

Are bank and non-bank lending substitutes?

Evidence from the 1848 financial crisis in Antwerp

Maite de Sola Perea^{a*}, Ruben Peeters^a & Marc Deloof^a

^a University of Antwerp, Prinsstraat 13, 2000 Antwerp, Belgium

* Corresponding Author

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Abstract

The 1848 revolution in France triggered a run on Belgian banks and reduced their lending. Since this bank crisis was an exogenous shock, it provides a unique opportunity to investigate whether bank lending and non-bank lending were complements or substitutes in this period. We exploit a new database on notarial credit in Antwerp to measure the effect of a reduced availability of bank loans on notarial credit. Our findings suggest that notarial lending was an important substitute for bank lending. The total amount of notarial lending significantly grew during the crisis in the city of Antwerp where bank lending was prevalent, while it did not change in rural areas where bank lending was rare. Borrowers based in the city obtained larger loans, though at higher rates. These results suggest that the perceived risk of notarial loans increased only to a limited extent during the crisis.

Keywords: 1848 crisis, liquidity shock, notarial credit, bank lending, Belgium

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1. Introduction

Financial systems are usually characterized by different forms of funding that interact dynamically. These forms vary in several ways such as by source, maturity, and collateral enabling them to serve distinct purposes and meet different financial needs. This raises the question of whether these forms of funding behave as complements or substitutes, and what conditions determine the nature of their interaction at different times.

Given the prevalence of commercial banks in the financial landscape since the late nineteenth century, studies on these interactions often investigate the conjunction between bank and non-bank credit, such as stock markets or trade finance (among others, Huang et al., 2011; Cheng, 2012; Casey and O'Toole, 2014; Afrifa et al., 2023a; Dottori et al., 2024). Nonetheless, we know little about the early days of commercial banks, when they were not yet the dominant funding source in many financial systems. Recent economic literature argues that banks and (stock) markets developed as complements rather than a zero-sum game (Song and Thakor, 2010; Ugolini, 2021). Cull et al. (2006) shows that modern financial institutions and local financial intermediaries financed different economic segments during the nineteenth and early twentieth centuries North Atlantic Core. Hoffman, Postel-Vinay, and Rosenthal (hereafter HPVR 2000, 2015, 2019) find that (modern) banks and (traditional) notarial credit markets in France complemented each other in the nineteenth century. However, most studies take a long-term view and provide limited insights into the short-term interactions between bank and non-bank funding sources during periods of crisis or shocks.

This paper investigates the joint functioning of bank and non-bank credit markets in the province of Antwerp during the 1848 banking crisis. Employing the crisis as an exogenous shock, this paper explores whether non-bank credit, specifically notarized lending, acted as a substitute or a complement to bank lending. To the best of our knowledge, this is the first paper analyzing the relationship between bank and notarial lending during a banking crisis providing insights into the substitution potential of these credit forms when one is constrained. Furthermore, the paper does so for a period of industrialization and financial transformation. If banks and notaries were true complements with poorly substitutable products, borrowers could have been left without much recourse when a lending channel disappeared (Taketa and Udell, 2007). On the other hand, if their products could function as substitutes, this could smoothen the impact of liquidity shocks and support local economic activity. Thus, answering this question is important because it improves our understanding of the flexibility and resilience of financial systems in the past and the joint functioning of modern and traditional intermediaries.

It also adds insight into modern financial institutions' role in economic growth in an industrializing economy.

For France, HPVR found that (modern) banks and (traditional) notarial credit markets developed in the same geographical areas but offered different products. Banks specialized in short term commercial lending while notaries intermediated long term mortgages. Nonetheless, it remains unclear whether the products banks and notaries offered could have been used as substitutes when one of both was restricted. To answer this question, we study the case of Belgium. It was the first country on the European continent to industrialize, and one which, since its independence in 1830, pioneered an important universal banking system that spurred industrial development (Chlepnier, 1926, Sylla, 1991) Belgium's notarial system was similar to France, as it had been modeled on the French example during the French occupation of the Austrian Netherlands.

Specifically, we investigate lending in and around the city of Antwerp. A wealthy trading city in Belgium, it provides an ideal case study due to its economic importance and diverse financial infrastructure. The city hosted an important branch of the Société Générale (Belgium's largest universal bank), several private bankers, a local stock exchange, a vibrant notarial capital market, as well as seasoned business owners and wealthy notables looking for investment opportunities (Peeters and van Kooten, 2024). This meant that firms potentially had access to a range of funding options, including bank lending, trade credit, mortgage loans, and equity, making it an excellent place to analyze the interaction between bank and non-bank credit markets.

