The Legacy of the Brethren of the Common Life

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Abstract

The Brethren of the Common Life (BCL) were a religious community founded by Geert Groote in the city of Deventer in the Netherlands in the late fourteenth century. The BCL stimulated the accumulation of human capital through schools, libraries and the production of books and laid the intellectual foundation for Christian Humanism in the Low Countries and the rest of Northern Europe. This paper empirically investigates the long-lasting impact of the BCL on a range of economic and societal outcomes in the Low Countries. Our empirical estimates provide evidence that the BCL has contributed to the uniquely and early high rates of literacy in the Low Countries in the decades before the amazing development of the Dutch Republic in the seventeenth century. In addition, we find positive effects of the BCL on early book production and on city growth in the fifteenth and sixteenth century. Finally, we find that cities with BCL-roots significantly earlier joined the Dutch Revolt against the Habsburg Rulers. These findings are supported by regressions that use distance to Deventer as an instrument for the presence of BCL.

1. Introduction

The Brethren of the Common Life (BCL) were a religious community founded by Geert Groote in the city of Deventer in the Low Countries in the late fourteenth century. The BCL stimulated the accumulation of human capital through schools, libraries and the production of books, and followed a socially inclusive approach for educating ordinary young citizens. This way, the BCL laid the intellectual foundation for Christian Humanism, which is considered one of the most profound cultural changes in Western history (e.g., Israel, 1995) and has been directly linked to fundamental differences in economic development by inducing the Reformation (as e.g., Becker and Woessman, 2009 have analyzed for Germany). The early development and diffusion of Christian Humanism in the Low Countries provoked a severe repression of the Dutch by the Habsburg Rulers in the sixteenth century. These developments seem to be the most fundamental factors for the Dutch Revolt against the policies of Charles V and Philip II in the late sixteenth century, which marks the start of the amazing development of the Dutch Republic in the seventeenth century.

This paper investigates the impact of the legacy of the Brethren of the Common Life on a number of early economic and societal outcomes. We analyze the impact of the BCL by focusing on differences across a sample of Dutch cities in the late Middle Ages and early Renaissance. First, we study the impact on two indicators of human capital: literacy rates and book production. We examine whether the uniquely high rates of literacy in the Low Countries in the decades before the start of the Dutch Golden Age, as noted by historians (e.g., Parker, 1977; Cippola, 1969), are associated with the BCL. The data on literacy rates at the end of the sixteenth century come from the Amsterdam archives and are the oldest data that enable an assessment of local differences in literacy in the Low Countries (e.g., Hart, 1976). We investigate the relationship between the location of BCL-schools and local differences in literacy rates. In addition, we examine the relationship between the BCL and the production of books at the city-level in the period 1470-1500, which is the period immediately after the invention of the movable type of printing press in Mainz. Second, we study the impact of BCL on economic well-being by investigating the relationship between BCL and city growth. In the literature on explaining urbanization, modern European city growth is used as the main indicator of economic progress (e.g., Dittmar, 2011). Third, we examine the relationship between the BCL and the Dutch Revolt in the second half of the sixteenth century. The Dutch Revolt started on 1 April 1572 when about 600 rebels took the small city of Brielle. In the next months many cities in the Low Countries revolted against the

Spanish rulers. We investigate whether the presence of the BCL is associated with the starting date of the Revolt in Dutch cities.

To empirically document the association between the BCL and the economic and societal outcomes in the fifteenth and sixteenth century we use OLS estimators. We then attempt to establish a causal relationship between the BCL and the economic and societal outcomes by using instrumental variables techniques. The instrument we use is the distance to Deventer, the city where Geert Groote founded the BCL in the late fourteenth century and many influential Christian Humanists, such as Desiderius Erasmus and Pope Adrian IV, attended the famous Latin school. Our estimates show that distance to Deventer is associated with the economic and societal outcomes after 1400, but not with the presence of schools before 1400 or with city growth before 1400.

Our empirical estimates suggest a positive relationship between the BCL and the accumulation of human capital at the city level. The rate of literacy and the number of new book editions is higher in cities that had BCL-activity. In addition, we find that cities in which the BCL was active have experienced stronger population growth in the period 1400-1560. Moreover, the location of the BCL is associated with the start of the Dutch Revolt. Cities with BCL-roots joined the rebellion significantly earlier relative to other cities. These associations are robust for various specifications. We also find some evidence that these associations can be considered as causal relationships. The instrumental variable estimates, using distance to Deventer as an instrument, corroborate the OLS-estimates for all the outcomes that are considered. We conclude that the legacy of the Brethren of the Common life had a long-lasting impact on the economic and societal changes in the Netherlands in the period before the start of the Dutch Golden Age.

The paper proceeds as follows. In the next section the mechanism of how the BCL has influenced education outcomes, economic development and societal change is explained. Section 3 presents the data sources. In Section 4 three main sets of regression results are documented. Section 5 presents a number of robustness checks and discusses alternative explanations. Section 6 concludes.

2. The Mechanism

This section describes how the Brethren of the Common Life (BCL) has had a long-lasting impact on the unique economic and societal developments in the Low Countries. Two key

elements can be distinguished. First, the BCL stimulated the accumulation of human capital through schools, libraries and the production of books. Various recent studies provide evidence for the impact of human capital on city growth and economic change in fifteenth and sixteenth century Europe (e.g., Baten and Van Zanden, 2008; Dittmar, 2011). Second, the BCL laid the foundation for Christian Humanism in Northern Europe, which is considered one of the most profound cultural changes in Western history (e.g., Israel, 1995). Christian Humanism induced the Reformation which provoked a severe suppression of the Dutch by the Habsburg Rulers, who were part of the Roman Catholic Church. All formally elected Holy Roman Emperors between 1438 and 1740 were from the House of Habsburg. These developments seem to be the most fundamental factors for the Dutch Revolt against the policies of Charles V and Philip II in the late sixteenth century, which marks the start of the amazing development of the Dutch Republic in the seventeenth century. The emphasis of the BCL and Christian Humanism on the personal development of individuals, which separated the Protestants from the traditional Roman Catholic Church, might also have fostered a Protestant economic mentality focused on individual capitalism and entrepreneurship.

2.1. Foundation of the BCL

Geert Groote (1340-1384) was the founder of the BCL, which has later on in history been put under the umbrella of the movement of Modern Devotion. Groote was a descendant of a rich family living in the city of Deventer, a city in the eastern part of the Netherlands. He was not so much interested in running the family business and decided to devote his life to reading and religion. After he survived a serious disease, he established the BCL, the first sign of the Modern Devotion movement in Europe. Modern Devotion is a religious movement within the Roman Catholic Church, which promoted an intense personal relationship with God. Groote established the movement because of dissatisfaction with the moral decline in the Catholic Church. In particular he used his family's wealth to buy houses in which he established communes, which are known as BCL houses. The monastic reform that Modern Devotion pursued was to return to the customs among the early Christians. The motive force was at first primarily religious: "to return to a simple New Testament life, and to rest faith in a vernacular Bible accessible to all" (Laurie, 1896, p.143). To achieve this, Groote translated parts of the bible to Dutch with additional explanatory notes just before he passed away in 1384. He gave special emphasis on the use of vernacular and preached in almost all big cities in the Low Countries by 1380 (Hyma, 1950, p. 20). The BCL believed that the best way to achieve a socially inclusive church reform was to educate the young and support the spread

of literacy so that religion becomes a personal experience. Education of ordinary young citizens was one of the main pillars of the BCL. Remarkably, this concept of personalizing religion became one of the key features of Christian Humanism and the Reformation about 150 years later.[1]

The movement had a unique character and organization, which differs from other forms of establishments of that time in several ways. First of all, members lived a common life but no wows were taken as in monasteries. Members enjoyed a mixed-life balancing daily and religious activities. This mixed-life philosophy encouraged members to become influential in society and to support the BCL rationales on education of the youth and monastic reform. The manual work in the BCL houses was book copying. This was exceptional in the sense that all other known religious organizations and monasteries of that time engaged in agriculture as manual work. After the invention of the movable type of printing around 1450 in Mainz some brothers engaged in printing and teaching activities.[2] Finally and most importantly, the BCL used education as a tool to achieve monastic reform. The ideal to educate the youth increased the supply of education, which had drastic long-run impact on the development of Dutch society.

2.2. Impact on Human Capital

Groote believed that religion is personal and thus people should be able to read and decide for themselves (Hyma, 1924, p. 16). This view on religion was different from the view of the Roman Catholic Church at the time (Post, 1968, p. 25). Translation of the Bible into Dutch, book copying (and printing), supporting schools and innovations in the educational system are the achievements of the BCL with the greatest impact on early human capital formation in the Low Countries. These achievements can be collected under three main headings: Copying and printing books, supplying education to all and institutionalizing education to make it more effective and efficient.

2.2.1. Copying and Printing Books

Before the invention of printing, books were duplicated simply by copying from a master book, which in most cases was obtained through personal contacts. Copying books was an essential activity for the BCL and specifically mentioned in the preface of the constitution of the Deventer and Zwolle houses: “Our houses were founded with the intention that, in

[1] The Reformation started in Wittenberg (Germany) in 1517 with the theses of Martin Luther.
[2] The diffusion of the printing press in Europe starts in Mainz around 1450. Johannes Gutenberg invented the movable printing press in Europe (e.g., Dittmar, 2011).

imitation of the Primitive Christian Church, priests and clerics might live there supported by their own labor, namely the copying of books, and by the return from certain estates" (cited in Hyma, 1968, p. 15).[3] Agricultural work did not associate with the movement's cause and moreover book production was a major source of income to support BCL houses and dormitories. Books copied by the BCL were known for the accuracy of texts and the quality of production (Haselden, 1939).

With the invention and diffusion of the printing press around 1450, copying manuscripts became inefficient and unprofitable. There were two implications of this development. First, brothers started to engage in teaching to compensate for the loss of income. Second, the BCL established printers of their own and supported other printers. By 1490 about sixty printing establishments were controlled by the BCL (Haselden, 1939). In Brussels, the BCL operated the first and only printing press. All 37 incunabula editions (books published before 1500) from Brussels were printed by the BCL. Table 1 provides an overview of all books published before 1500 in the Low Countries. About fifty percent of all editions published in the Netherlands before 1500 were coming from the printing presses in Deventer (640 editions) and Zwolle (153 editions). 177 of these books published in Deventer and Zwolle were classics (see Strand, 1968, p. 55). For comparison, the famous printing centre in Antwerp is responsible for 477 editions. By the year 1500 *The Imitation of Christ* by Thomas à Kempis, which is a major source book for the BCL, passed through 59 editions with 1,000 copies in each edition (see Liebell, 1924). *The Imitation of Christ* was the second most read religious book after the Bible.

