively prevailed over academic legal education in the preparation of barristers, serjeants-at-law and judges". He refers to earlier writings of Donahue, C. "The Civil Law in England", *The Yale Law Journal*, 84, 1974 (1), 167-181 and Vinogradoff, P. *Roman Law in Mediaeval Europe*. London: Harper, 1909. See also Zimmermann, 2011, op. cit. p. 45.

brought devastating religious wars with huge demographic, economic and political consequences, which would have to be taken into account. Third, the economic development became more dependent on overseas trade and the rise of imperialism and colonialism. Fourth, it has been often analyzed and there seems to be a consensus that the decisive split in Europe during this period was between Britain and Holland on the one hand which developed into constitutional monarchies with constrained and accountable governments and strong parliaments and the absolutist monarchies in many other parts of Europe with a big power to tax and to intervene.<sup>23</sup> This holds equally for the Habsburg Empire, Prussia, France and Spain. This split alone explains much of the growth differentials in Europe between 1600 and 1800 and made most of continental Europe lag behind England and Holland regardless of all other features of its legal system. We do not support the now popular thesis of an economic superiority of common law over civil law.<sup>24</sup> The continental development over this period was comparatively less conducive for economic growth, because the absolutist system could not credibly protect private investors in the same way as in England, which rejected Roman civil law, and the Netherlands, which received it in the 16<sup>th</sup> century by the Habsburg rulers and after independence kept and developed it without interference from outside.<sup>25</sup>

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<sup>23</sup> De Long, J.B. & Shleifer, A. "Princes and Merchants. European City Growth before the Industrial Revolution", *Journal of Law and Economics*, 36, 1993 (2), 671-702. See also Brennan, G. & Buchanan, J.M. *The Power to Tax. Analytic Foundations of a Fiscal Constitution*. Cambridge: Cambridge University Press, 1980 and North, D.C. *Structure and Change in Economic History*. New York: Norton, 1981.

<sup>24</sup> Glaeser, E.L. & Shleifer, A. "Legal Origins", *The Quarterly Journal of Economics*, 117, 2002 (4), 1193-1229 and López de Silanes, F., La Porta, R., Shleifer, A., & Vishny, R. "Law and Finance", *Journal of Political Economy*, 106, 1998, 1113-1155. For an overview on the discussion see Zywicki, T. & Stringham, E. "Common Law and Economic Efficiency", in: Parisi, F. & Posner, R. (eds.). *Encyclopedia of Law and Economics*. 2nd edition, forthcoming.

<sup>25</sup> One of Holland's greatest legal scholars, Hugo Grotius said in 1633 in a talk in Hamburg "So apparent is the equity of (Roman Law) in its several parts, but especially in those which pertain to contract and unlawful damage, that it prevails even among those people whom the Romans could never conquer by arms, and it does so without any force, triumphing merely by virtue of its innate justice." Cited in: Zimmermann, 1996, op. cit.

*B. Did Substantive Roman Law Lower Transactions Costs and Promote Growth?*

In the 19<sup>th</sup> century many scholars believed that substantive Roman law had an impact on economic development. They pointed especially to the sophisticated law of contracts and property and the concentration of legal obligations at the individual rather than at the community level. This view is probably valid for contract law, which especially under the influence of Canon law was made more informal and lowered transaction costs. However it is questionable for many other features of Roman law. The latter provided little support in areas most important for business. Wieacker regards the view - widely held in the 19<sup>th</sup> century- according to which the Roman law replaced an old law, which could not support the economic demands of the time as antiquated. He lists the following shortcomings of substantive Roman law with regard to transaction costs: no publicity and invisibility of mortgages, insufficient legal forms for joint property, which impeded the development of companies, nonexistence of commercial papers and payment by cheque. Women's legal powers were limited, impeding their participation in businesses. Shipping laws and mining laws did not exist within Roman law. Formless obligations were possible only in Canon law. One can add that the strong definition of individual property, protected by a property rule (*actio negatoria*) had the tendency to create anti-commons problems.

Wieacker also points to the fact that the specific influence of substantive Roman law was low in many of those parts of Europe, which until the 16<sup>th</sup> century were economically very successful, Flanders, Northern France and the cities of the Hanseatic League.<sup>26</sup> In the Holy Roman Empire, which included parts of Southern France, Northern Italy and the kingdom of Bohemia Roman law became strongest. Switzerland, the Netherlands, the Hanseatic cities and England, Castilia and Catalonia did not accept Roman law as their substantive law and in other parts as in France and Poland the direct influence was limited, mostly to procedural law.

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<sup>26</sup> Wieacker, 1996, op. cit. p. 150.

But even in the imperial parts of Europe it took centuries for substantive Roman law to gradually replace local customary law. In the first period its influence consisted of filling gaps and bridging inconsistencies within the traditional law. However, it served this function also in all other countries. Only from the middle of the 15<sup>th</sup> century did Roman law gradually replace the traditional law in the Holy Roman Empire and academic jurists ousted the traditional jurors and town clerks. The process of growth in Europe however started much earlier, together with the rise of law as an academic discipline.

Also there were other types of law that emerged at the same time. These other types of law were not like Roman law. They included feudal manorial law to agricultural production, guild law and municipal law to manufacturing and the law merchant and municipal law to commerce. Enforcement was in special manorial courts or merchant courts. Roman law could be applied to any of these economic activities. But that it did a better job is not clear.<sup>27</sup> It is however probable that the new training of jurists in Roman and canon law and the related concepts influenced also these legal developments outside Roman law, especially the legal procedure. Berman takes the view, that the whole of medieval legal development was driven by a papal legal revolution, which in his view had a status similar to that of the reformation, the French or the Russian revolution. One must not follow this contested hypothesis to think it is probable that the continuous increase in numbers of learned lawyers with a university degree affected the law also in spheres which had no relation with substantive Roman law at all.

### *C. The New Law Emphasized Commercial Values and Repelled Community Values*

The ambiguity of particular rules of Roman law with regard to business transactions however does not imply that the body of Roman law had no positive impact on the rise of the commercial culture across Europe. One feature of Roman law and its link to economic growth is its inherent tendency to accentuate commercial values and repel community values. Starting with Petrarch in the 14<sup>th</sup> century, legal scholars and social

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<sup>27</sup> We thank James Gordley for valuable information on this point.

scientists have regarded Roman law as conducive to capitalism and a materialistic world order, since it separated legal obligations from morality and custom. Such different authors as the legal historian Heinrich Brunner, Max Weber, Marx, Tönnies and Proudhon held this view.<sup>28</sup> In Tönnies' juxtaposition of society and community Roman law was conducive to the rise of an "unbrotherly" commercial moral consisting of honesty, long-term cooperation and reliability as opposed to group solidarity, kinship and loyalty. The legal historian Whitman argues that there is an important link between the rise of Roman law and the rise of a commercial culture.<sup>29</sup> He maintains that Roman law influenced the gradual shift from a community to a more individualistic and market oriented society. Whitman argues that Roman law alleviated the acceptance of commercial attitudes such as the profit motive, buying cheap and selling high, or the acceptance of bankruptcy as bad luck rather than a shame. According to Whitman this feature of Roman law as a stimulator of a commercial culture can easily be overlooked, if scholars focus too strongly on whether particular rules of Roman law promoted or retarded the commercial revolution during the Middle Ages.

#### *D. Academically Trained Lawyers Became a European Elite Group and Helped to Provide the Law for Cities and Merchants*

An important indirect effect of academic law, on which legal historians broadly agree, is the rise of a highly trained legal elite throughout Western Europe. So high was their prestige and so towering were their capabilities in comparison to untrained practitioners, that academic lawyers gradually occupied all important spheres of public and private life and reformed and rationalized public administration and business.<sup>30</sup>

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<sup>28</sup> Whitman, J.Q. "The Moral Menace of Roman Law and the Making of Commerce. Some Dutch Evidence", *Yale Law Journal*, 105, 1995 (7), 1841-1889. Especially noteworthy is Tönnies, F. *Gemeinschaft und Gesellschaft*. Leipzig: Fues, 1887, in which the author stresses the juxtaposition of Roman law as the law of the society, based on individual obligations versus the law of the community with its community obligations and highlights the "rational mechanics" of the Roman law of obligations.

<sup>29</sup> Whitman, 1996, op. cit. p. 1841 and the survey on this matter by Bender, P. *Die Rezeption des römischen Rechts im Urteil der deutschen Rechtswissenschaft*. Frankfurt on the Main et al.: Lang, 1979.

<sup>30</sup> Wieacker, 1996, op. cit. p. 70.

**Table 1: Careers of Graduates in Law**

<i>Bologna Graduates 1070-1619</i>			<i>Tübingen Graduates 1477-1534</i>		
	<i>N</i>	<i>%</i>		<i>N</i>	<i>%</i>
Church (clergy)	478	39.44	Church (clergy)	1095	67.30
Public Administration	262	21.62	Public Administration	327	20.10
Academia	91	7.51	Academia	133	8.7
Church Administration	381	31.44			
			Other Career	72	4.43

NOTE: The table shows the various career paths that graduates in law from Bologna and Tübingen took. We did not try to standardize these two statistics. This would have meant to add the figures of "Church Administration" to either "Church (clergy)" or "Public Administration" because the church had important roles to play in the administration of cities and provinces and not only in the organization of the clergy. SOURCE: Cantoni, D. & Yuchtman, N. "Legal Institutions, Medieval Universities, and the Commercial Revolution", *NBER Working Paper*, 17979, 2009.

Learned lawyers had the skill to draft complex city statutes, business contracts and prototypes of modern companies. Academically trained lawyers played an important role in the development of the *lex mercatoria* of the Middle Ages and the constitution of medieval cities<sup>31</sup> and as well as other innovative legal forms.<sup>32</sup>

The abstractness of the law allowed them to transpose its content to new fields, which until then were undeveloped. Their influence was far reaching, also in those areas, where substantive Roman law had not been adopted as well as those fields in which new legal forms had to be developed, such as in commerce.

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<sup>31</sup> It is probable that Jordan von Boizenburg, author of the "Ordeelbook", the first charter of the Hanseatic city of Hamburg of 1270 studied Roman Law and Canon Law in Bologna. See Bertelsmeier-Kierst, C. *Jordan von Boizenburg (um 1200–nach 1270)*. Berlin: Erich Schmidt Verlag. Available at: [http://www.hrgdigital.de/HRG.jordan\\_von\\_boizenburg\\_um\\_1200\\_nach\\_1270](http://www.hrgdigital.de/HRG.jordan_von_boizenburg_um_1200_nach_1270) (21-7-2013). Hermann Langenbeck studied in Perugia in the middle of the 15th century. He became later the city major of Hamburg and author of the revised city constitution of 1497. See Speer, Heino and Repgen, Tilman. *Herman Langebek*. Heidelberg: Heidelberger Hypertext-Server. Available at: <http://www.rzuser.uni-heidelberg.de/~cd2/hdhs/objekte/2272.htm> (21-7-2013).