The 1848 financial crisis offers a unique opportunity to examine the interaction of both credit markets. The Belgian 1848 crisis, caused by the French February Revolution, proved a severe shock to Belgian banking. Following news of the revolution, Belgian savers ran the commercial banks to redeem their banknotes, causing them to enter into distress, restrict lending, and suspend bill discounting. Stock listings fell by half and the stock exchanges of Brussels and Antwerp closed on 25 and 26 February respectively (Mardini and Schuler, 2014). The Banque Commerciale d'Anvers suspended payments on 29 February, and by early March Antwerp was suffering a cash shortage (Gille, 1963). While the political turmoil quickly disappeared, bank distress continued until May 1848 after multiple government interventions stabilized the banking system.

To study the crisis' impact on notarial lending, we rely on a unique database of notarized credit contracts from the city and province of Antwerp. The quantitative material is complemented with archival material including bank yearly reports, ministerial communications, and parliamentary discussions. We use econometric analyses to assess the impact of the crisis on notarial lending, both at the aggregate level (new notarial lending on a monthly frequency) and the loan level. The latter approach allows us to observe the effect of the crisis on different loan characteristics, which helps disentangle supply- and demand-side effects. We find that notarized credit substituted, at least partially, for constrained bank lending during the 1848 banking crisis, as notarial lending volumes increased. Interest rates went up for certain borrowers, but there was not generalized tightening.

The paper proceeds as follows. The second section describes the historical context and the chronology of the 1848 crisis, highlighting why this period provides interesting research opportunities. The third section provides an overview of the economic theory of bank and non-bank lending during financial crises. The fourth section describes the source material and introduces the unique characteristics of the newly collected datasets of notarized credit contracts and banking information. Section five investigates lending through notaries to find a significant increase in the amount of notarial credit contracted during the crisis period in the city of Antwerp, as opposed to rural areas. It also assesses the changes in loan conditions for notarized credit during this period. The sixth section discusses the possible explanations for the increase in notarial lending and whether this was due to a possible substitution effect between the bank and notarial lending. The seventh section presents additional evidence and robustness checks, while section eighth concludes.

2. Background to the 1848 Crisis

In the early 1840s, Belgium was a young country with an emerging economy. The first country on the European continent to industrialize, its industry was mainly located around coal mines in Walloon areas, as the booming port town of Antwerp formed its commercial heart. The growing international trade and local firms required a large amount of short-term credit provided by local banks, trading firms, and credit markets (Veraghtert, 1980). The transformation of Belgium's economic system went hand in hand with the development of a modern, universal banking and financial system that would become one of the most important in the world (Chlepnier, 1926; Sylla, 1991, p. 54; Ugolini, 2021).

In 1822, William I, King of the Netherlands, founded the first modern commercial bank in Belgium, the Société Générale, which, particularly after the country's independence in 1830, contributed greatly to Belgium's industrialization. The banking sector continued to grow with the foundation of the Banque de Belgique in 1835. Both banks dominated the Belgian banking landscape for decades and were allowed to issue banknotes and discount bills in a semi-free banking system (Mardini & Schuler 2014). Over the years, they spread across Belgium through their branches and patronized banks. The core of their business model involved investing directly in industrial companies. In this way, they not only contributed to the country's industrialization but also to the development of securities markets (Ugolini, 2021). These long-term investments, however, represented a sizable maturity mismatch with liabilities that consisted, to an increasingly large extent, of short-term deposits.

Commercial banks and branches were mostly located in larger settlements which typically had more economic activity. This suggests that, at the time, their services, including discount activities, were mainly used by urbanites (Chlepner, 1926, p. 83). Outside the main towns, small firms and entrepreneurs would have relied on private banks to obtain liquidity through discounts, or on non-bank credit such as notarized lending.