2.2.2. Education for All

Public schools received considerable attention from the BCL. Schools in Deventer and Zwolle were among the best schools in transalpine Europe in the fifteenth century (e.g., Hyma, 1924; Post, 1968). John Cele (the rector of the BCL school in Zwolle from 1375 to 1417) and Alexander Hegius (rector from 1483 until 1493) are well-known educators who supported the ideals of the BCL for monastic reform (see Post, 1968). The BCL supported these schools and intervened in the selection process of teachers and rectors. For instance, a great number of the letters of Groote were written to the rectors of Deventer, Zwolle and Kampen. The Deventer school reached 2,000 students under Hegius and the Zwolle school attracted about 1,200 students under the direction of John Cele. Given the population figures

[3] In the early 1440s the rector of the Doesburg BCL house turned manual work from book copying into agriculture. He was dismissed immediately (see Post, 1961, p. 384).

of the mid 15th century, in both cities about 25 percent of the inhabitants were students. To illustrate the significance of this number in terms of learning and education we can compare it to contemporary Boston and London, two of the top university cities according to Global University City Index.[4] In 2009 there were about 135,000 students enrolled in tertiary education programs in Boston which corresponds to 21 percent of Boston city population.[5] For London with a tertiary student population of about 400,000 this figure is about 6 percent.[6] This number is about 12 percent for Amsterdam (about 89,000 students). The Deventer school has distinguished alumni including Desiderus Erasmus, John Murmelius, Conradus Mutianus and Pope Adrian IV (the only Dutch pope throughout history).

The BCL also established schools in various cities in the Low Countries and Germany such as Utrecht, Amersfoort, Nijmegen, Liege, Delft and Ghent. In some cases (for instance, 's-Hertogenbosch) the schools were established because the city magistrate requested the BCL to control the education in the city (e.g., Gem, 1907). In Utrecht the BCL had the monopoly in schools of pupils aged 12 and above. Similarly, in Amersfoort all secondary schooling was controlled by the BCL by 1555 (Henkel, 1968).

A major challenge was to spread education to rural areas. By setting up hostels and dormitories for poor children, the BCL made education more accessible and encouraged poor children to attend schools. In Deventer, Zwolle, Amersfoort and 's-Hertogenbosch the hostels were large enough to accommodate up to two hundred pupils. Most of them attended the public school or the BCL school in the city. Brothers generally played a role in the spiritual needs of these children but most of the time helped them learn how to read and write. In all hostels there was a brother who was assigned the task to go over what students learned in class (see Post, 1968, p. 394). Figure 1 shows the cities with known BCL houses in the Netherlands on a map.

2.2.3. Institutionalizing Education

The eight-grade system, which is still what the current educational systems in most Western countries is based on, was originally invented by John Cele in Zwolle and later successfully adapted by the Deventer BCL school. This innovation, that significantly improved teaching

[4] See http://www.rmit.com.au/browse;ID=q3l220b3wzs5 for details.
[5] The figures are for students who are enrolled in a university in Boston city. If we consider all universities in Boston metropolitan area the number is as low as 6 percent (see the U.S. Department of Education National Center for Education Statistics at http://nces.ed.gov/globallocator/).
[6] According to the Higher Education Statistical Agency there are 265,111 university students in London in 2005. Including all other colleges and tertiary schools, this is about 400,000 (http://www.londonhigher.ac.uk/294.html for details).

standards, had a great impact on institutionalizing education. By dividing secondary school education into eight classes, the curriculum became less demanding for children. The first grades were based on more practical teaching (i.e., knowledge that everybody needs) and advanced courses were taught later on. The usual teaching-day of about ten hours was reduced by almost fifty percent. Personal notes of pupils were collected in a book for further practice and visual aids, such as maps, were incorporated in teaching (Henkel, 1968). The system was organized in such a way that students in the eighth grade, assisted students in lower grades, sometimes even in the form of tutoring and the organization of exams. The most important innovation of eight-grade division was the inclusion of *trivium* (grammar, logic and rhetoric) and *quadrivium* (arithmetic, geometry, music and astronomy) in the curriculum. This system corresponds to the first two grades observed in medieval universities. Under the auspices of Alexander Hegius (in Deventer), advanced courses even included Latin, Greek and Hebrew. These attempts were among the first to introduce humanistic thoughts into education.

The BCL was instrumental in transferring this new organizational innovation in education to other cities in the Netherlands and the western and south-western parts of Germany. The system reached a degree of maturity under Hegius in Deventer and gradually diffused from Deventer to other cities. Being educated in the Deventer school, Louis Dringenberg used similar principles to set up the first school in a humanistic fashion in Schlettstadt, Germany in 1441 (Hyma, 1924, p.16). In similar way, John Murmelius applied the new system to schools in Münster.

In Amersfoort the system was amended to have nine grades. Liege also had a nine-grade system. Johann Sturm copied the organization in Liege to the school in Strasbourg around 1538. He specifically credited the BCL and the school in Liege as the source of his educational reform. From Strasbourg, the eight-grade system penetrated into Germany. John Calvin, who was an assistant of Sturm in Strasbourg from 1539 to 1541, carried the system to the school he established in Geneva in 1559. Calvin organized the school in seven grades with more emphasis on biblical texts. He reduced the share of classical literature.

When Jesuits were called to Rome in 1584 to suggest improvement in the organization and administration of education, they suggested a system that resembled the BCL school system. The final form of this plan (published in 1599) resulted in the foundation of Jesuit schools in which education was organized according to an eight-grade system. Pijper (1914) argues that

English puritans carried the eight-grade system to America and McCarrel (1934) argues that the BCL influenced the development of modern training school in the United States.

Germany, Belgium and Switzerland followed the earlier innovations in education in the Netherlands with a lag of about a century. It is interesting to observe that the reflection of this on literacy rates was persistent till the mid-eighteenth century. In Figure 2a we can see this by plotting literacy rates from 1600 to 1775. The data is gathered from the marriage records after 1580 in the Amsterdam Archives (Hart, 1976).[7] The percentage of grooms that signed the marriage record is considered as a proxy for literacy. As can be seen from the graph, in 1600 the literacy rates in the Netherlands were about two times those of Germany and this gap closed only in the mid-eighteenth century. If we look at literacy rates in different parts of Germany and the Low Countries the picture is even clearer. Figure 2b compares literacy in cities in the eastern part of the Low Countries with those in the western part of Germany (Niedersachsen). We have literacy rates for about 15 cities in the Niedersachsen region which borders the Low Countries and includes three important Hanseatic trade cities (Bremen, Lübeck and Hamburg) that are in the east of Niedersachsen. It seems that the cities that are closer to Dutch border (west-Niedersachsen) were more literate than the ones located in the eastern part of Germany. West German towns had comparable literacy rates relative to their Dutch neighbors starting from the eighteenth century. There seems to be a literacy gap ranging from 70 percent in 1600 to 15 percent in 1800 between the Low Countries and West Germany. Considering that the three cities on the west are important trade cities we expect the literacy on average rates to be even lower in other parts of Germany.[8]

2.3. The Impact of BCL on Christian Humanism

Together with the Windesheim Congregation and the Chapter Sion under the Augustinian Canons Regular, the BCL formed the Modern Devotion movement around the city of Deventer. Towards the end of the fifteenth century, BCL allied themselves closely with the humanists (e.g., Laurie, 1896 and Hyma, 1951).

The influence of the BCL on Christian Humanism can be seen from the similarity of ideas and from networks of influential persons and schools. Christian Humanism started between 1470 and 1490 in the Modern Devotion-cities of the north-eastern parts of the Low Countries

[7] From the records of about a million marriages from 1580 onwards in Amsterdam it is possible to see whether the groom and bride signed or put a mark indicating approval of the marriage. There is also indication of where (city of origin) the groom or bride is coming from. See Appendix Section A.2.1 for more information.
[8] This literacy gap is even more pronounced for women.

(Deventer, Zwolle, Kampen and Groningen). It was a blend of Italian humanist science and Christian ideals, fostered by the tradition of the BCL. The ideas about personalizing religion from Thomas à Kempis' widely spread book *The Imitation of Christ* are fundamental for the *Philosophia Christi* of Rudolf Agricola and Desiderius Erasmus, and for the leading thinkers of the Reformation since 1517. Wessel Gansfort (1419-1489), one of the leading Modern Devotion representatives, worked in the north-eastern cities Zwolle, Deventer and Groningen. His work had a direct influence on Martin Luther. Agricola, who is considered to be the founding father of humanism in Northern Europe (e.g., Israel, 1995), was educated by the BCL and worked during most of his life in the north-eastern cities of the Low Countries. The major individualistic reform movements that revolted against medieval scholasticism and the institutions that underpinned it were laid by the BCL. It caught on in the universities (e.g., the famous *College de Montaigu* in Paris became one of the leading theological faculties in the late fifteenth century; among the students were Erasmus, John Calvin and Ignatius Loyola the founder of the Jesuits) and required a redefinition of God, who was no longer a rational governing principle but an arbitrary. God was now a ruler, and religion would be more fervent and emotional. Luther however advocated that no mercy exists but from God.

Before 1490 Christian Humanism had an impact on the culture of the Low Countries through the urban and Latin Schools, especially schools in the north-eastern Dutch cities. Geert Groote attended the Latin School in Deventer. Alexander Hegius (1439-1498), who was Agricola's main pupil, was the headmaster of the Latin School in Deventer from 1483 until 1493. This school, famous in the whole area including the German region of Westphalia, was the seed-bed of Dutch humanism. Erasmus (1466-1536) attended this school between 1475 and 1484. Around 1500 Deventer was the centre of humanist book production in Northern Europe with more Greek text editions than Paris (Schoeck, 1988).

The impact of the BCL on Christian Humanism can be seen from the relations between the leading thinkers of the BCL and Christian Humanism. Figure 3 presents a chronological network graph of the most important people educated by the BCL from 1400 to about 1550. The persons in the network are sorted according to their year of death. The orange nodes indicate that the person was either affiliated with the BCL or received education in one of the BCL schools. The size of each node shows the centrality of a person, i.e., how central a person and his neighbors are in a network. As can be observed from the picture, the BCL-affiliated people penetrated in to the age of the Reformation and had connections with leading figures in the German, Swiss and British reform movement. Important intellectuals educated

by the BCL include the humanists Desiderus Erasmus and Conradus Mutianus; printers such as Badius Ascensius (Jose Bade); prominent mystics and scholars such as Wessel Gansfort, Rudolph Agricola and Thomas à Kempis; and influential educators such as John Cele, Alexandre Hegius, Ludwig Dringenberg, John Standonck and Johann Sturm. More information on the data and all persons in the network is provided in the Appendix (Section A.2.7).

2.4. The BCL and the Uncompleted Reformation in the Low Countries

The Reformation had its symbolic start in 1517 when Martin Luther posted his theses on the All Saint's Church in Wittenberg. Luther was educated at the Latin school in Magdeburg, which was led by the BCL. The main ideas of Christian Humanism constitute the roots of the Reformation. For instance, Erasmus distinguishes in his main works, published between 1503 and 1516, 'false religion' from 'true Christianity'. He stimulated individuals to organize their own personal life like the life of Christ and to keep one's distance from false devotion – statues, veneration, pilgrimage, fasting and ceremonial rituals. Erasmus criticized the behavior of the clergy and the corruption and the immorality in monastic institutions in the same way as Geert Groote had done a century before.