<sup>32</sup> Wieacker, 1996, op. cit. p. 85.

Many authors believe that the spontaneous (bottom up) evolution of commercial law (*lex mercatoria*) with commercial courts and rules and procedures catering the needs of the rapidly growing merchant society was influenced by the rise of academic law in universities. Lawyers held important positions in the emerging states and in the church administration, which had an impact on the development of modern city constitutions and on the rise of the merchant law.<sup>33</sup> This indirect channel of influence was important and arguably even more important than the direct transplant of Roman substantive and procedural law.

Berman argues that without law as an academic discipline, the rise of cities in Europe would have been impossible. "What made urbanization possible then and not before, were new religious and legal concepts and institutions and practices -and new religious and legal concepts and acts- concerning communes and another kind of fraternal associations with collective oaths, corporate personality, charters of liberties, rational and objective judicial procedures, equality of rights, participation in lawmaking, representative government and statehood itself". The new law merchant<sup>34</sup> allowed for a deep structural change of commercial transactions. It contained contracts for joint ventures. The *commenda*<sup>35</sup> was an arrangement in which money was invested in return for a share of the profits. The investors had no managerial responsibilities and no liability for amounts beyond their investment. The *compagnia* was similar to a modern partnership. The insurance contract was a new legal instrument. New commercial documents were invented like the Bill of Exchange and the Bill of Lading, which allowed for cash free payment and the rise of banking and fiat money. Greif argues that the legal education in

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<sup>33</sup> Berman writes that even though some merchant law had survived from antiquity independent from the *Codex Justinian*, "it is conceivable that the learned Romanists in the European universities of the late eleventh, twelfth and thirteenth century could have created a new body of mercantile law out of the Roman texts. (...) It is also conceivable that the Canon lawyers at the same universities, together with their colleagues in the papal and episcopal chanceries, could have done the same, especially in view of the fact that ecclesiastical corporations engaged heavily in commercial activities." Berman, 1983, op. cit. p. 340. See also Benson, B.L. "The Spontaneous Evolution of Commercial Law", *Southern Economic Journal*, 55, 1989 (3), 644-661.

<sup>34</sup> Lopez, R. S. & Raymond, I. W. *Medieval Trade in the Mediterranean World*. New York: Columbia University Press, 1955. This book shows the highly sophisticated structure of such contracts, which were not just written forms of custom among merchants.

<sup>35</sup> The *commenda* predates the period that we are referring to. It was known throughout the Mediterranean by the 5<sup>th</sup> century, if not even before, albeit under various names. We owe this information to one of our referees.

universities was pivotal to the rise of commerce in the Middle Ages. "We believe that the legal education provided by medieval universities played an important, causal role in promoting the commercial revolution."<sup>36</sup> Stein writes "what the civil law supplied was a conceptual framework, a set of principles of interpretation that constituted a kind of universal grammar of law, to which recourse could be made whenever it was needed."<sup>37</sup> Therefore the main impact of the new law on economic development might have been not the effect of the particular rules of substantive or procedural law on transaction costs, but rather its abstractness and scientific structure, which allowed jurists and clerics to develop superior reasoning for conflict resolution and build and develop new legal forms, which were conducive to the flourishing of businesses and merchant cities. Their influence was important regardless of whether the substantive law was Roman, manorial, guild or merchant. And it was important even though in many places and for long periods of time laypeople like elder men, senior merchants and jurymen (Schöffen) with no legal training dominated in courts.

*E. The New Law Led to a Process of Civilization that Reduced Blood Feuds and Clan Revenge*

Wieacker wrote about the economic impact of learned law in Europe that "the jurists prepared the ground for economic expansion,"<sup>38</sup> referring to the capacity of the new law to solve conflicts between laws and even legal systems and thus contributing to the withering away of feudal strife and clan revenge. He maintains, that the development of the rational legal method and reasoning on the peaceful functioning of the European society can hardly be overestimated, because it contributed to a reduction of the epidemic blood revenge in the Middle Ages. Academic lawyers could peacefully solve conflicts, for which means and routines of conflict resolution did not exist in traditional law practice and which therefore led to violent self-help, which was legally rooted in

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<sup>36</sup> Greif, A. "The Fundamental Problem of Exchange. A Research Agenda in Historical Institutional Analysis", *European Review of Economic History*, 4, 2000 (3), 251-284.

<sup>37</sup> Stein, 1999, op. cit. p. 61.

<sup>38</sup> Wieacker, 1981, op. cit. p. 278. Unlike untrained jurors jurists were lawyers who had received legal training in universities and studied Roman and canon law.



customary law. Wieacker sees feudal strife as the main impediment to commercial development from the 9<sup>th</sup> to the 13<sup>th</sup> century.<sup>39</sup> The consiliatores, who were mostly law professors in Northern Italy, used their intellectual monopoly and prestige of the new law to peacefully resolve difficult political and economic tensions of the time by giving their (legal) opinions.<sup>40</sup> In the empire this development towards public peace culminated in the general prohibition of feuds and the establishment of the Imperial Chamber Court (1495), which received jurisdiction over violations of public peace. This pacification and "process of civilization" was not dependent on the transplant of Roman substantive law. It was rather a result of a common and convincing new legal grammar and its widespread use by jurists. Wieacker presents this conjecture with the following words: "[E]ven the very principle of settling social and economic conflicts not only by force, authority or compromise but also by the application of general conceptual rules which is the characteristic feature of Western legal thought - became possible on the basis, and perhaps only on the basis, of Roman Law, or what was thought to be Roman Law."<sup>41</sup> It was however also the rising powers of royal governments which enabled them to some extent to crack down on blood feuds, as did the church. This had a potentially big impact on the safety of private property.<sup>42</sup> This hypothesis can however not be directly tested as time series data on the number of feuds in the Middle Ages do not seem to exist. However, it seems to be undisputed, that during the late Middle Ages homicide rates declined dramatically in Europe.<sup>43</sup>

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<sup>39</sup> "[T]he extremely high transactions costs of 10th century Western Europe were mainly caused by the internecine warfare between knights and princes, characteristic of the system (as the Peace of God movement shows)". van Zanden, J.L. *Economic Growth in a Period of Political Fragmentation, Western Europe 900–1300*. Utrecht: Research Group on Social and Economic History of Utrecht University, 2006, p. 30.

<sup>40</sup> Wieacker, 1983, op. cit. p. 83.

<sup>41</sup> Wieacker, 1981, op. cit. p. 257

<sup>42</sup> Wieacker, 1981, op. cit. p. 278.

<sup>43</sup> Eisner, M. "Modernization, Self-Control and Lethal Violence. The Long-Term Dynamics of European Homicide Rates in Theoretical Perspective", *British Journal of Criminology*, 41, 2001 (4), 618-638. Eisner shows that homicide rates decreased substantially from the 13th to the 16th century, by 73 per cent in England, by 70 per cent in Germany and Switzerland, by 47 per cent in the Netherlands and by 16 per cent in Italy. See p. 629.

*F. Roman Law or Learned Lawyers? The Two Competing Hypotheses Tested in our Study*

These research results and conjectures by legal historians lead to two competing hypotheses, which we test in this paper.

The first hypothesis is that the rules of Roman (Justinian) law were conducive to the rise of commerce and economic growth.

In that case one should find more (city) growth in those areas of Europe, which swiftly accepted Roman law and less growth in those areas, which preserved and developed the inherited customary law or used new forms of law. This would then particularly be the case in Northern Europe, Switzerland and in independent kingdoms, like Poland or Hungary, which resisted Roman law and mistrusted it as a vehicle of imperial power.<sup>44</sup> Implicit in this hypothesis is the view that the old customary law did not have the potential to serve as a vehicle for the rise of commerce in Europe.

The second and competing hypothesis is that growth occurred as a result of the rational scientific and systemic features of the new law and its training of jurists in the newly established universities in all of Catholic Europe, which includes England well into the 16<sup>th</sup> century.

This enabled them to create new legal products for cities and merchants as well as more systematic and convincing ways of conflict resolution. It also enabled the development

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<sup>44</sup> Wieacker writes "(...) the tendency of the Glossators after Imerius was to support the Salic and Hohenstaufen Emperors in their theoretical and political claims." Wieacker, 1995, op. cit. p. 31. Switzerland was part of the Holy Roman Empire during the whole period of our study. But when the imperial chamber court, which used Roman law, was established in 1495 it did not recognize its authority for fear of imperial domination ("Die eidg. Orte erkannten allerdings aus Sorge um die eigene Gerichtshoheit das Reichskammergericht nicht an." Stadler, H.: *Fehde*. Historisches Lexikon der Schweiz. Available at: <http://www.hls-dhs-dss.ch/textes/d/D8606.php?topdf=1> (21-7-2013)). Poland and Hungary were not part of the empire and "rejected Roman law, the legal system of German emperors". Giario, T. "Legal Tradition of Eastern Europe. Its Rise and Demise", *Comparative Law Review*, 2, 2011 (1), 1-23, p. 5. In England and France anti-imperial views, explain to some extent the reluctance to embrace Roman law. "English and French jurists (...) consistently refused, in the English kingdom as in the French, to accept the validity of imperial Roman law, heralded at the same period by the imperial 'glossators' in Germany and Italy as the principal source of law." Kriegel, B. "The Rule of the State and Natural Law", in: Hunter, I. & Saunders, D. (eds.). *Natural Law and Civil Sovereignty. Moral Right and State Authority in Early Modern Political Thought*. Basingstoke: Palgrave Macmillan, 2002, p. 13.

of new legal forms, which allowed for a more intense economic cooperation, division of labor and specialization. If this hypothesis is right, one should find more economic growth in those areas with a high density of universities with law departments (as proxies for legal education and the number of law scholars). This effect should have been independent of the spread of substantive Roman law as opposed to customary law, manorial law and merchant law because law professors in all universities across Europe, including England, taught law according to the Bologna model. Hence students were taught Roman and Canon law, whereas local customary law was learnt on the job only.

The new legal ideas could therefore freely flow into the legal reality in all Catholic countries, including England. As academic lawyers held important positions the new concept of law influenced the local and regional laws even if a country resisted the reception of the Roman law. These changes were arguably the most important ones and accounted for a silent cultural change. They influenced all countries where lawyers were trained in universities, i.e. in all of Western Europe. This development only excluded Russia,<sup>45</sup> the Moorish parts of Spain and the East Roman empire. The latter cultivated an inflexible, petrified and simplistic relic of the laws of late antiquity with the emperor's unlimited power to tax, take and regulate, which also influenced Russian law.