After 1830, Belgium experienced a period of rapid development and industrialization that concluded with the economic and financial crisis of 1838-1839. A renewed threat of war with the Netherlands in 1838 triggered bank runs across the country that resulted in the default of the Banque de Belgique. The illiquidity of the banks' investments took its toll. While the Société Générale could count on loans from Parisian banks to increase liquidity, the Banque de Belgique defaulted before it was saved by the government to safeguard the financial system (Mardini and Schuler, 2014). After 1839, the Banque de Belgique reduced her involvement with industry and focused on maintaining a high liquidity. The Société Générale, unscathed by the crisis, continued its industry equity investments, although it did decrease the attractiveness of its savings bank deposits¹ to reduce its liquidity mismatch and the cost of its liabilities (Chlepner, 1926). By the early 1840s, the two largest commercial banks were still strongly intertwined with large industrial enterprises, while local bankers provided bill discounting facilities to smaller firms (Mardini and Schuler, 2014).

¹ This included lowering the interest rate on savings deposits and lengthening the notice period before funds could be withdrawn (Chlepner, 1926).

The 1845-1846 famines troubled the economic recovery, particularly in predominantly rural Flanders, where unemployment was high (Ó Gráda et al., 2007). However, while political revolutions raged across Europe in 1848, the political landscape remained relatively calm in Belgium and protests were quickly suppressed (Beyen, 2019; Gooch and Rooney, 2005). Still, a financial crisis occurred when news of the French Revolution reached Belgium on 25 February 1848 and fear of revolution and war with France caused a bank run (Luyten, 1986). Stock prices of commercial banks fell rapidly and stock markets closed immediately (Figure 1). Contemporary accounts stated that “nowhere was the convulsion, alarm, and destruction of credit more prominent than in the kingdom of Belgium” (Lumley, 1857, p. 61). The Banque d’Anvers, a semi-independent subsidiary of the Société Générale, provided 11 to 18 million Belgian Francs annually through bill discounting in the years preceding 1848; but like the Société Générale, it stopped discounting during the crisis (Veraghtert, 1980, p. 201).²

Figure 1: Index of bank stock prices, 1833-1850.

(monthly data; December 1831 = 100; capital-weighted index)



Source: SCOB. The shaded area represents the crisis period from February until May 1848. The index includes stock prices of the Société Générale (from December 1830), Banque de Belgique (from February 1835), Banque Foncière (from June 1835), and Banque Nationale (from May 1850), weighted by market capitalization.

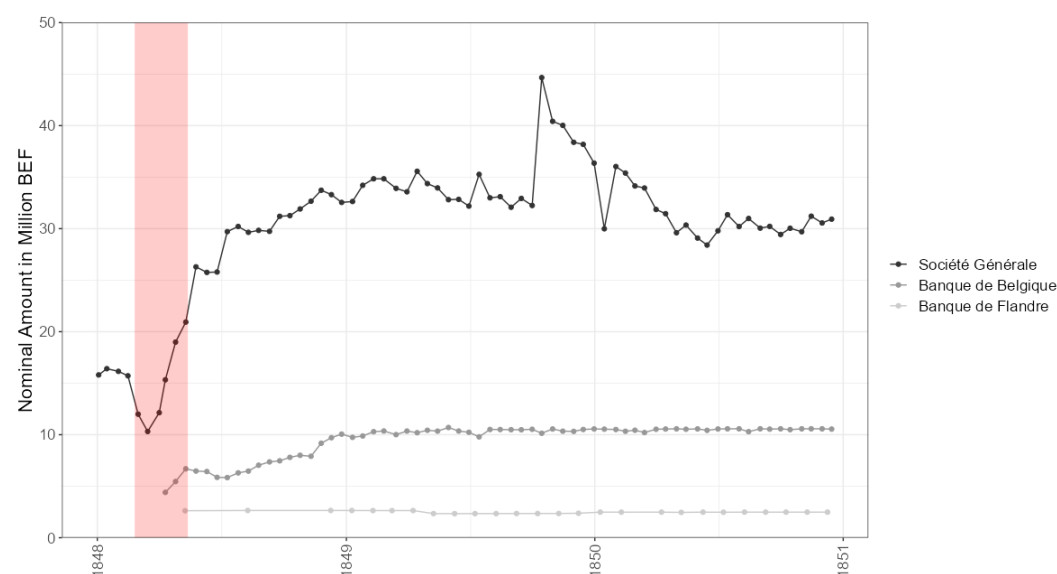
Belgian banks operated in a semi-free banking system, meaning that some banks were allowed to issue bank notes limited to a maximum share of their capital. In a free banking system, the quantity of notes was set by the interaction between the demand for notes (amount of notes

² Antwerp trading firms often did not have strong relations with the two large universal banks and therefore lost access to discount facilities when several local banks ceased operations, as the banks privileged the firms with closest relations to them (Buyst and Maes, 2008, p. 160). We do not have any information on the operations of other banks.

held by the public) and the supply of notes (notes issued by banks).³ Following the news of the French 1848 revolution, the Société Générale was in trouble and its note circulation fell by a third in a matter of days, as people demanded conversion into coins (Figure 2).