The Reformation in the Low Countries developed in a different way than the Reformation in Germany or other parts of Europe. For many decades the Reformation in the Low Countries remained an uncompleted Reformation, and this seems a key factor for the Dutch Revolt against the Spanish rulers. Between 1490 and 1520 Christian Humanism quickly diffused in the Low Countries, more than in any other country in Northern Europe. Christian Humanism conquered Latin Schools, found many followers in city administrations and had a large impact on education, culture and religious consciousness (Israel, 1995). Hence, Christian Humanism was more deeply rooted and diffused in the Low Countries than in other European Countries. However, the Habsburg rulers (Charles V and Philip II) were more powerful in the Low Countries and probably more afraid of Christian Humanism in the Low Countries because of its early start and wide scale diffusion due to the high levels of literacy among ordinary citizens. To fight the reformatory movements, the Habsburg rulers used severe repression against all deviant religious practices (the inquisition). Another factor that is likely to have contributed to the different development of the Reformation in the Low Countries is the opinion of Desiderius Erasmus. He wanted to bring change from within the Roman Catholic Church and did not object to the institution of the Church or faith, again a similar position as taken by Geert Groote a century before. Erasmus was also afraid that the reaction

to Luther's protest against the Roman Catholic Church would backfire on the whole movement of Christian Humanism.

2.5. The Dutch Revolt

The strong repression by the Habsburg rulers created a situation which has been described as a 'mental civil war' with strong alienation of substantial parts of the population from the state and the traditional church (Israel, 1995). In 1566 a covenant of members of the lesser nobility came together and submitted a petition to the Regent Margaret of Parma. The objective was to obtain a moderation of the placards against heresy in the Netherlands. This petition played a crucial role in the events leading up to the Dutch Revolt.

In the next months the Netherlands became the scene of the *Beeldenstorm*, a riotous iconoclastic movement by Calvinists, who stormed churches and other religious buildings to desecrate and destroy church art and all kinds of decorative fittings over most of the country. The movement started in the Southern Low Countries and seemed to have a spontaneous character. However, after spreading to the Northern Low Countries, the movement started to have a systematic and organized character by the inference and coordination of nobility and influential citizens (Israel, 1995).

A remarkable difference between the Northern and Southern Low Countries was that in the Northern Low Countries there was no Catholic reaction against the iconoclastic violence. Israel (1995) suggests that this difference indicates a lack of support for the traditional Roman Catholic Church and the Habsburg Rulers in the Northern Low Countries. Philip II reacted by sending an army of 10,000 troops, led by General Alba, to suppress the rebellion. Alba took harsh measures and rapidly established a special court with a staff of 170-200 people (*Raad van Beroerten* or Council of Troubles) to judge anyone who opposed the King. No one, not even high nobility who had been pleading for less harsh measures, was safe. Israel (1995) notes that it is remarkable that this council, with an exception of the Southern cities of Doornik, Antwerp, Valenciennes and Ieper, found more evidence of organized opposition and heresy in the Northern Low Countries, indicated by relatively more convictions in the Northern cities.

The large number of executions led the court to be nicknamed the "Blood Court" in the Netherlands, and Alba to be called the "Iron Duke". Rather than pacifying the Netherlands, these measures helped to fuel the unrest. In addition, the number of refugees from nobility and influential citizens was much higher in the North than in the South. The threat of losing

power and wealth might have been an argument for these groups to start revolting. The Dutch Revolt started on 1 April 1572 by a group of 600 rebels ('Gueux') who took the small coastal city of Brielle. In the next months the Revolt spread especially in the Northern Low Countries. After many years of war against the Spanish armies the seven Northern provinces became independent in 1588 which marks the start of the Dutch Republic. Figure 4 shows the revolting cities in the Netherlands. The numbers attached to the dots indicate the time measured in days that elapsed after Brielle was taken over by the rebels. These dates are drawn from historical records (e.g., De Graaf, 2004; Parker, 1977). A list of cities and revolt dates is presented in the Appendix (Section A.2.4).

3. Empirical Strategy and Data

The aim of the empirical analysis is to investigate the long-lasting impact of the BCL on a range of economic and societal outcomes. Our main variables are: the locations of the BCL, book production, literacy, city growth and the starting date of the Dutch Revolt. We use a number of data sources for these variables. In this section we present the most salient details. Detailed variable definitions and data sources as well as an elaborate description of our data treatment can be found in the Appendix.

Our main independent variable is a dummy for the presence of the BCL in a city. The information on the presence of the BCL is taken from Hyma (1924; 1950; 1951 and 1958), Post (1968), Fuller (1995) and Van Engen (2008). Figure 1 shows a map of the Netherlands in which we present the cities with a BCL house. As dependent variables we use two indicators of human capital: book production and literacy rates. The data on book production for the period 1470-1500 are from the British Library Incunabula.[9] Data on literacy in 1600 come from the Amsterdam Archives and Hart (1976). Male literacy is defined as the share of grooms that signed for their marriage in Amsterdam instead of stamped for it by finger print. Since the place of birth of each of the grooms is known, this provides information about literacy in other cities (see the Appendix for more details on these data). The literacy rates we obtain in this way are available for 33 cities. It should be noted that these literacy rates are based on samples of migrants to Amsterdam, which might induce measurement error, for instance due to the distance to Amsterdam. As our third dependent variable we look at city growth. We use data on city growth between 1400 and 1560 for a sample of 67 cities with more than 1,000 inhabitants in 1400. Data on smaller cities (around 500 inhabitants) seem

[9] See www.bl.uk/catalogues/istc/index.html.

quite unreliable because for most of these cities a number of exactly 500 is reported (e.g., Lourens and Lucassen, 1995). The fourth dependent variable that we are interested in is the Dutch Revolt. We investigate whether the BCL is related to the starting date of the Dutch Revolt in a specific city. The dates of the start of the revolt for 38 cities are known from historical records (e.g., De Graaf, 2004; Parker, 1977). See also Figure 4 for a map with the lags in days after the rebels took Brielle.

For the empirical analysis we follow a two-step approach. As a first step we regress a specific outcome (*Y*) for city *i* on the presence of the BCL (*BCL*) and include a set of controls (*X*):

$$Y_i = \alpha_0 + \alpha_1 BCL + \alpha_2 X_i + \varepsilon_i. \quad (1)$$

Estimation of this equation provides us with a coefficient for the association between the BCL and the outcome of interest. A concern with this estimation is that the location of BCL-schools might not be random. For instance, the presence of the BCL might depend on the local demand for education, the wealth of a certain area or the city growth in the previous period. If such factors are correlated with the outcome variable, but unobserved by the researcher, the estimated association in equation (1) does not yield the causal effect of the BCL on the outcome variable.

To further investigate the causality of the relationship between the BCL and the range of outcomes, we apply an instrumental variable approach, in line with some recent studies on the impact of historical events (e.g., Becker and Woessman, 2009; Dittmar, 2011). We use the distance to Deventer (*DD*), the city where Geert Groote founded the BCL, as an instrument for the presence of BCL activity. This yields the following first stage equation:

$$BCL_i = \beta_0 + \beta_1 DD_i + \beta_2 X_i + u_i. \quad (2)$$

The identifying assumption is that distance to Deventer is not correlated with the unobserved factors in equation (1). We assess this assumption by investigating the association between distance to Deventer with the educational infrastructure in the Low Countries before 1400 and with city growth in the century before the founding of the BCL.

4. Estimation Results

This section presents three sets of main results of how the BCL has affected human capital and economic development and how it has fostered societal change.

4.1. The Effect of the BCL on Human Capital

In addressing the effects of the BCL on human capital, we present two pieces of evidence. First, Table 2 presents a set of estimates in which we explain differences in book production across cities in the period 1470-1500 by the presence of local BCL-houses. Second, Table 3 reports results of an analysis in which we explain differences in literacy rates around 1600 by the existence of the BCL in cities. Both variables are used to proxy early human capital stocks in the Low Countries.

The first column in Table 2 reports the OLS estimate of the BCL dummy variable on the share of printed books produced in 66 cities in the Low Countries. We use data on book production in the period 1470-1500 because this is the earliest possible period for which data are available, since the invention of the movable type of printing press around 1450 in Mainz (e.g., Dittmar, 2011). We have left the city of Deventer out of the analysis because half of the total book production in the Netherlands was done in Deventer in the late fifteenth century (see Table 1) and Deventer is the source from which the BCL originated. The estimated coefficient suggests that the presence of the BCL increases the share of book production by 2.3 percentage points. Controlling for population size in 1400 and latitude and longitude does not substantially change the effect. Because Deventer produced almost 30 percent of all books in the Low Countries, leaving out Deventer reduces the size of the estimated coefficients. We weigh the observations by city population in 1400 because of the likelihood of measurement error in smaller cities with only little or no book production. As Table 1 has shown, the production is rather skewed with a substantial part of the books produced in a few cities, such as Zwolle, Gouda, Utrecht and Leiden.

In columns (4)-(9) we instrument the BCL by distance to Deventer to show that it is likely that the BCL has a positive effect on book production. The first stage results reported in columns (4), (6) and (8) reveal negative and significant correlations between distance to Deventer and the BCL. The F-tests are sufficiently large to ensure the analysis does not suffer from weak instruments. The 2SLS estimates in columns (5), (7) and (9) show statistically significant positive effects of the BCL on the share of printed book production across the 66 cities in our sample. These estimates suggest that the presence of the BCL increased book production with 2 to 4 percentage points, which suggest that the BCL has supported human capital development. Indeed, one of the most important goals of the BCL was to foster education for all by stimulating learning how to read and write, as discussed in Section 2.

Also, the manual work to make a living consisted for a large part of copying and printing books, which explains why book production is linked to the BCL.

In Table 3 we show the results of a regression analysis in which we estimate the effects of BCL on male literacy in 1600. Our sample consists of 33 cities for which literacy is available as early as 1600. The literacy figures are taken from Hart (1976) and the Amsterdam Archives (see the Appendix for more details about these data). Male literacy is defined as the share of grooms that hand-signed for their marriage in Amsterdam instead of stamped for it by finger print. Since we know the place of birth of each of the grooms, this provides information about literacy in other cities. The marriage records we use as the dependent variable are from the period 1600-1625. The coefficient in column (1) suggests that literacy is about 6 percentage points higher in BCL-cities. In the estimates reported in columns (2) and (3) we add distance to Amsterdam. The reason for doing so is that travelling to Amsterdam around that time may have taken a while, which makes it more likely that the grooms from outside Amsterdam are from neighboring cities or at least cities relatively nearby. The estimated coefficients for the BCL remain similar and distance to Amsterdam shows up, as expected, negative but does not have a significant effect on literacy outcomes. Because of the small number of observations, we do not add more covariates to the regression equation.

The instrumental variable analysis is reported in columns (3)-(6) of Table 3. The first stages are promising in terms of the estimated coefficients, but the F-test below 10 suggests that we could suffer from a weak instrument problem. However, since the values are well above the critical value of 5 and the number of observations is relatively low, this analysis is still useful. The coefficients in the 2SLS are higher than those in the OLS analysis, but confirm the picture. These higher 2SLS coefficients, which are based on the variation in BCL-schools induced by the distance to Deventer, suggest that BCL-schools close to Deventer are especially important for differences in literacy.

Overall, these two sets of estimates confirm the mechanism suggested by historians that the BCL movement, started by Geert Groote in Deventer, had an effect on human capital development in the Low Countries in the fifteenth and sixteenth century.

4.2. The Effect of the BCL on City Growth

Table 4 presents the effects of the BCL on economic development. In particular, we focus on city growth between 1400 and 1560 for our sample of 67 cities. We only use cities with more than 1,000 inhabitants because the population figures for smaller towns are set at 500. This

decreases the reliability of these numbers for empirical analysis. In this period, the economy of the Low Countries seems to have entered a transition phase as described by Van Bavel and Van Zanden (2004) in which a higher level of development is absorbed by higher population growth. Galor and Weil (1999) have referred to such a transition as a Post-Malthusian regime in which technological change and human capital translate into population growth.