#### **IV. THE DATASET**

In this section we describe the variables of our study. Some of these are ordinal indices, which we constructed ourselves on the basis of historical literature. Some are count variables, which we took from publications of economic historians. Some of those are available only since recently. Without the research on long time series data of the last decades this study would have been impossible. We also considered other variables that we do not present in this section because these were not included in the final model. For example, a capital city dummy variable to control for cities that do not derive their

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<sup>45</sup> It seems that the reception of Roman law in Russia became an important development only in the 19<sup>th</sup> century. See Avenarius, M. *Rezeption des römischen Rechts in Russland*. Dmitrij Mejer, Nikolaj Djuvernua und Iosif Pokrovskij. 11 ed. Göttingen: Wallstein Verlag, 2004.

economic prosperity from commercial activities but rather from taxing the country<sup>46</sup> and an Atlantic city dummy variable for the year 1600 to control for the effect that the discovery of the New World had on the changing patterns of commerce and economic development in European cities. These variables were not included in the models presented here.

We have no dataset on the substantial technical progress<sup>47</sup> in the middle ages. Improvements in agriculture in plows and the yoking of animals allowed the heavy soil in river basins to be farmed. Better transportation produced a greater demand of agricultural products. As a result, a huge amount of new land, previously "waste," was brought under cultivation. New mills, which were commonly used to grind grain, doubled or tripled their horsepower. For example, mills were fitted with cams, which turned a rotary motion into an up-and-down hammering motion; they could then be used to process ore and process cloth. A bellows that could produce a continuous blast of air revolutionized metallurgy. All these effects and many more could not be modeled directly. They could only be taken into account indirectly by the specification of some of our models, which correct for biases resulting from missing variables (fixed effects model).

#### *A. The City Population Variable*

Our dependent variable *City Population* measures the city population of European medieval cities in thousands. We follow the example of De Long and Shleifer<sup>48</sup> and use the size of medieval European cities as an indicator for economic prosperity. City size is an adequate indicator for economic prosperity because the economic system of a typical European medieval city was primarily based on commerce rather than on administration, military or consumption of the ruling class. Furthermore, as other

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<sup>46</sup> De Long and Shleifer, 1993, op. cit. p. 15.

<sup>47</sup> Gimpel, J. *The Medieval Machine. The Industrial Revolution of the Middle Ages*. London: Penguin Books, 1977.

<sup>48</sup> De Long and Shleifer, 1993, op. cit. pp. 671-702.

aggregate quantitative indicators for economic prosperity in medieval Europe are scarce there is no better proxy for economic growth beside city population available.<sup>49</sup>

The only data available on GDP per capita are from Maddison, which are not detailed enough for our study.<sup>50</sup> A major factor that influences a city's population, i.e. economics prosperity in a given time period is its preexisting population. We therefore also include a lag variable for *City Population* in our model. It should be noted that our main results (see below) persist when we do not include this lag variable in our model.

The *City Population* variable is constructed using data from Bairoch,<sup>51</sup> who estimated population numbers for 2,200 European cities, in which the number of inhabitants had reached 5,000 at least once between 800 and 1800.<sup>52</sup> We selected 209 West European cities from Bairoch's database. With a few exemptions the *City Population* variable only includes cities that in the period from 1000 to 1600 at least once reached 10,000 inhabitants. We included a few other cities with great historical importance, for example Stockholm. Cities from those European countries in which the Roman law had no relevance at all were not included.<sup>53</sup> We also excluded cities with lots of missing values in the period under study. Cities with more than three missing data points were excluded. This is a reasonable approach because we assume this city population data is missing at random.

We decided to interpolate the missing population data of all cities that were included in our final sample. However, it should be noted that the key results of our statistical analysis (see below) persist even if we do not interpolate but instead simply exclude the

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<sup>49</sup> De Long and Shleifer, 1993, op. cit. p. 5. We also included a *Capital City* variable in our model to control whether the capital status of a city affects its population size. The variable covered cities that were at a given point in time the residence of a king, for example London, Paris, Toledo, Naples, Prague, Cracow, Copenhagen, Stockholm and Edinburgh. Capital cities may not derive their economic prosperity from commercial activities such as trade and industries. Instead these cities may primarily generate income by taxing the country and finance the conspicuous consumption of the powerful as well as a bureaucratic and military system to maintain and expand their powers. See De Long and Shleifer, 1993, op. cit. p. 18. However, the *Capital City* variable did not substantially improve our model and was therefore excluded.

<sup>50</sup> Maddison, 2003, op. cit.

<sup>51</sup> Bairoch, P., Batou, J., & Chèvre, P. *La population des villes européennes de 800 à 1850. The Population of European Cities from 800 to 1850.* Geneva: Librairie Droz, 1988.

<sup>52</sup> Bairoch and Batou and Chevre, 1988, op. cit.

<sup>53</sup> This applies to the (future) countries Albania, Bulgaria, Greece, Romania, Russia and Yugoslavia.

cities that have missing data. It is nevertheless preferable to interpolate because this leaves us with more observations for our analysis. For the year 1400 50 cities and for the year 1500 8 cities had missing data. We interpolated these missing values using a linear interpolation and extrapolation calculation. For the year 1400 we reduced the resulting numbers by 30 per cent to take account of the influence of the Black Death. As a result, the dataset contains 1045 observations, that is the number of inhabitants of 209 cities at 5 points of time, namely the years 1200, 1300, 1400, 1500 and 1600. The dataset is well balanced with broadly unbroken data series among the included cities and for all points in time.

### *B. The Country Variable*

It is important to note that the Bairoch database classifies a city's country according to the political borders at the time of its publication. Bairoch's classifications are recorded in the *Country* variable. We used this variable without further changes as an independent variable to account for regional differences. However, we had to refine it in some instances to better account for particular regional and historical circumstances. For example, in France, Italy and Spain marked regional differences existed between the northern and southern part. According to our classification, South Italy starts at the longitude of Rome. France and Spain were also divided into a northern and southern part.

### *C. The Roman Law Variable*

This categorical variable is an integer running from 0 to 4, indicating the influence of substantive and procedural rules of the Justinian law as it was developed in Italian universities. The index number labels various European regions from 1200 to 1600. The meaning of the numbers is 0 for no influence of Roman law at all, 1 for little influence, 2 for medium influence, 3 for high influence and 4 for very high influence.

**Table 2: Index Numbers for the Influence of Roman Substantive and Procedural Law in Different European Regions (1200-1600)**

<i>Region</i>	<i>Index Number</i>
Moorish Spain, Eastern Roman Empire, Russia	0
England, Ireland, Poland, Denmark, Sweden, free cities of the Hanseatic League	1
Catholic Spain, Northern France, Scotland, Switzerland, the Netherlands, Flanders, Hungary	2-3
Germany, Bohemia, Austria, Northern Italy, Southern Italy, Southern France	3-4 <sup>54</sup>

NOTE: In the Eastern Roman Empire -even though the Corpus Juris Civilis was compiled in its capital during the sixth century- some Roman Law survived in a reduced and petrified form. The new legal developments, inspired by the Corpus Juris Civilis which spread over the whole Latin (Catholic) Europe had no effect in Greece or Russia until the 19<sup>th</sup> century.

The index number represents the extent to which the specific rules of the Corpus Juris Civilis were introduced in the different regions, or whether these regions retained and further developed their traditional customary laws. We decided on the numbers of this index on the basis of legal historical literature on the spread of Roman (Justinian) law in Europe, which gives the following picture. The regions belonging to the Holy Roman Empire, which include Germany, Switzerland, Austria, Bohemia, Flanders<sup>55</sup>, the Netherlands, and Northern Italy and parts of France regarded the Justinian law as the natural imperial law<sup>56</sup> with some exceptions. Even though the reception of substantive

<sup>54</sup> For the cities within the borders of the Holy Roman Empire we assume numbers, which increase over time and reach the peak value of 4 in the year 1500. This reflects the fact on which legal historians agree, that the reception of Roman law occurred in two phases. In the first phase it did not replace local customary law but modernized the procedure and was used to fill gaps. The second phase consisted of a reception of substantive law, which to a large extent replaced customary law. See Wieacker, 1996, op. cit. p. 127.

<sup>55</sup> The categorization of Flanders is particularly difficult. It was a province dependent on France until about 1300, and then became part of the Holy Roman Empire with most of its cities being free cities, later it became a province of the House of Habsburg. However, the law remained based on custom throughout the late Middle Ages. See Berman, 1983, op. cit. p. 370 and Encyclopedia Britannica Online. *Flanders*. London: Encyclopedia Britannica Online. Available at: <http://www.britannica.com/EBchecked/topic/209493/Flanders> (21-7-2013). For a more detailed account see Heirbaut, D. & Gerkens, J.F. "In the Shadow of France. Legal Acculturation and Legal Transplants in the Southern Netherlands and Belgium", *ISAIDAT Law Review*, 1, 2011 (3), 1-35.

<sup>56</sup> Wieacker, 1996, op. cit. p. 124. On the reception see also Janssen, A. & Schulze, R. "Legal Cultures and Legal Transplants in Germany", *European Review of Private Law*, 19, 2011 (2), 225-256 and Graziadei, M. "Legal Culture and Legal Transplants. Italian National Report", *ISAIDAT Law Review*, 1,

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and procedural Roman law took centuries, one can claim, that by the year 1500 it became dominant in those regions. However Flanders, which though it became part of the empire, retained and developed customary law. Switzerland dropped out of this development around 1400 and though it was nominally part of the Holy Roman Empire did for instance not recognize the authority of the Imperial Chamber Court, established in 1495.<sup>57</sup> Also the cities of the Hanseatic League preferred their merchant laws to the rules of Roman law during the relevant period.<sup>58</sup> The Netherlands adhered to their own laws even though they were formally part of the Holy Roman Empire. Much later, in the second half of the 16<sup>th</sup> century under the domination of the house of Habsburg centralized and Romanized courts were introduced there.<sup>59</sup> The independent kingdoms of Spain, France, Poland, Denmark, Sweden and Hungary resisted the substantive Roman law. In Spain and in France it became more important with a time lag. The kingdom of Naples is an exception. Emperors ruled it for large parts of its history, first the Staufer dynasty and later the Habsburg dynasty. The kingdom of Bohemia is another exception as it was part of the Holy Roman Empire. The South of France, south of the river Loire was more open to receive substantive Roman law than the North.<sup>60</sup> However in the whole of France as well as in Spain, Roman law substantially changed the legal procedure and jurisdiction and therefore became more influential than in the other independent kingdoms. The influence of Roman law in England is still a matter of debate among historians. English courts seldom cited Roman texts to support their decisions but it is not clear whether they disregarded them or whether they did not cite them because it was inappropriate. Lawyers and clerics of the time had received their training of Canon and Roman law in Oxford and Cambridge. Many of them had leading positions in the administration and the court of equity. Only in the late Tudor period had education of English judges been removed from the universities, which accelerated the divide towards the common law system. It seems however that according to the

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2011 (2), 1-47.