To fulfill the demand for conversion and withdrawals, the Société and the Banque de Belgique halted all bill discounting and lending, which led to a liquidity shock in the economy. Unlike in 1838, the government could not issue new treasury notes and thus had no financial space to directly bail out the banks in trouble (Chlepner, 1943). Instead, to reduce pressure on the banks, on 3 March the government proclaimed that it would continue to accept the notes of both banks, and on 20 March it suspended the forced convertibility of banknotes in coins, making the notes of commercial banks legal tender (Luyten, 1986).⁴ On top, banks were allowed to issue 30 million francs in new notes. In return, the banks had to deposit collateral (real estate or securities) with the Treasury.

Figure 2: Bank Notes in Circulation by Bank, Dec 1847-December 1850.



Source: Moniteur Belge and Annex to the 1848 Annual Report of the Société Générale p.33 (National Archives 2 - Joseph Cuvelier repository, Archives of Société générale de Belgique, 6th transfer, nr. 75.). Shaded area represents the crisis period from February 25 1848 until 15 May 1848.

The laws had the goal of renewing trust in the banking institutions and providing them with enough liquidity to maintain their discounting facilities. While the issuance of new

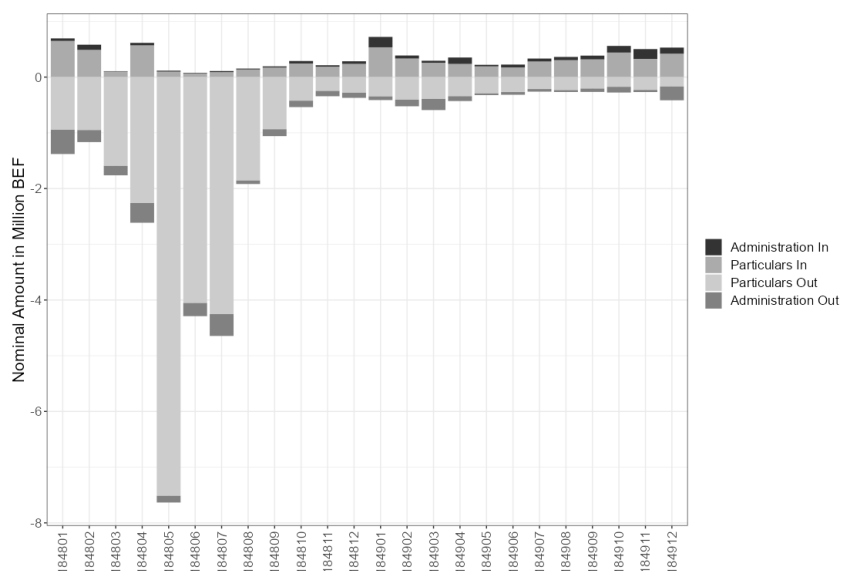
³ During periods of growth, banks can easily expand note circulation through lending, but shrinking demand is more difficult to manage. Banks can do so by increasing the interest rates on deposits (attracting bullion), increasing discount rates (reducing demand for credit) or offer favorable conditions for banknotes of other institutions to facilitate interbank clearing. For a theory of note circulation see (Mardini and Schuler, 2014)

⁴ The law was passed five days after the French government suspended convertibility (Guillaumin et al., 1850, p. 356). Chlepner (1943) incorrectly states that the law was published on 20 May 1848.

inconvertible banknotes provided the Société Générale with some flexibility, the bank mainly used this opportunity to meet the significant demand for deposit withdrawals (Buyst and Maes, 2008). Over the year, saving deposits, which represented 20 percent of total liabilities, were reduced by half (see Figure 3). As a result, the total amount of banknotes in circulation increased (see Figure 2). The law of 22 May furthered this trend by authorizing 20 million francs in bank notes issuance, specifically for the repayment of deposits.⁵ By the end of 1848, banknotes in circulation reached 46 million BEF, a large share of which most likely ended up in the hands of bank customers who withdrew their deposits, before further spreading out in the whole economy.