The regression analysis reveals a strong positive effect of the BCL on city growth. The OLS estimates in Table 4 suggest that the presence of the BCL increases city growth by about 35 percentage points, with the exact impact depending on the specification. All specifications control for initial size and we add several covariates to the equation. Cities along the sea coast also seem to grow faster. Whether or not cities are located next to a main river or whether they are closer to Roman trading routes does not seem to matter for their growth in this period. Also inclusion of latitude and longitude returns insignificant coefficients.

To determine the causal impact of the BCL on economic development we instrument the BCL with distance to Deventer. Table 5 reports the estimation results. The first stage results in columns (1) and (3) along with the F-test for the validity of the instrument make us confident that the analysis is sensible. The 2SLS results in columns (2) and (4) present significant estimates, although at the 10 percent significance level. For a sample of only 67 cities this is still a remarkable result.

Taken together the estimated coefficients suggest a causal effect of the BCL on city growth in the Low Countries in the period 1400-1560. These estimates are consistent with the observation that the Low Countries experienced a wave of urbanization before other European countries did (e.g., Bairoch, 1988), which has given them a head start towards the Dutch Golden Age in the first part of the seventeenth century. What our estimates add to these observations is an economic interpretation along with a mechanism: the presences of the BCL in some Dutch cities offers an explanation for why economic development was ahead of other countries at that time.

4.3. The Effect of the BCL on the Dutch Revolt

The third set of results links the BCL to societal change. In particular to the Dutch Revolt, which started on 1 April 1572 when Alba was beaten by a group of 600 rebels who took Brielle. Immediately after the seizure of Brielle other cities started to revolt against the Spanish occupiers. The Dutch Revolt diffused relatively quickly across the Low Countries as Table A.2.6 in the Appendix and Figure 4 show. From historical records we know the dates

of the start of the revolt for 38 cities in our sample of 67 cities (e.g., De Graaf, 2004; Parker, 1977). Since the Dutch Revolt diffused across the whole of the Low Countries, all cities were influenced (Parker, 1977). So it is unlikely that for cities for which no official revolting date is known, the revolt was not happening. We have constructed revolt dates for the remaining 29 cities for which we do not have the historical date of the revolt by assigning the dates of surrounding cities in such a way that they multiply the revolt date by the weighted distance between the cities and average this product to get to a calendar date.

More developed cities are more likely to revolt against the Spanish occupiers because they suffer from the high taxes and benefit from free trade with other cities. We have observed in the previous section that the BCL has a direct effect on economic development in the period just before the Revolt. This makes it plausible to control for the size of the cities before the Revolt. We include the log of the cities' populations in 1560 as a covariate in the regression equation. In Table 6 we report estimates of the effects of the BCL on the Dutch Revolt. The dependent variable is the number days it took before the Revolt started in a city, after 1 April 1572. The first two columns present OLS results. The coefficient on the BCL is insignificant in column (1) which could be due to the fact that the Revolt started in Brielle, which is a town in Holland, whereas the BCL diffused from Deventer, which is in the eastern province Overijssel (see Figure 1 in Section 2). Adding city size along with a dummy variable, which takes on the value one if a city is on the North Sea, and information about latitude and longitude yields a negative and statistically significant coefficient. When interpreted causally, the estimated effects from the OLS analysis suggest that the Revolt occurred about 20 days earlier in cities with BCL presence.

The final four columns in Table 6 show the results of the 2SLS analysis. We again instrument the BCL with distance to Deventer. The first stage estimates are again statistically significant and the 2SLS estimates suggest a substantial earlier start of the Dutch Revolt in cities in which the BCL established houses and/or schools. The estimated coefficients suggest that these cities started revolting about 40 days earlier.

Next to the direct effect of the BCL on the Dutch Revolt, there could be an effect through education. Christian Humanism particularly developed in cities with BCL activity and the Habsburg rulers were suppressing this form of humanism in the Low Countries by very harsh means. As a result of the quick diffusion of Christian Humanism in the early sixteenth century, many citizens were literate. Cities with more literature citizens are more likely to

revolt because they were constrained in trading and writing contracts under the Spanish rulers. Hence, we also regress the Dutch Revolt on literacy. As the match of the data about literacy and the Dutch Revolt is not so good we are able to carry out the regression analysis for only 17 cities.

Table 7 reports the estimates. The first column shows the direct effect of literacy on the Dutch Revolt. The estimated effect is negative and significant, which suggests that more literate cities are more likely to start revolting against the Spanish rulers early on. The analyses reported in the next three columns in which we add a number of covariates confirm the pattern. We also add population size in 1560 in the specification reported in column (3). The effect of literacy on the Revolt remains there, although the significance is only there at the 10 percent level. Finally, in columns (4) and (5) of Table 7 we report the 2SLS estimates. The first and second stage estimates confirm the conclusions of earlier revolt in more literate places.

Overall these estimates suggest that the BCL has served as a seed-bed for sweeping societal change in the Low Countries. We have found both a direct effect of the presence of the BCL and an indirect effect through human capital on the Dutch Revolt.[10] The Dutch Revolt has marked the start of the Dutch Golden Age through the Union of Utrecht in 1579 and the formation of the Republic of the Seven United Provinces in 1581. The Union of Utrecht resounds the legacy of Geert Groote and the BCL because it emphasizes that every citizen should be free in the choice of his or her personal religion and no person should be prosecuted based on his or her religious choice.

5. Robustness

This section reports a number of robustness checks and examines a number of possible alternative explanations.

5.1. Developments before the BCL

We first consider two developments that could mitigate our mechanism and estimates. First, the BCL could have built its legacy on the presence of schools before it was established in the late fourteenth century. Second, we relate city growth in the period right after the founding and diffusion of the BCL (i.e., 1400-1560) directly to the BCL. Cities could however have been on a growth path before 1400. We address both possibilities in this section.

[10] The effect of change through education has also been emphasized by Goldin and Katz (1998; 2008) in their research explaining trends in human capital formation in the United States in the twentieth century.

Table 8 reports estimates, for our sample of 67 cities, of the presence of schools before 1400 on the probability of the presence of the BCL in that city. We have collected the data on the presence of schools before 1400 from Post (1954). We estimate four logit models. In column (1) of Table 8 we find a statistically insignificant coefficient for the presence of pre-1400 schools on the BCL. Adding a set of covariates in the specifications reported in the next three columns does not improve the estimation results. If anything, the results become even weaker. These estimates suggest that the BCL is a watershed in the Dutch educational history and that human capital development before the establishment and diffusion of the BCL did not contribute to its foundation by Geert Groote in Deventer.

Information about populations is only available for 15 important Dutch cities before 1400. Bairoch (1988) reports population figures for 1300 and 1400 for Amsterdam, Delft, Deventer, Dordrecht, Groningen, Kampen, Leiden, Maastricht, Middelburg, Nijmegen, 's-Gravenhage, 's-Hertogenbosch, Schiedam, Utrecht and Zutphen. The main source for other cities in the Low Countries of that time is Lourens and Lucassen (1995); they only report reliable population numbers from 1400 onwards. When we conduct an OLS regression analysis on these 15 observations similar to the one reported in column (1) of Table 4, we find a positive coefficient of 0.142 for the BCL, which is insignificant and small compared to the coefficients in Tables 4 and 5 (the t-ratio equals 0.63). Initial population in 1300 yields a coefficient (standard error) of -0.790 (0.153).

Both sets of estimates suggest that it is unlikely that developments in terms of human capital formation and economic development before the founding and diffusion of the BCL mitigate our estimates.

5.2. Placebo Tests of Instrumental Variable Identification

We instrument the BCL by distance to Deventer. There could be other developments explaining our results. For example, Haarlem is often cited as one of the cities adopting the mobile printing press in the 1460s. In Dittmar's analysis Haarlem is among the first Dutch cities to adopt a printing press (Dittmar, 2011). This could influence our results, particularly those on literacy and book production. Also, Utrecht and Amsterdam have been important religious and trading cities in Dutch history, which merits a closer look.

To analyze possible other channels through which our results could be explained we have run a number of placebo tests in which we replace distance to Deventer by distance to Haarlem, Utrecht and Amsterdam. Table 9 reports the results of 2SLS estimates (first and second

stages and the F-test for significance of the instrument) for literacy, city growth and the Dutch Revolt. The first row copies the estimates for Deventer from the models reported in Table 3 columns (6) and (7), Table 5 columns (3) and (4) and Table 6 columns (5) and (6). The next three rows report the estimates of the placebo tests using the other cities as instruments for the BCL.

The first set of estimates on the causal effects of the BCL on literacy in 1600 suggest that Utrecht and Amsterdam produce similar first stages relative to Deventer although not significantly so, whereas the first stage for Haarlem has the wrong sign. The F-tests produce too low values to merit a sound 2SLS analysis. The coefficients in column (3) yield no significant results, except for Utrecht based on a very weak instrument. Turning to city growth in the period 1400-1560, the first stages for Haarlem, Utrecht and Amsterdam yield the right signs, but again the F-tests are low. Also the 2SLS results are not impressive. Finally, the first stages explaining the Dutch Revolt are all significant and produce the right signs. However, the instruments are again very weak. The 2SLS estimates do not yield any significant results.

In conclusion, we believe that developments in other important cities of that time fail to tone down our findings.

5.3. The Legacy

Our estimates show a long-lasting effect of the BCL on human capital, economic development and sweeping societal change. However, from the mid-seventeenth century onwards the economic success of the Republic of the Seven United Provinces and the delayed spread of the Reformation lead to the extinction of the BCL and the Modern Devotion movement in general. The virtues of Modern Devotion became widespread all over the country and the rest of Northern Europe and the economy does not benefit from the direct presence of the BCL anymore. The educational benefits of the BCL are documented in Figures 2a and 2b in which we observe the difference between education levels in the Low Countries and Germany until at least 1800. The strong economic development is well-documented by the Dutch Golden Age from about 1580 onwards.

Table 10 reports a set of OLS estimates in which we explain literacy rates in 1860 by the BCL and a set of 2SLS estimates in which we instrument the BCL by distance to Deventer. It is the same regression as the one reported in Table 3, but now for the full set of 67 cities (using the same set as in Table 3 produces similar conclusions as the ones drawn here). The

OLS estimates in the columns (1)-(4) suggest no direct effect of the BCL on literacy in 1860. The other covariates produce sensible results in their relation to literacy. Also the 2SLS estimates, reported in columns (5)-(8), do not yield any significant causal effect of the BCL on literacy in 1860. What we do observe in this set of regressions is that the share of Protestants in the population has a positive effect on education. This is consistent with the findings of Becker and Woessman (2009) for Germany for the same time period. We interpret these findings as a strong effect of the BCL in the take off of education (see the estimates in Table 3), but no further BCL-role in boosting education in more modern times (i.e., around the mid-nineteenth century).

Finally, Table 11 reports a set of OLS estimates in which we explain city growth up to 1795, a century after the Dutch Golden Age was over. These estimates are similar to the ones reported in Table 4, except for the dependent variable which is now growth between 1400 and 1795. The estimated coefficients reported in Table 11 have the same sign compared to those presented in Table 4. However, the effect of the BCL is no longer statistically significant, except for the estimates reported in columns (1) and (3). Here we find a marginally significant effect of the BCL on city growth, if we interpret the results causally. 2SLS estimates (not reported here) do not yield any significant coefficients, suggesting that the causal effect of the BCL on economic development is especially strong immediately after its foundation and diffusion in the Low Countries.