<sup>57</sup> Stadle, Fehde, op. cit.

<sup>58</sup> Wieacker, 1996, op. cit. p. 102 and p. 151.

<sup>59</sup> Brants, 2010, op. cit. pp. 1-117, esp. p. 15.

<sup>60</sup> Stein, 1999, op. cit. p. 554.



established historical view, Roman law had only a small influence in England.<sup>61</sup> The same applies to Ireland, which came under English domination in the 12<sup>th</sup> century,<sup>62</sup> but not to the independent Kingdom of Scotland, where influence of Roman law was stronger.<sup>63</sup> However in Denmark,<sup>64</sup> Sweden, Poland and Hungary there is little influence of Roman law in the relevant period from 1200 to 1600. In Hungary the influence seems to be slightly higher.<sup>65</sup> Polish cities used the Magdeburg Law, which displays however only a very indirect influence of Roman law. After assigning index numbers for the Roman law variable to the particular cities we discussed the results with two legal historians, which led to some improvements.

#### *D. The University Variable*

The *University* variable is a number, which tries to quantify the impact of lawyers on the economy of a city, proxied with the number of universities around this city. The variable measures to what extent the modern "learned" law influenced a city at each point in time in our dataset, The variable is based on a list of 148 European universities that were founded in the period between 1000 and 1600. The list is based on the following sources. For the dates between 1000 and 1500 we mainly used the work of

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<sup>61</sup> "Roman law had little influence [in England] except in so far as it later informed ca[n]on or ecclesiastical law (and later mercantile law), which remained an important source of law, especially in respect of family law, until the Reformation, and the break with the Church of Rome". See Farran, S. "Legal Culture and Legal Transplants. England and Wales", *ISAIDAT Law Review*, 1, 2010 (2), 1-35, p. 3. However the author also points out the fact that the judges in the court of equity were usually clerics and therefore heavily influenced by canon and Roman law.

<sup>62</sup> Sinder, J. "Irish Legal History. An Overview and Guide to the Sources", *Law Library Journal*, 93, 2001 (2), 231-260.

<sup>63</sup> Gordon, W.M. "Roman Law in Scotland", in: Evans-Jones, R. (ed.). *The Civil law Tradition in Scotland*. Edinburgh: Stair Society, 1995, 13-19. Gordon writes that even much before the first University was founded (St. Andrews in 1415) legal documents from courts and papal as well as imperial notaries show a significant influence of Roman law in Scotland.

<sup>64</sup> Tamm, D. "The Danes and Their Legal Heritage. The Nordic Countries and Their Law", in: Dahl, B., Melchior, T., & Tamm, D. (eds.). *Danish Law in a European Perspective*. Copenhagen: Gadjura, 1996, 33-52 and Tamm, D. "Legal Culture and Legal Transplants. Danish National Report", *ISAIDAT Law Review*, 1, 2011 (2), 1-7. Tamm writes that "Denmark never received Roman Law".

<sup>65</sup> Hamza, G. "Die römischrechtliche Tradition und die Privatrechtsentwicklung in Ungarn", *Revista Chilena de Historia del Derecho*, 22, 2010 (1), 211-245. Hamza writes that in Hungary local law remained predominant and that Roman law was promoted exclusively by the academic training of lawyers. He also wrote that Hungarian students went to study law in such different places as Northern Italy, Paris, Oxford and later also in Cracow and Vienna.

Verger.<sup>66</sup> We complemented missing data with the work of Frijhoff.<sup>67</sup> Verger does not cover university foundations between 1500 and 1600 and for this period we therefore entirely relied on Frijhoff. Not all universities had faculties of law. Some had only faculties of arts, theology or medicine. We screened the literature and could eliminate some universities without law faculties. Referring to webpages of European universities and searching for historical information completed missing and imprecise data from both sources. It can however not be excluded that some of the universities in our data set did not provide legal education.

We apply the following formula. A 300km (approximately 186 miles) radius is drawn around each city in our dataset. Every university that lies within this radius counts as one and a city's index score is the sum of all these universities. However, the universities of Bologna and Paris / Orléans were treated differently from all other universities. These universities were both of great importance for legal education in medieval Europe. Therefore the index already increases by one if these universities fall within a 1500km (about 932 miles) radius of the given city.

The choice of the 300km and 1500km radius are based on the following considerations. Students of canon and civil law had the option to study abroad at a renowned university, primarily Bologna and Paris / Orléans or at a regional university close their hometowns. During the early periods of our study, i.e. in the twelfth and thirteenth century only few universities existed and these were not wide spread over Europe. During this time students therefore had to travel abroad to obtain a legal education. Broadly speaking, the high costs involved in doing so limited legal education to a small group of well-off students.<sup>68</sup> During the later periods of our study, in the fourteenth and fifteenth century, more and more universities were founded and this made it possible to obtain a legal education in most regions of Europe. Rather than travelling abroad students now

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<sup>66</sup> Verger, J. "Patterns", in: de Ridder-Symoens, H. (ed.). *A History of the University in Europe I*. Cambridge University Press: Cambridge, 1992, 35-74.

<sup>67</sup> Frijhoff, W. "Patterns", in: de Ridder-Symoens, H. (ed.). *A History of the University in Europe II*. Cambridge University Press: Cambridge, 1996, 43-106.

<sup>68</sup> de Ridder-Symoens, H. "Mobility", in: de Ridder-Symoens, H. (ed.). *A History of the University in Europe I*. Cambridge University Press: Cambridge, 1992, 280-304, p. 281. See also Rashdall, H. *The Universities of Europe in the Middle Ages*. Volume II. Oxford: Oxford University Press, 1969, pp. 213-214.

preferred to study at these regional universities, usually the one closest to their hometowns. Towards the end of the middle age the large majority of all students studied at regional universities and the remainder studied mostly within their own country.<sup>69</sup> Generally speaking, this development towards regional universities now also allowed a larger group of less well-off students to obtain a university education and this further increased the availability of trained lawyers.<sup>70</sup> Rashdall illustrates this development by stating that "Martin Luther could hardly have enjoyed a university education if he had had to go to Paris for it; and without a university education for Luther, and such as Luther, the German Reformation could not have been."<sup>71</sup> Thus, only few students chose to study abroad and among the diverse reasons that may have motivated them were to obtain first-class teaching and a prestigious degree from an internationally renowned university.<sup>72</sup>

To clarify how these thoughts relate to our index consider the following example. In the year 1500 four universities (Leipzig, Rostock, Greifswald and Copenhagen) existed within a 300km radius of Hamburg. The universities of Bologna and Paris both fell within a 1500km radius of Hamburg. Hence Hamburg's score on the *Universities* index in 1500 is 6. In the same way we calculated index scores for all other cities in our dataset and for all other points in time. We then transformed the resulting index into a categorical variable with 8 equal frequency categories. The categories group together cities across time that have approximately the same score on the university index. The transformation has the advantage that we mediate the effect of a few cities that score very high on the university index towards the later periods in our study. In 1200 and 1300 only few universities exist and all cities belong to the categories 1 to 3 and 1 to 6, respectively. Afterwards more and more universities come into existence and from 1400 to 1600 all 8 categories are filled with cities.

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<sup>69</sup> de Ridder-Symoens, 1992, op. cit. p. 287.

<sup>70</sup> de Ridder-Symoens, 1992, op. cit. p. 286 and Rashdall, 1969, op. cit. pp. 214-215.

<sup>71</sup> Rashdall, 1969, op. cit. p. 214.

<sup>72</sup> de Ridder-Symoens, 1992, op. cit. p. 288 and p. 289.

### *E. The Political Freedom Variable*

De Long and Shleifer classified the political freedom of Western European regions on an eight-point scale.<sup>73</sup> This index codes medieval governments as follows: full constitutional monarchy or republic as 7, weak-prince "Ständestaat" as 6, independent city-republics as 5, princes checked extra-constitutionally by powerful magnates as 4, feudal anarchy as 3, strong-prince proto-absolutism as 2, non-bureaucratic absolutism as 1 and full bureaucratic absolutism or rule by military conquerors as 0.<sup>74</sup> We adopted De Long and Shleifer's scale for our analysis and further refined the coding of the regions. Their index did not cover all regions in our dataset. We coded the missing regions according to our own findings in history books and after consulting with legal historians. We also recoded some cities in regions that were already covered by the index. This was done when we felt that we had to improve the coding of a city when compared to its classification on the general political freedom index of its country, for example this was done for cities with a senatorial constitution, so called free cities. In our statistical analysis we obtained the most reliable results when we transformed the index into a binary variable that codes as 1 those cities that were politically free, i.e. the categories 7 to 4.

### *F. The Book Production Variable*

Buringh and Van Zanden<sup>75</sup> describe manuscript and printed book production as a comprehensive measure for economic performance and societal capabilities in a mediaeval country. They argue that book production can serve as an important proxy for a number of variables, such as the production and accumulation of ideas, the level of literacy and the consumption of luxury goods.<sup>76</sup> For the years 1200, 1300, 1400 the *Book*

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<sup>73</sup> De Long and Shleifer, 1993, op. cit. pp. 23-25.

<sup>74</sup> De Long and Shleifer, 1993, op. cit. pp. 24-25.

<sup>75</sup> Buringh, E. & van Zanden, J.L. "Charting the Rise of the West. Manuscripts and Printed Books in Europe. A long-term Perspective from the Sixth through Eighteenth Centuries", *The Journal of Economic History*, 69, 2009 (2), 409-445.

<sup>76</sup> Buringh and Van Zanden, 2009, op. cit. pp. 409-410.

*Production* variable contains estimates of the number of individual manuscripts that was produced in a given city's country. In the 15<sup>th</sup> century the invention of the printing press led to a steady decline in the importance of the manuscript production.<sup>77</sup> However, manuscript and printed book production still coexisted for some time. For the year 1500 the variable therefore contains both: the number of manuscripts and the number of new titles and editions of printed books multiplied by estimates of the average size of print runs. For the year 1600 the variable then only contains estimates of the total number of printed books that was produced in a given city's country. Using this data from Buringh and Van Zanden we created a simple index that measures the relative increase in a country's manuscript and book production. To calculate the index we divided a country's total book production at each point in time by the number of manuscripts produced in the year 1000, i.e. 200 years before our investigation starts. This transformation allows us to better compare the growth in book production across all European countries despite their differing population sizes. To ease the visibility of the variable's coefficient for the reader, which otherwise becomes almost zero, we scaled the variable down by a factor of six.