The deposit withdrawals from the Société Générale continued for several months after the start of the crisis, partly as a consequence of the required notice periods (up to 60 days). Flows in deposits returned to pre-crisis amounts only in September 1848. By the end of that month, deposits had dropped by 33 million BEF (70 percent of the amount at the start of the year), though they recovered somewhat in the following months. By the end of 1848, deposits at the Société Générale were half the size of the year before, and total assets had dropped by 22 percent (a decrease of 54 million BEF).

Figure 3: Monthly In and Outflow of Deposits at the Société Générale de Belgique, 1848-1849



Source: Archives SG (National Archives 2 - Joseph Cuvelier repository, Archives of Société générale de Belgique, 6th transfer, nr. 75). Annex to the 1849 annual report.

⁵ Chlepner (1943, pp. 23–24) argued that because the circulation of banknotes rapidly increased while not experiencing depreciation, this made people acquainted with the use of (fiat) banknotes. In most crisis situations, people would shy away from fiat money. During the crisis, banks were also allowed to issue banknotes with lower denominations (most notably 5 BEF, equivalent to a few days' salary for industrial workers and laborers). Because there were penalties attached to note issuing, the banks never issued the maximally allowed amount of banknotes.

To ensure the continuity of bill discounting, the law of 20 March 1848 also created a special discount office in Brussels called the Comptoir Central (Central Counter). The Société Générale and the Banque de Belgique each contributed 8 million BEF to the capital of the Comptoir which started operations immediately. On top, Brussels-based firms set up a credit union to discount bills on 26 May 1848, but this only started operations on 1 July 1848 and thus came too late to provide relief during the crisis (Denis, 1899).⁶

The Comptoir Central made a difference at the height of the crisis. In April 1848, it accounted for 19.3 percent of the total discounts, but as the Société Générale and the Banque de Belgique stabilized, its market share declined to an average of 7.6 percent in 1849 and 3.5 percent in 1850.⁷ In terms of the number of bills, the Comptoir Central was more relevant. It discounted nearly 15,000 bills in 1848, about half the amount of the Banque de Belgique, and slightly more than the Société Générale. A third (4,710 bills) were discounted in April and May. This suggests that, at the height of the crisis, the Comptoir Central lent to small and medium size enterprises that were excluded from the largest banks' discounting facilities and no longer had access to discounting through local bankers (Buyst and Maes, 2008). However, the Comptoir's reach was very local. In 1848, 94 percent of the discounted bills originated from Brabant (the province it was located in) accounting for 66 percent of the total value. Bills from the provinces of Hainaut and Luxembourg each represented 14 percent of the total value, while bills from the province of Antwerp made up just 1 percent of the total value.⁸

Although discounts by the Société Générale recovered after the crisis, their overall level in 1848 was considerably lower than in previous years (figure 5). While we have no information on discounts provided by private bankers (before or during the crisis), these institutions had limited capital bases and relied on the larger banks to rediscount bills. Thus we assume that the restriction in bill discounting was passed through from the large commercial banks through the private bankers, rather than compensated by them (Mardini and Schuler, 2014).

⁶ According to Denis (1899) L'Union du Crédit de Bruxelles was the first credit union founded in Europe. Dating back to 26 May 1848 it predates the better known Raiffeisen credit union (first established on 5 February 1849) and the first Schulze-Delitzsch union, from 1850.

⁷ Moniteur Belge.

⁸ This local focus of the new Comptoir Central was suspected by some members of the Parliament during the discussions that led to the approval of the law of 20 March, given the difficulties to transact across Belgian cities (session of 20 March 1848, Senate. Source: [Search Plenum](#))

Figure 5: Annual discounts by the Société Générale de Belgique

(Nominal BEF millions)

Source: Archives SG (National Archives 2 - Joseph Cuvelier repository, Archives of Société générale de Belgique, 6th transfer, nr. 75).