6. Conclusion

This paper has investigated the long-lasting impact of the Brethren of the Common Life on economic and social outcomes in the Low Countries. After the founding of the BCL by Geert Groote in Deventer in the late fourteenth century, the movement positively contributed to human capital formation and economic development in the Low Countries. Many historians have laid emphasis on the importance of the BCL for the development of Christian Humanism in Europe (e.g., Israel, 1995). In addition, others have related the BCL to early urbanization in the Netherlands (e.g., Bairoch, 1988) and high levels of human capital. Parker (1977, p. 21) cites the notes one of Philip II's staff members took when he visited the Low Countries in 1549: "Spanish visitors ... noted the widespread literacy in the Netherlands. One of Prince Philip's entourage, Vicente Alvarez, noted in his journal that 'almost everyone' knew how to read and write, even women ..." Hence, the BCL is likely to have contributed to

the early development of the Low Countries, even before the Dutch Golden Age (Van Bavel and Van Zanden, 2004), and has formed a strong foundation for the Dutch Revolt in 1572.

An important contribution of our analysis is that it is the first to document the importance of the BCL for economic and societal change. We provide a mechanism through which the BCL has influenced human capital formation by describing their activities in book production, educating young citizens and institutionalizing education. In addition, we show how the BCL has contributed to city growth by stimulating entrepreneurship through emphasizing individual responsibility. Finally, we offer a channel through which the BCL has led to the Dutch Revolt in the northern part of the Low Countries in 1572. We both show a direct effect through Christian Humanism and an indirect channel by means of high levels of education among ordinary citizens.

Our second main contribution is to quantify the impact of the BCL on economic and societal outcomes. In particular, we report estimates which suggest an effect of the BCL on book production and early literacy in the Low Countries in the sixteenth century. We also find evidence of stronger city growth in cities in the period 1400-1560 where BCL-houses had been established. Finally, we document estimates that reveal a role for the BCL in the Dutch Revolt. Cities with BCL-houses started their revolt against the Spanish rulers earlier relative to other cities.

Overall our mechanism and empirical evidence shows that BCL has been an important factor for the early development of the Low Countries.

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Appendix

This section provides detailed information about the data sources used for the empirical analysis and about the construction of variables.

A.1. Variable Definitions

Variable	Definition
Growth 1300-1400	Growth of city population from 1300 to 1400. *Source*: Bairoch (1988)
Growth 1400-1560	Growth of city population from 1400 to 1560. *Source*: Lourens and Lucassen (1995). See Section A.2.2 for details.
Growth 1400-1795	Growth of city population from 1400 to 1795. *Source*: Lourens and Lucassen (1995). See Section A.2.2 for details.
Log population 1300	Log of city population in 1300.
Log population 1400	Log of city population in 1400.
Revolt	The lag in days of the diffusion of the Dutch Revolt from the start in Brielle on 1 April 1572. *Source*: De Graaf (2004). See Section A.2.4 for details.
Book share	The number of printed book editions as a share of total printed book editions in the Netherlands from 1470 to 1500. *Source*: Incunabula Short Title Catalogue at http://www.bl.uk/catalogues/istc/index.html.
Literacy 1600	Estimated literacy rates around 1600 based on Hart (1976). *Source*: Simon Hart's inventory at the Amsterdam Municipality Archives and Hart (1976). See Section A.2.1 for details.
BCL	Dummy variable which equals one if there is a BCL house in the city. The sources and details are presented in Section A.2.3.
Distance to Deventer	Distance to the city of Deventer in kilometres. See Section A.2.6 for details.
Roman Settlement	Distance to the closest Roman settlement and Roman trade route in kilometres in the Netherlands. See Section A.2.6 for details.
Sea	Dummy variable which equals one if the city is on the sea coast at the time of the analysis.
River	Dummy variable which equals one if the city is along one of the main rivers.
Latitude in radians	Latitude value of a city in radians. See Section A.2.6 for details.
Longitude in radians	Longitude value of a city in radians. See Section A.2.6 for details.

A.2. Data and Variable Construction

This section provides details about the data sources and the construction of variables.

A.2.1. Literacy

Information about early literacy in the Netherlands (or Low Countries) is based on two different sources. Before 1810 we rely on the Amsterdam Marriage Registers. Our proxy for literacy is the percentage of brides and grooms that hand signed the register when they got married. After 1810 we rely on signatures on birth certificates to proxy adult literacy in a similar way.

Early literacy data are collected from the Amsterdam Marriage Registers which includes information about brides and grooms starting in the late sixteenth century. The registers include both information on the place of birth of brides and grooms and whether or not they signed the register or stamped a finger print. If people were illiterate, finger prints were used to sign for the marriage. There are around 928,000 marriages in the period 1580-1810, so about two million observations. Since we know the place of birth of people, we obtain literacy

information for 34 cities from 1600 onwards. The data reveal that the percentage of non-Amsterdam born brides and grooms ranges from around 40 in the late sixteenth to about 70 in the early seventeenth century. These numbers also include foreign born brides and grooms, mainly from Germany. This allows us to analyse literacy for 20 cities in Germany.

The data are not available in electronic format. Simon Hart, the late keeper of the Amsterdam archives, has structured the files in 25-year periods from 1600 onwards (Hart, 1976). This way Hart built an archive on marriage registers, which is available for research in the Amsterdam Archives. The archive is structured by cities and accessible under inventory number 883: *Archief van dr. S. Hart, Gemeentearchivaris*. From these documents we collected literacy data for 34 cities in the Netherlands for six provinces (Friesland, Gelderland, Groningen, Noord-Holland, Overijssel and Zuid-Holland). These provinces are defined according to their present structure and encompass the Dutch Seven Provinces of that time. Information about German cities is available for what are now three Länder: Lower Saxony, Schleswig-Holstein and North Rhine-Westphalia. A detailed list of archive numbers matched to provinces is presented in Table A.2.1. The photocopied records are available upon request.

Table A.2.1: Archive numbers of marriage registers

2	Documents on individual items
2.5.6	Historical demography
2.5.6.2	Treatment of marriage registers
2.5.6.2.1	The Netherlands
645	Total state, graphics, maps - 1 folder
646-648	Gelderland
649-651	Noord Holland
652-653	Overijssel
654-656	Zuid Holland
658-660	Friesland
661-662	Noord Brabant
663-664	Groningen
665-666	Zeeland
667	Drenthe
668-669	Limburg
2.5.6.2.2	Germany
670	Total state, graphics, maps - 1 folder
671-673	Schleswig-Holstein
674	Hamburg
675	Bremen
676-683	Niedersachsen
684-685	Oost Friesland
686-696	Detailed personal information on Oost Friesland
697-700	Nordrhein Westfalen
701	Hessen
702	Rheinland-Pfalz and Saarland
703	Baden-Württemberg
704	Bayern
705	East-Germany

Source: Amsterdam Archives. Number 883: *Archief van dr. S. Hart, Gemeentearchivaris*

After 1810 we base our calculations on data from birth registers for all main cities in the Netherlands. These data are available from the Historical Sample of the Netherlands (HSN) at the International Institute of Social History (IISH). An advantage of these data is that it provides information about the date and age of the father, whether or not the father is illiterate and whether or not the register was signed or not. There are about 78,000 records from 1811 onwards spanning a period of about 100 years. The geographic aggregation is at the town level, which allows us to aggregate data for about 1,100 municipalities in the Netherlands around 1860. For each observation we have the fathers' age, his state of literacy, birth date and place of residence. We would like to pinpoint one year but do not have enough observations if we only choose birth certificates from for example 1860. For this reason we estimated for each observation whether or not the father is likely to be alive in a certain year using the average life expectancy in 1850. To increase the sample size we took 1860 as the midpoint of a

twenty year period and construct a dummy variable that takes the value one if the father is likely to be alive in between 1841 and 1880.

Table A.2.2: Nineteenth century literacy rates in 11 provinces

	1810	1850	1890
Groningen	0.84	0.90	0.97
Friesland	0.86	0.90	0.95
Drenthe	0.87	0.90	0.93
Overijssel	0.69	0.81	0.91
Gelderland	0.73	0.82	0.91
Utrecht	0.72	0.78	0.92
North Holland	0.84	0.92	0.97
South Holland	0.80	0.88	0.96
Zeeland	0.74	0.77	0.89
North Brabant	0.67	0.71	0.85
Limburg	0.58	0.73	0.91

Next, we aggregate this information to the current 450 municipalities in the Netherlands to increase the number of observations for each city. If the number of observations for a municipality in 1860 is less than 20, it is replaced by the 1860 literacy data computed for the contemporary municipality definition. About 250 replacements are made at this stage. Literacy data for the eleven provinces in the nineteenth century are presented in Table A.2.2. The literacy numbers for the 34 Dutch cities for which we have data from 1600 onwards are presented in Table A.2.3.

Table A.2.3: Literacy data for Dutch cities, 1600-1860

Province	City	1600	1675	1750	1860
NOORD HOLLAND	Alkmaar	0.64	0.86	0.96	0.97
GELDERLAND	Arnhem	0.75	0.81	0.90	0.91
GELDERLAND	Borculo	0.84	0.90	0.81	0.96
ZUID HOLLAND	Delft	0.64	0.75	0.92	0.94
OVERIJSSEL	Deventer	0.79	0.91	0.90	0.93
GELDERLAND	Doesburg	0.70	0.77	0.90	0.73
FRIESLAND	Dokkum	0.44	0.60	0.83	0.90
ZUID HOLLAND	Dordrecht	0.73	0.74	0.87	0.93
NOORD HOLLAND	Enkhuizen	0.59	0.78	0.92	0.93
FRIESLAND	Franeker	0.56	0.77	0.90	0.86
GELDERLAND	Groenlo	0.73	0.90	0.92	0.84
GRONINGEN	Groningen	0.63	0.76	0.85	0.93
NOORD HOLLAND	Haarlem	0.66	0.68	0.77	0.91
GELDERLAND	Harderwijk	0.70	0.68	0.88	0.89
FRIESLAND	Harlingen	0.51	0.68	0.83	0.87
NOORD HOLLAND	Hoorn	0.57	0.80	0.75	0.88
OVERIJSSEL	Kampen	0.69	0.72	0.88	0.83
FRIESLAND	Leeuwarden	0.60	0.76	0.84	0.94
ZUID HOLLAND	Leiden	0.64	0.68	0.73	0.79
NOORD HOLLAND	Naarden	0.70	0.51	0.80	0.91
GELDERLAND	Nijkerk	0.54	0.88	0.77	0.68
GELDERLAND	Nijmegen	0.74	0.74	0.81	0.85
OVERIJSSEL	Oldenzaal	0.62	0.69	0.74	0.70

OVERIJSSEL	Ootmarsum	0.80	0.77	0.94	0.94
ZUID HOLLAND	Rotterdam	0.67	0.77	0.84	0.97
OVERIJSSEL	Stad-Almelo	0.68	0.63	0.86	0.77
FRIESLAND	Terschelling	0.51	0.79	0.71	0.97
NOORD HOLLAND	Texel	0.63	0.81	1.00	0.95
GELDERLAND	Tiel	0.68	0.79	0.85	0.76
FRIESLAND	Vlieland	0.48	0.77	1.00	1.00
NOORD HOLLAND	Weesp	0.69	0.71	0.88	0.83
GELDERLAND	Zutphen	0.80	0.84	0.95	0.93
OVERIJSSEL	Zwolle	0.69	0.77	0.89	0.94
ZUID HOLLAND	Den Haag	0.79	0.82	0.88	0.93

A.2.2. Population

Lourens and Lucassen (1995) present population data on selected Dutch cities from the fourteenth century onwards. The earliest date for which they provide information is 1364. However, comparable population information (and sometimes census) data is not always available for the same years. For this reason they present comparable data for 155 cities for four years: 1400, 1560, 1630 and 1795. For almost half of these cities the 1400 and 1560 data are estimates. We base our sample on cities with 1,000 or more inhabitants because many of the smaller cities are set to 500. Table A.2.4 presents the top 10 populated cities in 1400, 1560 and 1800. For population figures before 1400 we rely on Bairoch (1988).