### *G. The Country Population Variable*

Urbanization is also a function of the total population. We therefore use a *Country Population* variable to control for the population in a city's country. For the year 1000 we use data from Maddison.<sup>78</sup> His work on long term world population development partially covers mediaeval Europe. For the years 1300 to 1600 we use data from Malanima.<sup>79</sup> To create his database Malanima used the work of Bairoch<sup>80</sup> as a starting point and included revised and updated data from multiple sources. Countries' population data for 1200 is missing in both sources. We had to interpolate this data

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<sup>77</sup> Buringh and Van Zanden, 2009, op. cit. p. 422.

<sup>78</sup> Maddison, 2003, op. cit.

<sup>79</sup> Malanima, P. *Decline or Growth? European Towns and Rural Economies 1300-1600*. Naples: Institute of Studies on Mediterranean Societies, 2007, p. 26.

<sup>80</sup> Bairoch and Batou and Chevre, 1988, op. cit.

using a given's country average growth rate from 1000 to 1300. To ease the visibility of the variable's coefficient we then scaled the variable down by a factor of four.

#### *H. The Black Death Variable*

The Black Death was the most devastating bubonic plague ever, which haunted Europe between 1347-1351.<sup>81</sup> The standard figure given for the Black Death mortality is one in three. Recent research has shown that the figure is probably even higher, around 50 per cent, and according to one estimate even 60 per cent.<sup>82</sup> It spread across the whole of Europe.<sup>83</sup> Research on the mortality rates in different countries is based on documents for cities, monasteries, schools, on notary files, last wills, lists of members of city councils, committees, bakers, house owners and necrologies as well as on contemporary reports.<sup>84</sup> Scholarly authors did not aggregate such numbers to estimate the survival rates in different countries. However, it is commonly agreed, that the Black Death was most devastating in those regions where the plague appeared first and persisted longest, namely in Italy. Generally the Mediterranean countries were hit more than most others. In England and Germany the plague was less devastating than in Italy, France or Spain. Other countries such as Scotland, Ireland and the Scandinavian countries with low population density or apart from the big trading routes suffered less. Surprisingly the same holds true for Holland.<sup>85</sup> Poland as well as Bohemia were not much affected.<sup>86</sup> It

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<sup>81</sup> Kelly, J. *The Great Mortality. An Intimate History of the Black Death, the Most Devastating Plague of All Time*. New York: HarperCollins, 2012; Benedictow, O.J. *The Black Death, 1346-1353. The Complete History*. Woodbridge: Boydell & Brewer, 2004; Snell, Melissa. *The Black Death*. New York: Medieval History Guide. Available at: <http://historymedren.about.com/library/bldeath.htm> (21-7-2013); Daileader, P., Stonebarger, T., Walz, L., Leven, J., & Matin, T. *The Late Middle Ages*. Chantilly: Teaching Company, 2007; Helleiner, K. F. "The Population of Europe from the Black Death to the Eve of the Vital Revolution", in: Rich, E. E. & Wilson, C. H. (eds.). *The Cambridge Economic History of Europe*. 4 ed. Cambridge: Cambridge University Press, 1967, 1-95; Pamuk, S. "The Black Death and the Origins of the 'Great Divergence' Across Europe, 1300–1600", 11 ed. Oxford University Press, 2007, pp. 289-317.

<sup>82</sup> See Daileader, 2007, op. cit. ch. 7. Benedictow, 2004, op. cit. arrives at 60 per cent. However his findings are contested.

<sup>83</sup> Bulst, N. "Der Schwarze Tod. Demographische, wirtschafts- und kulturgeschichtliche Aspekte der Pestkatastrophe von 1347-1352. Bilanz der neueren Forschung", *Saeculum. Jahrbuch für Universalgeschichte*, 30, 1979, 45-67.

<sup>84</sup> Bulst, 1979, op. cit. p. 51.

<sup>85</sup> van Bavel, B.J. "People and Land. Rural Population Developments and Property Structures in the Low Countries, c. 1300–c. 1600", *Continuity and Change*, 17, 2002 (1), 9-37, esp. p. 10. Cited in: van Zanden,

...

seems that only Iceland and Finland were unaffected at all.<sup>87</sup> We categorize the different countries into five groups (not affected = 0, very little affected = 1, little affected = 2, moderately affected = 3, highly affected = 4 and very highly affected = 5). We attach a number to each country or region in the sample or to any city lying in the particular region, if we have data on individual cities.

**Table 3: Black Death Variable for Different Countries in 1400**

<i>Classification of Countries</i>	<i>Severity of Black Death</i>
Finland, Iceland	0
Poland, Bohemia	1
Scandinavia, Scotland, Ireland, Netherlands, Switzerland	2
England(Wales), Austria, Hungary, Germany, Russia, Portugal	3
Belgium, France, Spain,	4
Italy	5

The following table displays summary statistics of all the key variables that were introduced in the sections above.

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J.L. & van Bavel, B.J.P. "The Jump-Start of the Holland Economy During the Late-Medieval Crisis, c.1350-c.1501", *Economic History Review*, 57, 2004 (3), 503-532.

<sup>86</sup> Daileader, 2007, op. cit.; Snell, The Black Death, op. cit.; Kelly, 2012, op. cit.

<sup>87</sup> Benedictow, 2004, op. cit.

**Table 4: Summary Statistics of Key Variables Over All Points in Time**

<i>Variable</i>	<i>Mean</i>	<i>S.D.</i>	<i>Min</i>	<i>Median</i>	<i>Max</i>
City Population (in thousands)	19.34	26.50	1.00	12.00	300.00
Roman law	2.52	1.27	0.00	2.00	4.00
University	7.13	6.52	0.00	4.00	31.00
Political Freedom	3.43	2.10	0.00	4.00	7.00
Book Production (in thousands)	8599.68	19724.25	1.73	397.81	73820.00
Country Population (in millions)	8.80	4.97	0.50	9.00	18.50
Black Death (in the year 1400)	0.77	1.60	0.00	3.84	5.00

Note: In the statistical models presented below *Book Production* was scaled down by a factor of 100,000 to ease the visibility of the variable's coefficient.

## V. RESULTS OF THE STUDY

### A. The City Population Models

We first fitted a pooled regression model to see whether our independent variables are suitable to predict the dependent variable *City Population*. Based on this model we tested for multicollinearity between the independent variables using VIF (variance inflation factors) but found no sign of multicollinearity (all VIF values were below 5).<sup>88</sup> We also tested for the existence of random and fixed effects. We tested for random effects using the Breusch-Pagan Lagrange multiplier test and for fixed effects using an F-test of the joint significance of the panels. Both test statistics were highly significant (p-value <0.01). This tells us that we should use a panel data model rather than a pooled regression. To decide whether to employ a fixed effects or a random effects model we ran the Hausman test. The test statistic was highly significant (p-value <0.01) and we therefore employed a fixed effects rather than a random effects model. We decided to fit

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<sup>88</sup> For statistical reasons the fixed effects model cannot include the time invariant *Country* variable that we use to control for regional effects. This variable contains the cities' country classifications according to the Bairoch database. The pooled regression model and the random effects model include the *Country* variable. This leads to a multicollinearity problem in these two models (VIF value for *Country Population* 6.03). The multicollinearity problem is especially strong when we control for era effects, i.e. when we include a time variable in the model (VIF value for *Country Population* 14.10).



the model with robust standard errors because the test statistic of the Wooldridge test for serial correlation within panels was highly significant (p-value <0.01). The table below presents the estimation results for the pooled regression (OLS), the fixed effects model, a the generalized estimating equation model (GEE) and, due to the count data characteristic of the dependent variable, a negative binomial regression model (NBR).

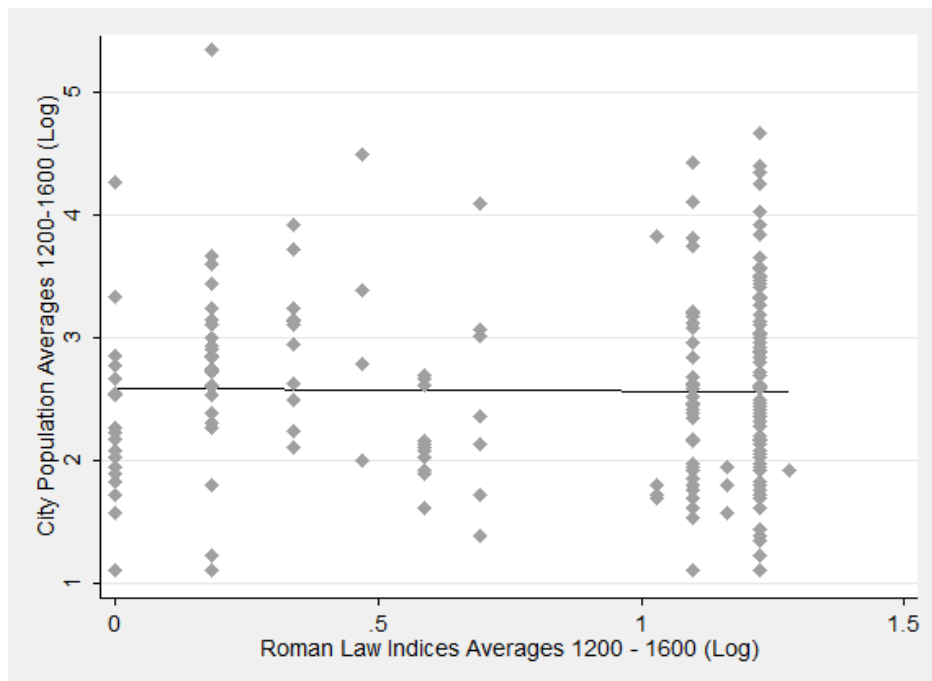
**Table 5: The City Population Models**

	(1)	(2)	(3)	(4)
	<i>OLS</i>	<i>Fixed Effects</i>	<i>GEE</i>	<i>NBR</i>
Roman Law	0.22 (0.98)	0.37 (0.93)	-0.16 (0.81)	0.02 (0.04)
Universities	0.94 (0.56)	1.51*** (0.41)	2.39*** (0.45)	0.05** (0.02)
Political Freedom	3.58** (1.28)	2.12 (1.52)	1.31 (1.18)	0.25*** (0.06)
Book Production	2.63 (1.42)	3.69*** (1.04)	2.98* (1.22)	0.26** (0.09)
City Population Lag	0.65*** (0.16)	0.26** (0.09)		0.03*** (0.00)
Country Population	1.12*** (0.25)	1.07*** (0.18)	1.03*** (0.14)	0.06*** (0.01)
Constant	-13.10*** (3.97)	-4.23 (3.11)	-11.99*** 3.16	1.10*** (0.17)
<i>N</i>	1045	1045	1045	1045
<i>R</i> <sup>2</sup>	0.51	0.35		

NOTE: \*Significant at 5%; \*\*significant at 1%; \*\*\*significant at 0.1%. The dependent variable is *City Population*. OLS = ordinary least squares; GEE = generalized estimating equation; NBR = negative binomial regression. For OLS, Fixed Effects and GEE models robust standard errors are in parentheses below coefficient estimates. For the NBR model the standard errors are calculated using residuals clustered on cities. The OLS, GEE and NBR models control for regional effects. The GEE model treats within-city differences in time as following a first order autoregressive (AR(1)) process.