The 1848 banking crisis eventually led the government to reform and regulate the Belgian banking sector, including the creation of the National Bank of Belgium with offices all across the Belgian territory as an issuance and discount institution in 1850. (Buyst et al., 2005)

3. Theoretical Overview

The coexistence of and interaction between different forms of finance has been long studied, both from a historical perspective (e.g. for Belgium, Ugolini (2021)) and on the basis of contemporaneous data from developed and developing economies. From a review of firms' financing around the world, Allen et al. (2013) examine the relative importance of market- and bank-finance and alternative financing channels (internal funding, trade credit, informal loans) across economies. They find that alternative funding sources are large and often dominant in fast-growing economies. One aspect of particular relevance to researchers and policy-makers relates to the extent to which firms can use different forms of funding to replace constrained credit from a given source of finance. The role of trade credit as a replacement for the financing of (bank) credit-constrained firms, in particular, has been often studied (among others, Petersen and Rajan (1997), Nilsen (2002), Danielson and Scott (2004)). Maskara et al., (2021) found that alternative sources of finance may also replace bank credit when banks' presence in a community is scarce or reduced.

The relationship between different forms of corporate funding need not be unique. Tang (2019) finds that peer-to-peer lending platforms can act both as substitutes and complements to bank credit. In the same line, Afrifa et al. (2023b) find that peer-to-peer or trade finance and short-term bank lending are complementary for firms with more restricted access to funding, but substitutes for companies with easier access to external finance.

Additionally, the interaction between different types of finance may vary over time, and in function of the macroeconomic or institutional environment. A large strand of this literature has focused on the impact of (financial) crises and a drop in bank funding on non-bank finance. When a shock occurs, some lending channels with greater exposure, contract, while others expand in response, altering the relationship between financing sources. Responses depend on instrument or lender characteristics (see Cornett et al. (2011)). In the case of restricted bank

lending, constrained firms resort to alternatives such as non-bank intermediated credit and money markets, trade credit, or raising capital (Berger and Udell, 2006; Cornett et al., 2011; Dewally and Shao, 2014; Garcia-Appendini and Montoriol-Garriga, 2013; Taketa and Udell, 2007). Nilsen (2002) shows that small firms expand trade credit when bank lending contracts. Casey and O'Toole (2014) find that European SMEs applied more often to trade credit and informal funding when bank credit was constrained. The expansion of non-bank credit, thus, can act as a counter-cyclical relief for corporate funding, supporting the economy at a difficult time (Huang et al., (2011)).

For smaller firms, access to finance can be more difficult due to limited access to information on their creditworthiness, lack of collateral, and problems related to information asymmetries (Berger and Udell (2006), Beck and Demirguc-Kunt (2006)). Such curtailed access to funding can translate into increased financial distress (Khwaja and Mian, 2008) and, for firms with low liquidity, a drop in asset growth, investment, and employment (Berg, 2018). Cull et al. (2006) show that local financial intermediaries used their local information networks to extend credit to small and young firms during the nineteenth and early twentieth centuries. Economic research highlights the special role of relationship banking between local banks/lenders and small firms as a way to reduce information asymmetries (among others, Deloof et al., (2019)), in particular during financial crises (Sette and Gobbi, (2015); Banerjee et al., (2021). Theory and empirical evidence also points at the importance of non-bank private debt for riskier firms (Denis and Mihov, 2003).

During the first decades of modern banking, a better knowledge of local borrowers may have provided incumbent lenders (in this case local individual investors) and intermediators with an advantage over commercial banks. HPVR argued that this was particularly the case for notaries. Notaries' role in the community, registering property sales, inheritances and contracts, would have made the notarial office a knowledgeable intermediary between lenders and borrowers.

Our main hypothesis states that notarized lending (partially) substituted for constrained bank lending during the 1848 crisis, in a manner analogous to the role played by relationship banking (vs other banks) and alternative finance sources (such as trade credit) which have been documented in the literature on contemporaneous finance. Thus, we expect notarized lending to increase as a response to the tightening in bank lending.

Furthermore, we expect a stronger reaction to the banking crisis in urban areas rather than in smaller settlements: given the larger role of banks in cities, the impact of bank lending

constraints would be stronger there, which would also imply that demand for notarized credit during the crisis grows more in the city of Antwerp than outside it. Our second hypothesis states that demand for notarial lending increased more in the city.