Table A.2.4: Top 10 populated cities in 1400, 1560 and 1800

City	1400	City	1560	City	1800
Utrecht	13,000	Amsterdam	30,000	Amsterdam	221,000
‘s-Hertogenbosch	9,000	Utrecht	27,500	Rotterdam	53,212
Dordrecht	7,500	‘s-Hertogenbosch	17,500	Den Haag	38,433
Haarlem	7,500	Haarlem	16,000	Utrecht	32,294
Maastricht	7,000	Delft	15,000	Leiden	30,955
Roermond	6,600	Maastricht	13,500	Groningen	23,770
Delft	6,500	Leiden	12,500	Haarlem	21,227
Zierikzee	6,300	Groningen	12,500	Dordrecht	18,014
Middelburg	6,300	Dordrecht	10,000	Maastricht	17,963
Nijmegen	6,000	Nijmegen	10,000	Middelburg	17,687

A.2.3. Brethren of the Common Life

The Brethren of the Common Life (BCL) originated from the city of Deventer. The first house was established in 1384 in Deventer and later followed by Amersfoort in 1395 and Zwolle in 1396. During the fifteenth century the organization spread over the Netherlands, contemporary Belgium and the Western part of Germany. The BCL consists of three forms of communities: brother houses, sister houses and schools. There were hostels for (poor) students as well. In some cases there were multiple houses in one city. For instance, in Deventer there were seven brother and sister houses. However, we do not have information about the number of houses for the majority of cities. Our BCL indicator measures BCL activity in terms of houses and /or schools in a city. It is constructed as a dummy variable that takes the value one if there has been a brother house, sister house or a school. There is not a single source that presents information about the BCL. We have made use of different sources: Hyma (1924; 1950; 1951 and 1958), Post (1968), Fuller (1995) and Van Engen (2008). Table A.2.5 presents the cities in which the BCL was present. Figure 1 is Section 2 presents all cities on a map.

Table A.2.5: Cities with BCL activity

Province	City	Province	City
UTRECHT	Amersfoort	GELDERLAND	Hattem
NOORD HOLLAND	Amsterdam	NOORD HOLLAND	Hoorn
GELDERLAND	Arnhem	OVERIJSSEL	Kampen

ZUID HOLLAND	Brielle	ZUID HOLLAND	Leiden
ZUID HOLLAND	Delft	GELDERLAND	Lochem
OVERIJSSEL	Deventer	GELDERLAND	Nijmegen
GELDERLAND	Doesburg	UTRECHT	Rhenen
NOORD HOLLAND	Enkhuizen	OVERIJSSEL	Almelo
OVERIJSSEL	Genemuiden	UTRECHT	Utrecht
ZUID HOLLAND	Gorinchem	NOORD HOLLAND	Weesp
ZUID HOLLAND	Gouda	GELDERLAND	Zaltbommel
GRONINGEN	Groningen	GELDERLAND	Zutphen
GELDERLAND	Harderwijk	OVERIJSSEL	Zwolle
OVERIJSSEL	Hasselt	NOORD BRABANT	‘s-Hertogenbosch

A.2.4. The Dutch Revolt

We constructed a diffusion variable of Dutch revolt using information on the date of uprising in a city after rebels took over Brielle from Alba on 1 of April 1572. Brielle takes the value 0. For each city, the revolt variable is calculated as number of days it took before the revolt took place in that city after 1 April. Our source is De Graaf (2004). For some towns not listed by De Graaf we have used a map from Parker (1977, Figure 7). The list of cities and the revolt gap in terms of days are presented in Table A.2.6. Figure 4 is Section 2 presents a map with all cities and the days at took before cities started to revolt against the Spanish rulers.

Table A.2.6: The diffusion of the Dutch Revolt in 1572

Province	City	Days
ZUID HOLLAND	Brielle	0
ZEELAND	Vlissingen	21
ZEELAND	Arnemuiden	28
ZEELAND	Veere	33
NOORD HOLLAND	Enkhuizen	50
NOORD HOLLAND	Medembik	56
GELDERLAND	Zutphen	69
GELDERLAND	Doesburg	73
GELDERLAND	Doetinchem	73
NOORD HOLLAND	Hoorn	72
UTRECHT	Oudewater	79
NOORD HOLLAND	Alkmaar	80
ZUID HOLLAND	Gouda	80
ZUID HOLLAND	Dordrecht	82
NOORD HOLLAND	Monnikendam	86
GELDERLAND	Harderwijk	93
GELDERLAND	Elburg	94
ZUID HOLLAND	Schoonhoven	97
GELDERLAND	Buren	100
NOORD HOLLAND	Naarden	102
GELDERLAND	Bommel	119
GELDERLAND	Hattem	104
OVERIJSSEL	Oldenzaal	110
NOORD HOLLAND	Haarlem	92
ZUID HOLLAND	Leiden	82
LIMBURG	Roermond	112
ZUID HOLLAND	Rotterdam	110
ZUID HOLLAND	Delft	115

UTRECHT	Woerden	127
OVERIJSSEL	Kampen	130
OVERIJSSEL	Genemuiden	131
OVERIJSSEL	Meppel	132
OVERIJSSEL	Zwolle	132
FRIESLAND	Sneek	137
GELDERLAND	Amersfoort	137
FRIESLAND	Franeker	147
FRIESLAND	Bolsward	146
LIMBURG	Weert	146

A.2.5. Census

We use the *Volkstellingen Archief* (Census) for information about population and households, such as population, religion and marital state starting from 1795 onwards. We collected all information for 1859, which is the first round available that presents data at the municipality level. The 1859 data present information on about 1,200 local area units. This information was matched to HSN literacy data explained above. The long-run analysis is based on this merged data set.

A.2.6. Distance Calculations

We use latitude and longitude values to calculate distance 'as the crow flies' measures. Distance to city X is calculated as:

Distance to city X = 6378.7**acos*((*sin*(latitude/57.2958)**sin*(latitude of city X/57.2958)) + (*cos*(latitude/57.2958)**cos*(latitude of city X/57.2958) **cos*((longitude/57.2958) - (longitude of city X/57.2958)))),

where *acos, sin, cos* notify arc-cosine, sine and cosine respectively. To calculate the distance to the nearest Roman trade route we have made use of the list of Roman Settlements in the Netherlands and the Peutinger map that shows the major trade routes in Roman times. Both sources are matched to obtain a list of towns for which we could obtain latitude and longitude values. Some towns are not matched to a modern settlement name. We omit those. Table A.2.7 lists the cities. The complete list of settlements is available at:

http://www.romanaqueducts.info/romeineninnederland/rinn_bijlagen.htm.

Table A.2.7: List of Roman Settlement according to Peutinger Map

Modern name	Classical name	Name in map of Peutinger
Alphen a/d Rijn	Albaniana	Albanianu
Blerick	Blariaco	Blariaco
Kesteren	Carvo	Carvone
Arnhem-Meinerswijk	Castra Herculis	Castra Herculis
Cuijk	Ceuclum	Ceuclum
Heerlen	Coriovallum	Cortovallio
Bunnik-Vechten	Fectio	Fletione
Voorburg (ZH)	Forum Hadriani	Foro Adriani
Rossum (GLD)	Grinnes	Grinnibus
Woerden	Laurum / Laurium	Lauri
Wijk bij Duurstede	Levefanum	Levefano
Katwijk-Brittenburg	Lugdunum	Lugduno
Maurik	Mannaricium	
Leiden-Roomburg	Matilo	Matilone
Zwammerdam	Nigrum Pullum	Nigropullo
Valkenburg (ZH)	Praetorium Agrippinae	Pretoriu.Agrippine
Utrecht	Traiectum	-

A.2.7. Network Data

The network data for influential people living in the fifteenth and sixteenth century are collected from various sources. We relied on books about the BCL, the Reformation and the compendium that gives short biographical information on people who lived in the times of Erasmus. In codifying the data we followed four simple rules:

1. Two persons are friends, colleagues, studied in the same school, teacher-student relation or a similar close relation;
2. Two persons have met once or twice and keep in contact afterwards;
3. Two persons have met once and kept contact from time to time through third person or letters; and
4. Two persons have never met but exchanged many letters on certain matters through time.

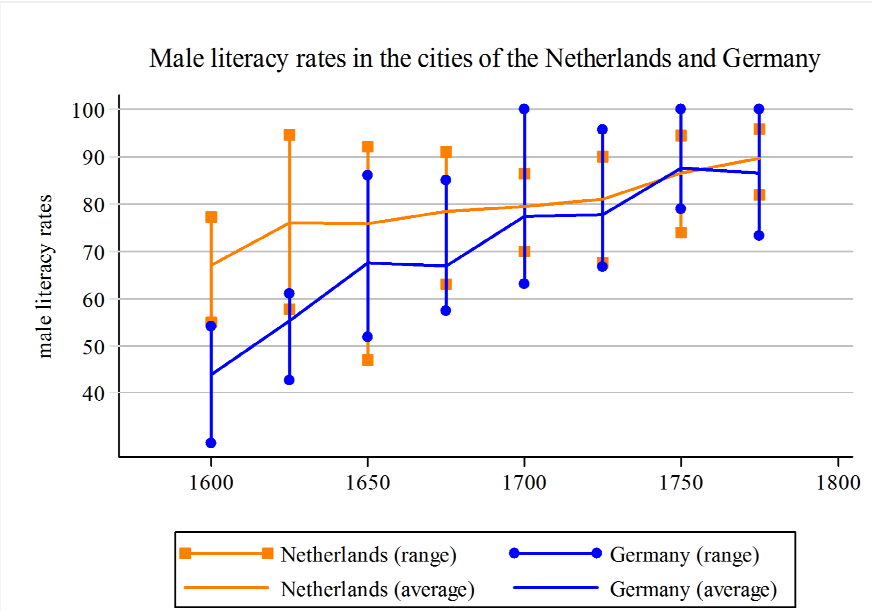
If one of the above rules is met we coded a link between two people. If a person studied in a BCL school, lived in a BCL house or took part in the organization we coded this person as affiliated to the BCL. The people in the network are shown in Figure 3 and a complete list of people with affiliations and additional information about their work and activities is available upon request.