In what follows we describe the preferred fixed effects model in more detail. The model has an overall R Squared value of 0.35. This indicates an appropriate fit of the model. The coefficient of the variable *Roman law* is not statistically significant at any conventional level of significance (p-value 0.69). Therefore there is no statistical evidence for an association between the spread of Roman law and the per capita income proxied by the city population number in this or any other of the above models. The following figure further demonstrates this finding. In this figure we calculated the average population between 1200 and 1600 of all cities and plotted these numbers against their average values on the Roman law index. The trend line is almost parallel to the horizontal axis, showing no relation between *City Population* and *Roman Law*.

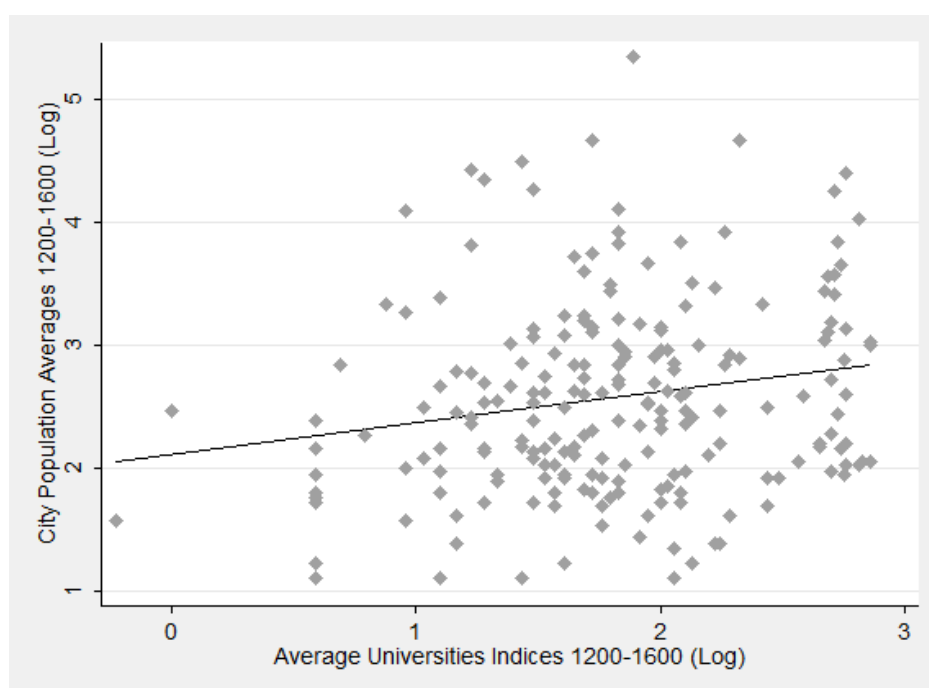
**Figure 2: City Population Plotted Against Roman Law Indices**



The coefficient of the variable *Universities* (in the version of 8 categories from "very low" to "very high") is statistically significant at the 0.1% level. The population of a city that scores higher on the index for universities increases. For each additional unit on the index the population increases on average by a predicted 1,515 inhabitants per period

after all other variables have been controlled for. This is our main finding. It shows that the spread of law as a scholarly discipline proxied by a city's access to university education had a positive impact on the city population between the years 1200 and 1600. The following figure further demonstrates this finding. In this figure we calculated the average population between 1200 and 1600 of all cities and plotted these numbers against their average values on the Universities index. The resulting scatter diagram shows a positive trend between the two variables. The two variables are also significantly correlated (correlation coefficient 0.19, p-value <0.01).

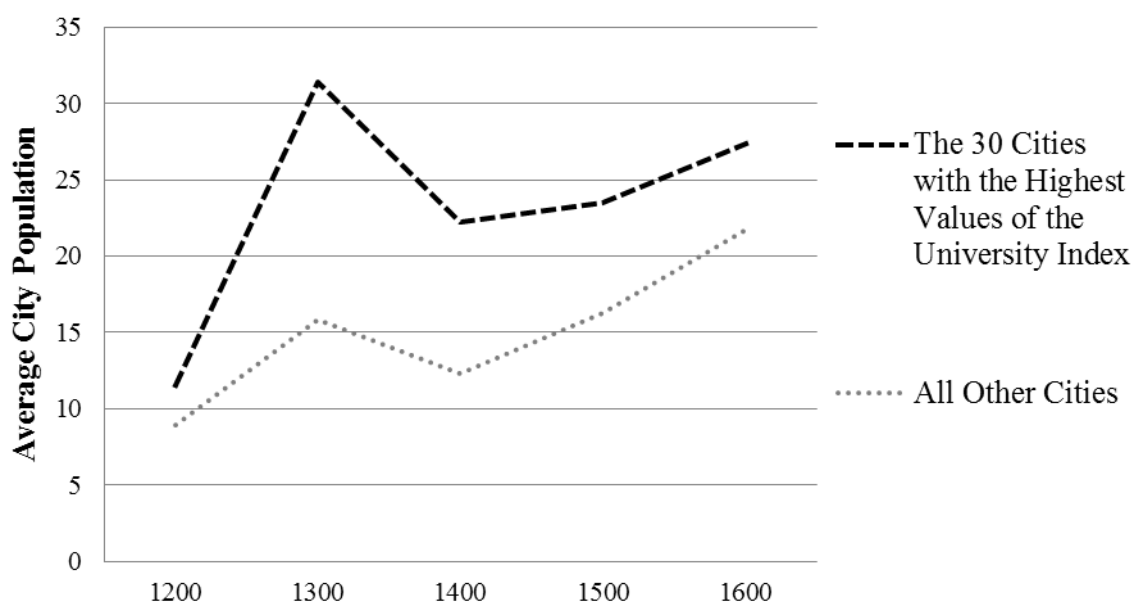
**Figure 3: City Population Plotted Against Universities Index**



To further illustrate our results we also separated all 209 cities into two categories. The first category contains the 30 cities from our sample that have the highest number of universities in a circle of 300 km around the city (plus Bologna and Paris / Orleans in a circle of 1500 km) at the 5 different points of time. The second category contains all other cities. We then calculated the average population number of the cities in both categories. It turns out that the 30 cities with the largest number of universities around

them have higher population numbers than all other cities. The population decline in 1400 results from the Black Death.

**Figure 4: Average Population of the 30 Cities with the Largest Number of Universities in the Area Compared to All Other Cities (in Thousands)**



The coefficient of the binary dummy variable *Political Freedom* is not statistically significant at any conventional level of significance.<sup>89</sup> The coefficient of the variable *Book Production* is statistically significant at the 0.1% level. An increase in a country's manuscript and printed book production has a positive effect on city population. For

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<sup>89</sup> However, if we run the model without the year 1600 our key results persist and *Political Freedom* is statistically significant at the 10% level. In this model (not displayed) more constitutional freedom leads to an increase in city population. The population of a city that is located in a country with the value 1 increases on average by a predicted 2,722 inhabitants per period as compared with a city that is located in a country with the value 0. These results are in line with previous research by De Long and Shleifer (see above). Furthermore, when we do not interpolate the missing values of the dependent variable *Political Freedom* is also statistically significant in the NBR model (results not displayed).

every 100,000 additional units on the index (i.e. when book production increases by the factor of 100,000 when compared to the year 1000) a city's population increases on average by a predicted 3,685 inhabitants. The coefficient of the variable *Country Population* is statistically significant at the 0.1% level. The total size of the population of the country in which a city is located has a strong, positive effect on city population. When the population in a particular country increases by 1,000,000 in one period (of 100 years) the population in all cities of this country increases on average by a predicted 1,070 inhabitants. The coefficient of the variable *City Population Lag* is statistically significant at the 1% level. The size of a city's population in the previous time period has a strong, positive effect on city population in the given time period.

Our main results relating to the *Universities* and *Roman law* variable also persist when the *City Population Lag* variable is excluded from the model. The *Black Death* variable is not included in the final models presented in this paper. The variable is correlated with the *Country Population* variable (correlation coefficient -0.16, p-value <0.01). If the *Black Death* variable is included in the model without *Country Population* its coefficient is statistically significant (p-value 0.02). However, when both variables are included the coefficient of the *Black Death* variable becomes insignificant (p-value 0.86). This indicates that *Country Population* already covers the effect of the plague. The *Country Population* variable reflects the decrease in the countries' total populations resulting from the plague sufficiently well. We therefore decided to exclude the *Black Death* variable from our models.

For statistical reasons the fixed effects model cannot include the time invariant *Country* variable. Nevertheless, we can include this variable in the other models presented above and hence control for regional effects. However, the pooled regression, the fixed effects and the NBR model do not control for era effects. Simply including a time dummy for the five points in time analyzed in the study reduced the explanatory power of our models and lead to theoretically implausible results. With the time variable included in the fixed effects model, the coefficient of the *Country Population* and the *Universities* variable become negative and insignificant (coefficient -0.30, p-value 0.49 and coefficient -0.02, p-value 0.97, respectively). It is however plausible that with increasing population in a country also city population increases. We therefore included population data for the different European countries as a predictor for the country's city

populations in our model. Without the time variable this predictor is highly significant and positive. With the time variable included *Country Population* has no significant effect on *City Population*. Clearly there is some conflation between these two variables because there are global population effects which are reflected in the time variable and the *Country Population* variable. We therefore decided to remove the time variable from the model. However, our main results still persist when we control for the main feature of time, i.e. the Black Death in the 1300s using a dummy variable for the year 1400. As an alternative to accounting for era effects using dummy variables for all points in time we then decided to impose a first order autoregressive (AR(1)) process on the correlation structure of the residuals using a generalized estimating equations (GEE) approach.<sup>90</sup> This approach confirms the results presented above. The GEE model treats within-city differences in time as following a first order autoregressive process. This makes it unnecessary to include the *City Population Lag* variable because the within-city structure over time is already sufficiently well modeled. Furthermore, the non-independence of observations in the same era is accounted for. Nevertheless, also if the *City Population Lag* variable is included in the model our key results persist.