4. Data

The analysis in this paper is based on a newly collected dataset comprising a sample of 2,465 notarial credit contracts notarized in the province of Antwerp between 1 January 1833 and 31 December 1837, and 1 January 1846 and 31 December 1850. From these contracts, we transcribed information on the size, interest, and maturity of the loan, the type of collateral used, the names, residences, and occupations of contracting parties, the name and location of the registering notary. On top, we collected any additional qualifications for the loan, such as the repayment specifications (in bank bills or coins) or conditional interest rates as well as the addresses of real estate collateral located in the city of Antwerp. Names of municipalities in Belgium were geocoded to 1960 NIS-codes,⁹ and street addresses within the city of Antwerp were connected to the 1835 Cadaster of the city providing us with information on the estimated value of the residence of the contracting parties residing in the city, as well as (for a subsample of loans) of the urban real estate pledged as collateral.

The notarial loan sample includes 2,775 loan contracts, of which 1,080 were notarized between 1833 and 1837 and 1,695 between 1846 and 1850. The sample includes all loan contracts registered by 63 unique notaries, of which 37 were active in the first period and 41 in the second period. Of those, four notaries were active in Antwerp city in the first period, and five in the second period.

The ANCRED sample represents 28 percent of the notaries active in the province of Antwerp between 1833-1837 and 38 percent between 1846-1850. Differentiating per area, the sample includes 29 percent of the notaries working in the city of Antwerp in the first period and 32 percent in the second period (29 and 40 percent, respectively, for the rural areas in the rest of the province). For these notaries, we collected all loan contracts registered in the given periods.

From 1833 to 1837, the notaries included in the ANCRED sample registered loans amount to 6.2 million (current) BEF. Between 1846 and 1850, the total was 8.1 million (current) BEF, at an average of 1.6 million BEF per year. This amounts to about one-tenth of the average annual discounts provided by the Société Générale in Antwerp between 1846 and 1850 (excluding

⁹ In the future, names of Dutch municipalities will be coded into 1850 Amsterdam codes (Van der Meer and Boonstra, 2011).

1848, for which no data is available). Assuming that the ANCRED notaries are a representative sample of all notaries in the province, annual notarial lending could correspond to about 28 percent of the Société Générale discounts in Antwerp¹⁰.

Table 1 summarizes the main descriptive statistics for both periods and the entire sample. Loan size was smaller in the second period than in the first one, while average loan maturity was shorter in the second period (the median remained unchanged), and the median interest rate increased. A higher share of loans was registered by notaries active outside of the city of Antwerp (in rural areas).

Around 40 percent of loans registered between 1846 and 1850 specified a change in the applied interest rate in case some condition was met: in most cases, this was a reduction in interest if the borrower repaid the loan installments on time.¹¹ [Data on conditional rates and payment and repayment conditions for the 1833-1837 period are incomplete at this stage.] The average (median) interest rate reduction compared to the originally agreed rate amounts to 40 (100) basis points. Loans with a conditional rate were significantly larger in size and had longer maturities and higher base interest rates than those without.

For the 1846-1850 period, 93 percent of loans included a repayment form condition, requiring the loan reimbursement to be made with a specific means of payment. In almost all of these loans (99.9 percent) the loan was to be repaid in metal coins, often even explicitly excluding banknotes, securities or future legal tender as means of payment. In 63 percent of the contracts, the sum lent was initially provided to the borrower in coins, and only 8 percent of the loans were supplied in banknotes.

Table 1: Summary statistics of notarial loans

Loan size in thousands BEF; interest rate and conditional rates in percentage points; maturity in years. “Rest of the province” equals 0 when the loan has been notarized in the city of Antwerp, 1 otherwise. “City lender” and “City borrower” equal 0 when the lender or borrower, respectively, are located in a municipality with less than 5,000 inhabitants, 1 otherwise. “Payment form” and “Repayment form” equal 0 if the loan must be provided or reimbursed, respectively, in banknotes; 1 if it must be provided or reimbursed in a mix of banknotes and coins; 2 if only coins are accepted; 3 for other forms of payment (e.g. in kind).

	mean	sd.	min	q1	median	q3	max	N
Period 1: 1833-1837								
Loan size (BEF thousands)	5.71	13.97	0.029	1	2.12	5	211.64	1,080

¹⁰ This comparison does not take into account the large differences in maturities between the two types of credit: a few months for bank discounts, compared to an average of around 10 years for notarized loans.

¹¹ For the 1846-1850 period, only 2% of the conditional rates were penalizing, i.e., a higher interest rate in case of late reimbursement.