Figure 1: Cities in which the BCL was present

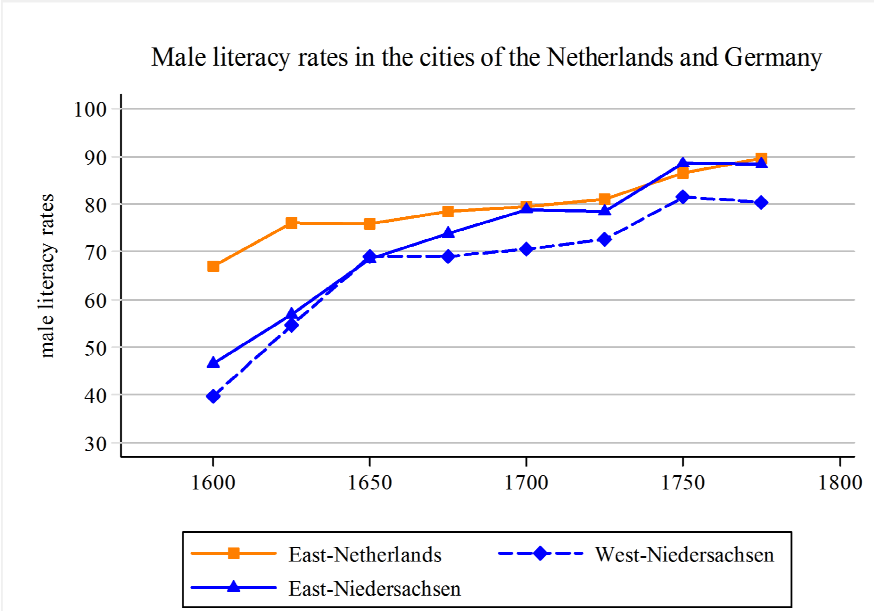
Sources: Hyma (1924; 1950; 1951 and 1958), Post (1968), Fuller (1995) and Van Engen (2008). Table A.2.5 also presents the cities in which the BCL was present.

Figure 2: Male literacy rates in the Low Countries and Germany

Panel A: Male literacy in the Low Countries and Germany

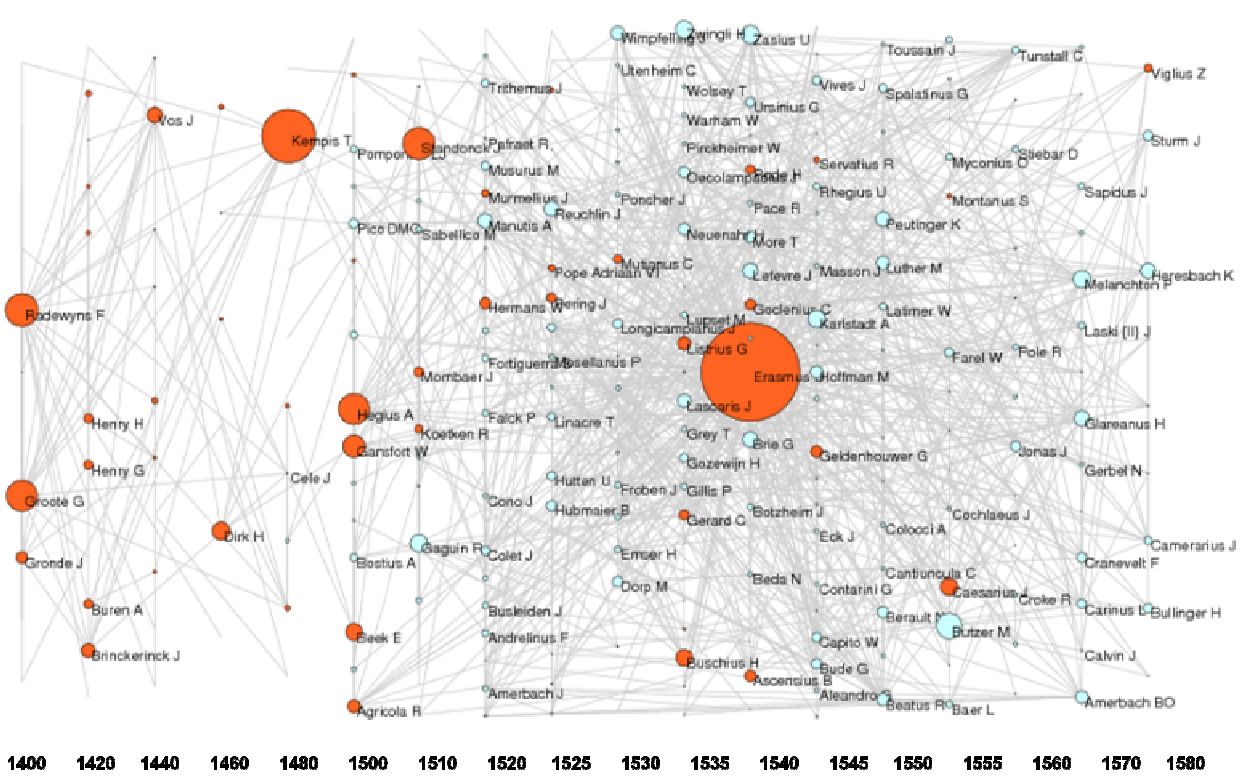


Panel B: Eastern part of the Low Countries vs. western part of Germany



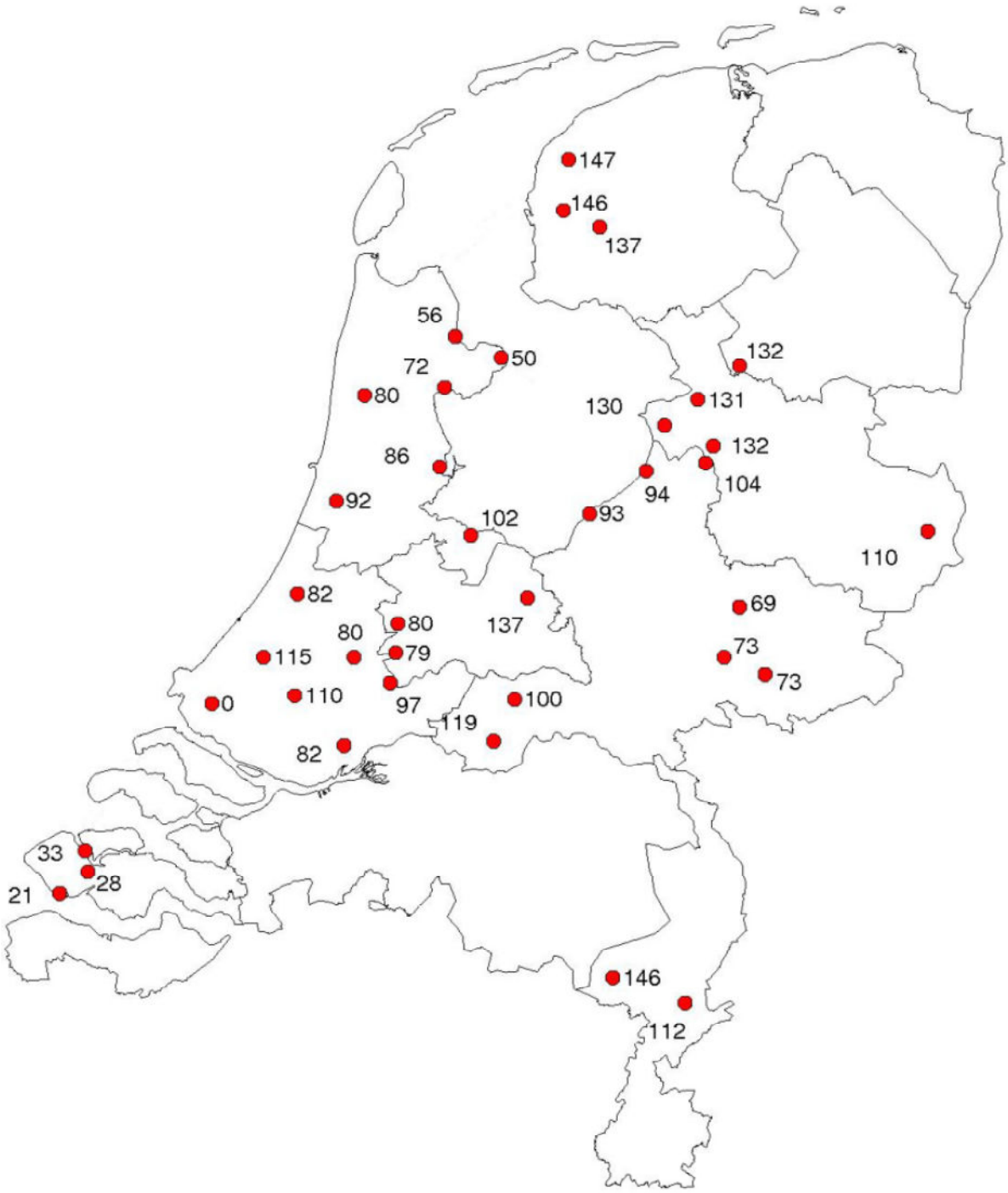
Sources: Hart (1976) and the Amsterdam Archives. See Appendix A.2.1 for more details.

Figure 3: Chronological network of important people, 1400-1550



Source: See Appendix A.2.7 for details

Figure 4: The diffusion of the Dutch Revolt in the Low Countries



Note: The list of cities is presented in the Appendix (Section A.2.4). The dots are cities for which historical records about revolt dates are known. The numbers show the lag in days in terms of diffusion from 1 April 1572 onwards. For example, the observation 0 is Brielle where the Revolt started and 132 is Zwolle in which the Revolt started on 11 August 1572.

Table 1: Book production (printed) in the Low Countries before 1500

City	Book production per 1,000 inhabitants	Number of book editions	Share in the Low Countries
Deventer	91.43	640	0.27
Zwolle	21.86	153	0.06
Antwerp	15.97	479	0.20
Louvain	15.71	267	0.11
Gouda	10.91	120	0.05
Leiden	4.00	56	0.02
Utrecht	3.45	69	0.03

Note: A total of 2,376 editions were produced in the Low Countries before 1500. Population figures in 1500 for Belgian cities are from Bairoch, Batou and Chèvre (1988).
Source: British Library Incunabula short title catalogue: http://www.bl.uk/catalogues/istc/index.html.

Table 2: The impact of the BCL on book production in the Low Countries, 1470-1500

(Dependent variable: Share of book production in total printed book production in the Low Countries, 1470-1500)

	OLS	OLS	OLS	1st stage	2SLS	1st stage	2SLS	1st stage	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Book share	Book share	Book share	BCL	Book share	BCL	Book share	BCL	Book share
BCL	0.023**	0.024**	0.018*		0.027*		0.030**		0.041**
	(0.010)	(0.010)	(0.009)		(0.015)		(0.015)		(0.019)
Dist. Deventer				-0.006***		-0.007***		-0.007***	
				(0.001)		(0.001)		(0.002)	
Log pop 1400			0.009*			0.238***	0.007	0.248***	0.003
			(0.005)			(0.061)	(0.005)	(0.068)	(0.006)
Latitude in radians		0.001	0.003					0.083	-0.001
		(0.002)	(0.003)					(0.072)	(0.005)
Longitude in radians		-0.002	-0.001					-0.055	-0.003
		(0.003)	(0.003)					(0.060)	(0.003)
Constant	0.002	-0.075	-0.356	1.103***	0.000	-0.819*	-0.057	-7.860	0.099
	(0.002)	(0.216)	(0.276)	(0.115)	(0.005)	(0.487)	(0.038)	(7.139)	(0.452)
F-test instrument				63.27		84.94		15.78	
Observations	66	66	66	66	66	66	66	66	66
R-squared	0.160	0.169	0.213	0.308	0.155	0.422	0.176	0.459	0.105

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All estimations are weighted by population.