We also considered a logarithmic transformation of our dependent variable *City Population*. When we did this the coefficient of the *Roman law* variable becomes significant (coefficient 0.21, p-value <0.01). However, from a theoretical point of view modeling city growth in this way does not seem plausible. It would reflect a higher than linear relationship between the number of universities around a city and city population, i.e. a law of increasing returns. In our view this is not justified. It implies that the effect of an extra university (our proxy for the availability of learned lawyers) is big for large cities and small for small cities, i.e. the size of the university effect would depend on city size. We rather expect this relationship to be linear or subject to decreasing marginal returns. Instead of employing a logarithmic model we therefore decided to run a negative binomial regression. This model has the advantage that it better accounts for the shape of the dependent variable's distribution than a linear model but it does not require a logarithmic transformation of our dependent variable. Furthermore, in contrast to a logarithmic model the negative binomial regression can also handle zeros in the

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<sup>90</sup> We thank Ted Eisenberg for this copious hint.

dependent variable. This allows us to also use the original data without interpolating the missing values of *City Population*. The negative binomial regression model therefore better accounts for the shape of our dependent variable's distribution and confirms the main empirical findings presented above. Another commonly used model for count data is the Poisson model, however a likelihood-ratio test found that the negative binomial regression model fits our data better.<sup>91</sup>

To conclude, we find a relation between the number of universities around a city and its population size. This is in line with Greif's and Berman's hypothesis that learned lawyers with training in the systematized and rationalized law caused the growth of cities. It is also in line with the hypothesis of Tönnies and Whitman, that the "learned law" eased business transactions as it promoted the development from a community, based on custom, loyalty, kinship and solidarity to a society based on individual autonomy. And it is in line with the hypothesis of Wieacker, that the rise of learned law had a pacifying effect on society with benevolent effects on investors and traders. Our statistical results suggest that it was not substantive Roman law as such but the rise of Roman and Canon law as an autonomous, scholarly and systematic body of learning that influenced growth.

## VI. THE PROBLEM OF CAUSATION BETWEEN CITY POPULATION SIZE AND THE NUMBER OF UNIVERSITIES AROUND CITIES

It is possible that city growth and the growing demand for legal services caused the legal discipline to flourish and not the other way round. We cannot therefore be sure about the effect of the *Universities* variable on *City Population*. In what follows we discuss the causality of this effect in more detail. We first present the results of a Granger causality test. We then discuss some empirical facts which seem to support the view that the arrow of causation rather goes from the development of universities with law faculties to city growth than in the opposite direction.

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<sup>91</sup> The likelihood-ratio test is based on the dispersion parameter alpha which is only valid when the residuals are not clustered on cities. We therefore performed the test without clustering.

A. *Statistical Analysis of Causation: Granger Causality Test*

The Granger causality test helps us to determine whether a causal effect between the two variables exists and if so in which direction.<sup>92</sup> The main idea behind this test is that past events cause future events. If city population causes the growth of universities then we would expect the lags of *City Population* to be significant in a regression with *Universities* as the dependent variable. We also need to include lags of the dependent variable itself, to control for the value of the *Universities* index in the previous period. If however causation goes in the other direction then *City Population* is a function of the previous value of the *Universities* index controlling for *City Population* in the previous period.

**Table 6: Granger Causality Test**

	(1) <i>City Population</i>	(2) <i>University Index</i>
City Population Lag	0.26** (0.09)	0.00 (0.00)
Universities Lag	1.66*** (0.26)	0.75*** (0.01)
Constant	6.16*** (1.43)	1.06*** (0.05)
<i>N</i>	1045	1045
<i>R</i> <sup>2</sup>	0.43	0.76

NOTE: \*Significant at 5%; \*\*significant at 1%; \*\*\*significant at 0.1%. Robust standard errors are in parentheses below coefficient estimates.

<sup>92</sup> Granger, C. W. J. "Investigating Causal Relations by Econometric Models and Cross-spectral Methods", *Econometrica*, 37, 1969 (3), 424–438.



The results of the Granger causality test provide statistical support for the view that universities triggered city growth and not the other way around (that city growth leads to the foundation of universities). In the first fixed effects model *City Population* is the dependent variable and the *City Population Lag* and *Universities Lag* variables are the independent variables. The lag variables contain the values of the respective variable from the previous time period. Both variables are statistically significant. *City Population Lag* at the 5% level and *Universities Lag* is significant even at the 1% level. This shows that the number of universities affects city population, even after controlling for city population in the previous time period. In the second model we reversed the direction of the causation. In this model the coefficient of *City Population* is not statistically significant. This shows that city population does not Granger cause the number of universities around a city.<sup>93</sup>

#### *B. Further Considerations on Causation*

We now discuss in an informal way the causality of the effect of *University* on *City Population* presenting some facts, which in our view support the hypothesis, that causation runs more from the new "learned law" to growth rather than from growth to the new law.

1. The data from the Bairoch data set show that city growth occurred in some European cities especially in Venice and Genoa from the year 900 to the year 1000 when the new law did not yet exist. However, most other cities lost population during that period. Only the commercial revolution of the 12<sup>th</sup> century led to widespread city growth. This growth occurred during a time when the influence of the new law was spreading quickly, especially in Italy. We believe it to be unlikely that the rise of some few cities in the 10<sup>th</sup> century could have triggered a demand pull of merchants, which initiated the rise of modern law.

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<sup>93</sup> A further method to deal with the problem of causation is structural equation modeling. We fitted such models to take into account that variables may influence each other in different ways. The results indicate that causation might work in both directions: from *Universities* to *City Population* and the other way around. However, the first link is significant at the 1% level, the second link only at the 10% level.

2. We try to show by way of a "Gedankenspiel" how improbable the idea of a demand model for sophisticated legal services for the startup merchant cities of the 12<sup>th</sup> century is. The Salic (Frankish) law is typical for the inextricable mix of formal law, custom, morality, clan obligation and symbolic meaning before the rise of modern law in the 12<sup>th</sup> century.

*"If any one have killed a man, and, having given up all his property, has not enough to comply with the full terms of the law, he shall present 12 sworn witnesses to the effect that, neither above the earth nor under it, has he any more property than he has already given, And he shall afterwards go into his house, and shall collect in his hand dust from the four corners of it, and shall afterwards stand upon the threshold, looking inwards into the house. And then, with his left hand, he shall throw over his shoulder some of that dust on the nearest relative that he has. But if his father and (his father's) brothers have already paid, he shall then throw that dust on their (the brothers') children-that is, over three (relatives) who are nearest on the father's and three on the mother's side. And after that, in his shirt, without girdle and without shoes, a staff in his hand, he shall spring over the hedge. And then those three shall pay half of what is lacking of the compounding money or the legal fine; that is, those others who are descended in the paternal line shall do this."<sup>94</sup>*

To imagine a merchant from Venice, Genoa or Seville who would bother to ask the presiding juror of this or a similar ceremony or ordeal for an expertise on a complex contract or how to set up a modern city statute, a joint stock company or cash-free payment method seems preposterous. The concepts and the legal products to render such services were neither in place nor in sight. It is as if Emperor Charles V (1500-1558), in whose reign the sun never set and who badly needed to speed up communication in his empire, would have asked the best engineers in the Christian world for a telephone installation. A demand model, which would explain the rise of universities, law departments and scholarly law as a consequence of city growth, is not conceivable at the beginning of this legal cultural revolution.

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<sup>94</sup> Halsall, P. *Medieval Sourcebook. Salic Law*. Fordham University Center for Medieval Studies. Available at: <http://www.fordham.edu/halsall/source/salic-law.html> (21-7-2013).

3. This argument does not apply to later periods, when the new system of law was more developed. However, a demand model for law would predict a decline of the number of universities and the number of legal manuscripts in times of a shrinking population. It would at least predict a decline of the growth rate of the number of universities and legal manuscripts. According to recent research the "Black Death" from 1347-1351 killed about half of Europe's population.<sup>95</sup> It seems that cities were hit even harder than villages. Cities imported and hosted bacteria easier than villages because they were located at trading routes and sanitation was particularly poor.<sup>96</sup> Notwithstanding in spite of the depopulation of cities the number of universities increased substantially between 1348 and 1400. Neither is the period during and after the Black Death characterized by a decrease in numbers nor by a decrease in the dynamic of expansion of universities in Europe. This fact does not support a demand model in which the rise of law is a function of the rise of merchant cities.

**Table 7: Foundations of Law Faculties in Catholic Europe 50 Years Before and After the Black Death**

	<i>Total Existing Faculties</i> 1297	<i>Increase before Black Death</i> 1298-1347	<i>Increase during and after Black Death</i> 1348-1398	<i>Increase after Black Death</i> 1398-1447
N	37	14	15	15
Increase (%)		38	29	23

4. It is also noteworthy that in Germany, which until then had no universities, several of them were founded in the late 14<sup>th</sup> and early 15<sup>th</sup> century. Their establishment

<sup>95</sup> See above "H. The Black Death Variable" and related literature.

<sup>96</sup> Voigtländer, N. & Voth, H.J. "The Three Horsemen of Riches. Plague, War, and Urbanization in Early Modern Europe", *The Review of Economic Studies*, 80, 2013 (2), 774-811.

was clearly not driven by the demand of growing cities. Cantoni and Yuchtman show that these foundations were related to the great Papal schism, during which one pope resided in Avignon and another in Rome (from 1379 onwards). The emperor was loyal to the pope in Rome. This excluded German students from universities in France and especially at the Sorbonne and even led to their exodus from French universities, which hastened the rapid foundation of German universities shortly after 1379,<sup>97</sup> namely Erfurt (1379), Heidelberg (1386), Cologne (1388), Würzburg (1403) and Leipzig (1409). These foundations owe their existence to the great Papal schism, but they sparked the establishment of regulated markets in many German cities<sup>98</sup> and therefore contributed to city growth.