Table 3: The effect of the BCL on literacy in the Low Countries around 1600

(Dependent variable: Male literacy rates in 1600)

	OLS	OLS	OLS	1st stage	2SLS	1st stage	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	literacy	literacy	literacy	BCL	literacy	BCL	literacy
BCL	0.059*	0.058*	0.064**		0.316**		0.308***
	(0.031)	(0.029)	(0.026)		(0.121)		(0.112)
d_amsterdam		-0.000	-0.000			-0.003	0.001
		(0.000)	(0.000)			(0.002)	(0.001)
logpop1560			-0.009				
			(0.018)				
d_deventer				-0.005**		-0.005**	
				(0.002)		(0.002)	
Constant	0.629***	0.632***	0.705***	0.848***	0.512***	1.117***	0.463***
	(0.026)	(0.030)	(0.152)	(0.176)	(0.058)	(0.249)	(0.115)
F-test (instrument)				6.34		7.09	
Observations	33	33	33	33	33	33	33
R-squared	0.096	0.096	0.103	0.170		0.228	

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

Table 4: OLS estimates of the relationship between the BCL and city growth, 1400-1560

(Dependent variable: Population growth 1400-1560)

	(1) Growth 1400-1560	(2) Growth 1400-1560	(3) Growth 1400-1560	(4) Growth 1400-1560	(5) Growth 1400-1560	(6) Growth 1400-1560
BCL	0.381***	0.376***	0.401***	0.347***	0.346***	0.358**
	(0.124)	(0.119)	(0.123)	(0.119)	(0.124)	(0.138)
Log pop 1400	-0.122*	-0.089	-0.107	-0.099	-0.053	-0.055
	(0.069)	(0.074)	(0.074)	(0.077)	(0.061)	(0.068)
Sea		0.346**		0.380**	0.166	0.176
		(0.139)		(0.154)	(0.135)	(0.139)
River			-0.104	0.002	-0.074	-0.070
			(0.108)	(0.099)	(0.105)	(0.106)
Dist. Roman				-0.002	-0.007*	-0.007*
				(0.002)	(0.003)	(0.003)
Latitude in radians						-0.096
						(0.214)
Longitue in radians						-0.000
						(0.070)
Constant	1.291**	0.940*	1.206**	1.106*	2.010***	10.880
	(0.510)	(0.551)	(0.536)	(0.582)	(0.644)	(19.722)
Observations	67	67	67	67	67	67
R-squared	0.132	0.236	0.141	0.262	0.582	0.584

OLS results for cities with 1,000 and more inhabitants in 1400. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: 2SLS estimates of the relationship between the BCL and city growth, 1400-1560

(Dependent variable: Population growth 1400-1560)

	(1) BCL 1st stage	(2) Growth 1400-1560	(3) BCL 1st stage	(4) Growth 1400-1560
BCL		0.591*		0.583*
		(0.320)		(0.298)
Dist. Deventer	-0.006***		-0.006***	
	(0.001)		(0.001)	
Log pop 1400	0.269***	-0.167*	0.289***	-0.141
	(0.058)	(0.099)	(0.065)	(0.096)
Sea			0.027	0.351**
			(0.125)	(0.152)
River			-0.063	-0.048
			(0.147)	(0.114)
Dist Roman			0.000	-0.002
			(0.001)	(0.002)
Constant	-1.184**	1.564**	-1.297***	1.358*
	(0.448)	(0.674)	(0.477)	(0.683)
F-test instrument	40.93		24.55	
Observations	67	67	67	67
R-squared	0.389	0.093	0.395	0.216

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

Table 6: The impact of the BCL on the Dutch Revolt in 1572

(Dependent variable: Lag of the number of days in the diffusion of the Revolt)

	OLS	OLS	1st stage	2SLS	1st stage	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Revolt	Revolt	BCL	Revolt	BCL	Revolt
BCL	-4.770	-27.189***		-38.106***		-42.944***
	(8.608)	(8.316)		(12.725)		(14.386)
Dist. Deventer			-0.007***		-0.007***	
			(0.002)		(0.002)	
Sea		-9.722			-0.123	-11.285
		(7.503)			(0.118)	(7.899)
Log pop 1560		10.809***			0.239***	14.915***
		(3.689)			(0.053)	(4.686)
Latitude in radians		9.362***	0.011	8.542***	0.030	10.577***
		(3.026)	(0.055)	(2.741)	(0.054)	(3.056)
Longitude in radians		15.018***	-0.109*	16.329***	-0.099*	15.948***
		(2.519)	(0.058)	(2.846)	(0.053)	(2.647)
Constant	96.205***	-969.672***	1.033	-817.367***	-2.783	-1,116.437***
	(5.207)	(266.892)	(5.039)	(242.748)	(4.928)	(273.162)
F-test instrument			16.41		17.86	
Observations	67	67	67	67	67	67
R-squared	0.005	0.533	0.258	0.381	0.451	0.498

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

Table 7: The impact of early literacy on the diffusion of the Dutch Revolt

(Dependent variable: Lag of the number of days in the diffusion of the Revolt)

	OLS	OLS	OLS	OLS	1st stage	2SLS	1st stage	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	revolt	revolt	revolt	revolt	literacy	revolt	literacy	revolt
Literacy	-2.377***	-2.010***	-1.625*	-1.856*		-2.008*		-2.009*
	(0.329)	(0.477)	(0.860)	(0.897)		(1.075)		(1.078)
Sea		8.108						
		(8.961)						
Dist Brielle		0.106						
		(0.084)						
Latitude rad			10.875	10.091	-6.069***	7.350	-5.503***	8.767
			(11.333)	(11.706)	(1.560)	(11.907)	(1.475)	(12.570)
Longitude rad			2.329	4.763	-3.511**	2.886	-2.620*	5.123
			(3.548)	(5.071)	(1.459)	(3.588)	(1.435)	(4.889)
Log pop 1560				4.936			2.092*	5.258
				(6.265)			(1.161)	(5.881)
Dist Deventer					-0.175***		-0.175***	
					(0.045)		(0.041)	
Constant	261.114***	222.501***	-804.636	-781.813	667.025***	-462.367	589.377***	-656.752
	(20.562)	(37.430)	(1,078.196)	(1,121.391)	(133.694)	(1,141.718)	(130.747)	(1,217.329)
F-test instrument					50.42		48.87	
Observations	17	17	17	17	17	17	17	17
R-squared	0.520	0.594	0.594	0.611	0.827	0.589	0.864	0.610

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

Table 8: The effect of the presence of schools on the establishment of BCL activity

(Dependent variable: Presence of the BCL)

	(1) BCL	(2) BCL	(3) BCL	(4) BCL
School before 1400	0.693	0.490	0.426	0.361
	(0.574)	(0.602)	(0.628)	(0.641)
Log pop1400		1.058***	0.988**	1.540***
		(0.364)	(0.397)	(0.522)
Sea			0.687	0.389
			(0.747)	(0.890)
River			0.964	0.815
			(0.690)	(0.821)
Latitude in radians				0.770**
				(0.391)
Longitude in radians				0.359
				(0.293)
Constant	-0.916***	-9.160***	-9.151***	-86.626**
	(0.319)	(2.878)	(3.105)	(37.347)
Observations	67	67	67	67

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

Table 9: Placebo tests of instrumental variable identification

	(1) 1st stage	(2) F-test	(3) 2nd stage
Literacy in 1600			
Deventer	-0.005**	7.07	0.30***
	(0.002)		(0.11)
Haarlem	0.017**	4.84	-0.54
	(0.008)		(0.36)
Utrecht	-0.006	1.90	0.26**
	(0.005)		(0.12)
Amsterdam	-0.003	1.46	-0.68
	(0.002)		(1.58)
City growth 1400-1560			
Deventer	-0.006***	23.42	0.58*
	(0.001)		(0.30)
Haarlem	-0.003	2.56	0.47
	(0.002)		(0.39)
Utrecht	-0.004	4.70	1.15
	(0.003)		(0.91)
Amsterdam	-0.004**	6.00	0.89
	(0.002)		(0.60)
Revolt 1572			
Deventer	-0.007***	17.89	-42.92***
	(0.002)		(14.35)
Haarlem	-0.003*	3.20	-8.83
	(0.002)		(22.64)
Utrecht	-0.003**	5.33	-14.55
	(0.001)		(27.45)
Amsterdam	-0.003**	4.75	-14.93
	(0.001)		(22.97)

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

Table 10: The direct impact of the BCL dies out in influencing human capital formation

(Dependent variable: Male literacy rates in 1860)

	OLS	OLS	OLS	OLS	1st	2SLS	1st	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Literacy	Literacy	Literacy	Literacy	BCL	Literacy	BCL	Literacy
BCL	0.0316	0.0153	-0.0118	-0.0139		0.0767		0.0615
	(0.0214)	(0.0214)	(0.0181)	(0.0192)		(0.0554)		(0.0604)
Log population		0.0205**	0.0166*	0.0168**			0.1162**	0.0071
		(0.0088)	(0.0084)	(0.0082)			(0.0457)	(0.0115)
Share of Prot.			0.1648***	0.1161*			0.4049**	0.1327**
			(0.0398)	(0.0602)			(0.1797)	(0.0542)
Latitude				0.0221*				
				(0.0130)				
Longitude				0.0018				
				(0.0074)				
Dist. Deventer					-0.0044***		-0.0040***	
					(0.0012)		(0.0011)	
Constant	0.8497***	0.6870***	0.6415***	-1.3554	0.7692***	0.8349***	-0.4352	0.7118***
	(0.0161)	(0.0774)	(0.0765)	(1.1453)	(0.1273)	(0.0235)	(0.3959)	(0.0994)
Observations	67	67	67	67	67	67	67	67
R-squared	0.0238	0.0707	0.2687	0.3081	0.1820		0.3323	0.1640

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

Table 11: The direct impact of the BCL dies out in influencing economic development

(Dependent variable: Population growth 1400-1795)

	(1) Growth 1400-1795	(2) Growth 1400-1795	(3) Growth 1400-1795	(4) Growth 1400-1795	(5) Growth 1400-1795	(6) Growth 1400-1795
BCL	0.402*	0.371	0.450*	0.355	0.191	0.196
	(0.226)	(0.223)	(0.226)	(0.229)	(0.276)	(0.315)
Log pop 1400	-0.163	-0.089	-0.114	-0.091	0.013	0.005
	(0.115)	(0.127)	(0.125)	(0.135)	(0.129)	(0.140)
Sea		0.733**		0.737**	0.487	0.476
		(0.284)		(0.301)	(0.300)	(0.304)
River			-0.326	-0.065	-0.169	-0.166
			(0.200)	(0.169)	(0.218)	(0.221)
Dist. Roman				-0.002	-0.013**	-0.012*
				(0.003)	(0.006)	(0.006)
Latitude in radians						-0.033
						(0.455)
Longitue in radians						-0.029
						(0.138)
Constant	1.879**	1.107	1.597*	1.243	3.074**	6.548
	(0.865)	(0.947)	(0.903)	(1.011)	(1.355)	(41.406)
Observations	67	67	67	67	67	67
R-squared	0.047	0.193	0.076	0.201	0.434	0.435

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