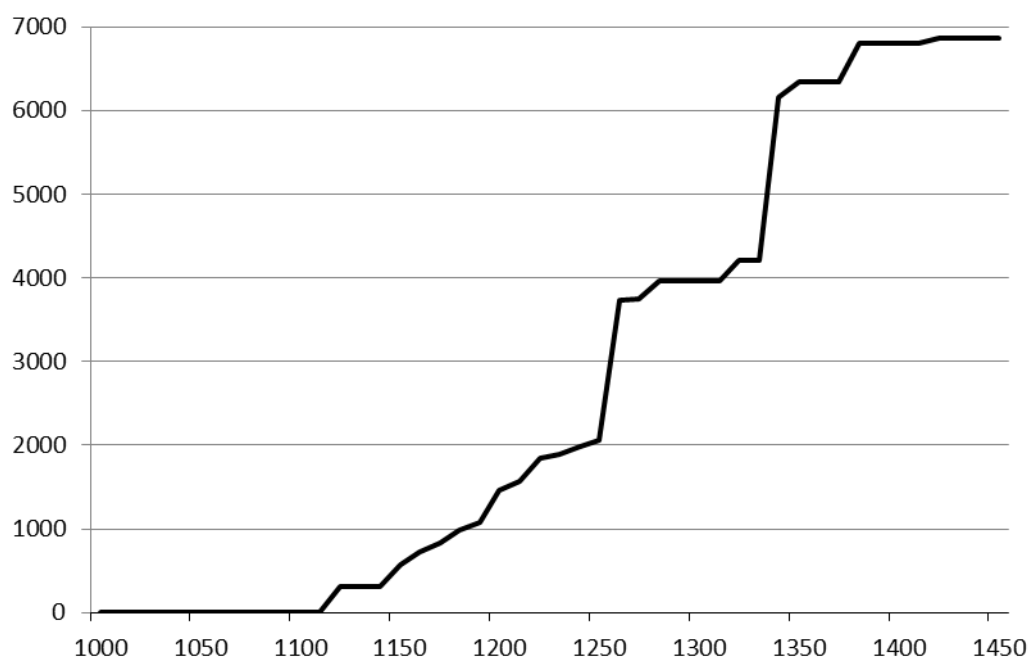
5. We get a similar impression when we look at the number of manuscripts in Roman and Canon law. It was during and after the Black Death that with the writings of Bartolus de Saxoferrato (1313-1357) and Baldus de Ubaldis (1327-1400) legal scholarship reached Olympic levels and became practically so important, that for centuries lawyers could not work without reference to these scholars. Again this had nothing to do with a demand from cities but it improved legal practice throughout Europe.

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<sup>97</sup> Cantoni and Yuchtman, 2012, op. cit.

<sup>98</sup> Cantoni and Yuchtman, 2012, op. cit.

**Figure 5: Accumulated Number of Roman and Canon Law Manuscripts**



NOTE: Max Planck Institute of Legal History provides an internet database on Roman law with information on all known legal manuscripts of the Middle Ages, the "Manuscripta Juridica". On its homepage it reads that it provides descriptions of 7133 manuscripts <http://manuscripts.rg.mpg.de/> (16.06.2013). The database informs about the authors and the texts but not about the publication year. Therefore we compiled a list of 60 scholars of Roman and Canon law which the literature of legal historians regards as outstanding, very important or important for the development and spread of Roman and Canon law. For the authors of Canon law we also used a databank of Ken Pennington of the Catholic University of America. <http://faculty.cua.edu/pennington/> (16.06.2013). We counted the number of scripts of each author on our list. As we have easy access to the year of death of each author we fixed the publication dates at a time 20 years before the author's death. As the time series spans 500 years this leads only to relatively small mistakes with regard to the year of publication. This led to the graph in figure 5.

Notice that the growth of the number of new law manuscripts is especially high after the end of the Black Death (1351), which contradicts an explanation according to which it was driven by economic needs (city growth).

6. An obvious counterargument against the Berman hypothesis that the new law caused the economic expansion is the rapid commercial development in Flanders and

later in the cities of the North European Hanseatic League. They developed sophisticated legal institutions without an influence of Roman law and with a booming *lex mercatoria*, which merchants developed themselves and which catered the needs of the business community. But again it is questionable whether this could have happened without the help of learned lawyers. In Flanders and in the Hanseatic cities lived many lawyers with a formal legal training from either French or Italian universities before they could be trained nearby.

7. These impressions are further supported by research on the economic development in Middle East (Arab) countries, which faced economic stagnation from the middle of the 13<sup>th</sup> century onwards. Kuran found that this happened even though Islam is inherently business friendly and neither cultural nor religious obstacles were higher than in Europe to allow for a sophisticated merchant law and especially company law. But Islamic law was so inflexible and rigid that modern legal forms -especially the corporation- could not develop.<sup>99</sup> In the Middle East the demand factors existed, but the legal system was not abstract, flexible and innovative enough to develop and deliver those legal products, which could have dramatically reduced transactions costs.

We conclude that the rise of law as an academic discipline was to a large extent independent from the growth and decline of merchant cities. The more plausible paradigm for the development of modern law in the Middle Ages is not a demand driven supply of legal services, which goes up and down with the overall economic activity but of a cultural development, which did not only react to demand factors but also followed its own laws.<sup>100</sup> This does not rule out the possibility and even high probability that causation in such a complex process works in both directions. But available data suggest that it worked mainly in one direction.

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<sup>99</sup> Kuran, T. *The Long Divergence. How Islamic Law Held Back the Middle East*. Princeton: Princeton University Press, 2012.

<sup>100</sup> Allen Watson expressed most explicitly the view that legal development follows its own intrinsic structures. "My conclusion is simple, Legal change comes about through the culture of the legal elite, the lawmakers, and it is above all determined by the legal culture". Watson, A. *The Evolution of Western Private Law*. Baltimore: Johns Hopkins University Press, 1985, p. 264.

## VII. SUMMARY AND CONCLUSIONS

Western law emerged during the high middle ages with the resurrection of Roman law (*Corpus Juris Civilis*), the rise of Canon law and the related development of the scholarly, rational and systematized "learned law" taught in the newly established universities. We test whether this development in medieval Catholic Europe had an influence on economic growth between the years 1200 and 1600. As data on per capita income in different countries, regions and points of time are not available for the relevant period we use data on city population of the Bairoch data set as proxies for per capita GDP. We work with data on the population of 209 cities in Western Europe. This allows us to test two competing hypotheses. According to one hypothesis the medieval resurrection of Roman law was conducive for doing business and the spread of Roman substantive and procedural law explains city growth. One would then expect more growth in those regions, which received much of Roman law and less in those, which either rejected Roman law or implemented only parts of it and developed their inherited customary law. To test this we constructed an index, which contains information on how widespread the reception of Roman law was in different European regions at different points of time.

The alternative hypothesis is that it was not substantive Roman law, which had an impact on growth but the rise of law as a scholarly discipline (*Verwissenschaftlichung*), which is intertwined with the reception of Roman Law and the development of Canon law but is not the same. With the rise of "learned law" in the universities across Europe a common legal grammar and a system of law gave legal scholarship and the law a flexibility and innovative openness, which enabled lawyers to create new legal forms conducive to business, like city statutes, companies, insurance contracts or cash-free payment methods. It also created a new spirit of the law, which separated legal from moral and customary, mostly community oriented obligations. Again this was conducive to business and economic development, regardless whether its impact was on the norms of Roman law, feudal law, customary law or merchant law. We use the number of universities near cities (in a radius of 300 km) as a proxy for the number of academically trained lawyers and their influence on jurisdiction, administration and commerce and therefore as predictor of the city's population. This index number

increases further when the influential universities of Bologna or Paris / Orléans are in a circle of 1500 km around the city.

Our panel study gives support to the second but not to the first hypothesis. From this we conclude that it is was not the Roman law as such but the scientific, rational, systematic and more individualistic approach of legal scholarship in all of western Europe which led to city population growth. The teaching of Roman and Canon "learned law" was the same in all European universities regardless of the extent to which substantive Roman law had become the law in the region around a university. The results of our study support the view of legal historians, especially Berman and to some extent Wieacker and Whitman that the medieval economic rise of Europe owes much to the rise of law as a rational and systematic scholarly discipline, which strengthened individual values over customary duties and generated superior rules of conflict resolution. This influence was independent from the extent to which a particular region adopted the rules of Roman law. Also, our study supports the view, that causation went from the rise and spread of modern legal scholarship to city growth. In such complex processes causality usually works in both directions. Our findings indicate more that the rise of learned law was a relatively autonomous cultural achievement with an impact on the economy rather than the opposite, a predominantly demand driven increase for law, lawyers and universities caused by the needs of rapidly growing cities.

Our study complements recent research of Kuran about the Middle East during the same period. There the legal system became sticky und inflexible, in contrast to the learned law of Western Europe. It systematized a stagnant law, not one that was evolving. The law schools in the Middle East (madrasas), were stagnant organizations, whereas universities were dynamic. Whereas the universities dealt with a progressively advanced law, the madrasas worked on homogenizing a law that did not change over time. This feature of the law contributed to the stagnation of the Middle East economy after 1250.<sup>101</sup>

Our findings are in some contrast to those writings of Max Weber, in which he

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<sup>101</sup> Kuran, 2012 op. cit.



maintained that the economic rise of Europe was driven by the protestant ethics, which trained humans to suppress their short-term "animalistic pleasures" in favor of their "constant motives".<sup>102</sup> Our findings do not contradict Weber's thesis but indicate that the decisive developments, which made Western Europe the economic powerhouse of the world took place before the reformation, that the underlying reasons for this were cultural developments, which influenced the economy indirectly through better institutions and that these institutions were set promoted by catholic authorities and spread in all parts of Western Europe. Our findings support the view of Douglas North and others, who maintain that the capacity of informal law enforced with social sanctions to generate growth is limited. For large organizations and transactions, stretching over long time periods and large distances formal law and new forms of law are necessary to drive economic development further.<sup>103</sup> This study does not support the view, that common law is inherently better suited than civil law to promote economic development<sup>104</sup>. The rise of modern law in Europe since the 11<sup>th</sup> century later resulted in the civil law tradition. It seems that a legal system supports growth, if it is flexible enough to adept to new developments and innovative enough to provide new legal forms, and that it hampers growth when it becomes sticky. Both features are compatible with common law as well as with civil law. The notion in this study that more lawyers imply more growth is not self-evident. Mancur Olson<sup>105</sup> showed that the net contribution of lawyers might be negative if their activities focus on rent seeking rather than on legally organizing win-win constellations. Olson took for granted that the law was already well developed. In Medieval Europe, this development was a task that remained to be accomplished.

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<sup>102</sup> Weber, M. *The Protestant Ethic and the Spirit of Capitalism*. London: Allen and Unwin, 1930, esp. p. 117.

<sup>103</sup> North, 1981, op. cit. and North, D.C. "The New Institutional Economics", *Journal of Institutional and Theoretical Economics*, 142, 1986 (1), 230-237.

<sup>104</sup> Glaeser and Shleifer, 2002, op. cit. and López de Silanes et. al., 2002, op. cit.

<sup>105</sup> Olson, M. *The Rise and Decline of Nations. Economic Growth, Stagflation, and Economic Rigidities*. New Haven: Yale University Press, 1982.