Loan interest rate (pp)	4.52	0.61	0	4	4.5	5	10.4	987
Conditional interest rate (pp)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Maturity (years)	11.2	6.56	0	10	10	10	60	941
Rest of province	0.53	0.5	0	0	1	1	1	1,080
City lender	0.57	0.5	0	0	1	1	1	970
City borrower	0.43	0.5	0	0	0	1	1	1,009
Payment form	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Repayment form	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Period 2: 1846-1850								
Loan size (BEF thousands)	4.79	16.08	0.09	0.8	1.8	4	350	1,695
Loan interest rate (pp)	4.55	0.68	0	4	5	5	15	1,679
Conditional interest rate (pp)	4.15	0.35	1.25	4	4	4.5	5	709
Maturity (years)	9.84	4.75	0	10	10	10	50	1,601
Rest of province	0.7	0.46	0	0	1	1	1	1,695
City lender	0.46	0.5	0	0	0	1	1	1,618
City borrower	0.33	0.47	0	0	0	1	1	1,600
Payment form	1.85	0.49	0	2	2	2	3	1,223
Repayment form	2	0.04	1	2	2	2	2	1,568

Source: ANCREd database.

Compared to the standard French notarial loan described by HPVR, notarized loans in Antwerp were on average, larger and had longer maturities (10 to 11 years in our sample vs 4 to 5 years in France around 1840). Interest rates showed more variation in Antwerp than in France, where, in 1865, 98 percent of the loans (weighted by loan size) were contracted at five percent, the legal interest rate at the time.

4.1.1 Urban and rural loan contracts

Loans registered in the city of Antwerp were significantly different from those registered in the rest of the province (rural areas) in several aspects. Table 3 shows the average and standard deviation of the main loan characteristics by place of registration for the sample in 1846-1850.

Most notably, city loans were considerably larger, with a median and average three to four times those of loans registered outside of the city. On average, interest rates were higher and maturities shorter. Conditional rates were more common for loans registered in the city compared to those in the rest of the province (58 vs 35 percent). Repayment requirements appeared almost as frequently in smaller towns as in the city (92 vs 95 percent).

In 80 percent of the loans registered in the city of Antwerp, both borrowers and lenders resided in cities (i.e. municipalities with over 5,000 inhabitants), although almost one-third of loans in the rest of the province also included at least one lender from a city.

Table 2: Summary statistics of notarial loans, according to place of registration (1846-1850)

Average and standard deviation (continuous variables); number and average in percent (categorical variables).

	Location of notary			
	Antwerp	rest of province	Total	Test
Sample frequency (percent)	N=514 (30.3%)	N=1,181 (69.7%)	N=1,695 (100.0%)	
Loan size (BEF <u>th.</u>)	10.37 (27.86)	2.37 (3.80)	4.79 (16.08)	<0.001
Loan interest rate (pp.)	4.80 (0.63)	4.44 (0.67)	4.55 (0.68)	<0.001
Conditional interest rate (pp.)	4.18 (0.29)	4.12 (0.39)	4.15 (0.35)	0.055
Maturity (years)	9.33 (3.43)	10.06 (5.19)	9.84 (4.75)	0.005
City lender				
No	57 (11.9%)	816 (71.6%)	873 (54.0%)	<0.001
Yes	421 (88.1%)	324 (28.4%)	745 (46.0%)	
City borrower				
No	100 (21.4%)	979 (86.5%)	1,079 (67.4%)	<0.001
Yes	368 (78.6%)	153 (13.5%)	521 (32.6%)	
Payment form				
Banknotes	44 (9.8%)	14 (1.8%)	58 (4.7%)	<0.001
Banknotes and coins	51 (11.3%)	31 (4.0%)	82 (6.7%)	
Coins	351 (78.0%)	720 (93.1%)	1,071 (87.6%)	
Other	4 (0.9%)	8 (1.0%)	12 (1.0%)	
Repayment form				
Banknotes	1 (0.2%)	1 (0.1%)	2 (0.1%)	0.561
Coins	485 (99.8%)	1,081 (99.9%)	1,566 (99.9%)	
linear regression test performed for Loan size, Loan interest rate, Conditional rate, Maturity.				
Pearson's chi-squared test for Rural, City lender, City borrower, Payment form, Repayment form.				

Source: ANCREd database.

Antwerp city notaries were much busier, registering almost twice the number of loans compared to their rural colleagues (respectively, an average of 24 compared to 13 loans per notary per year).

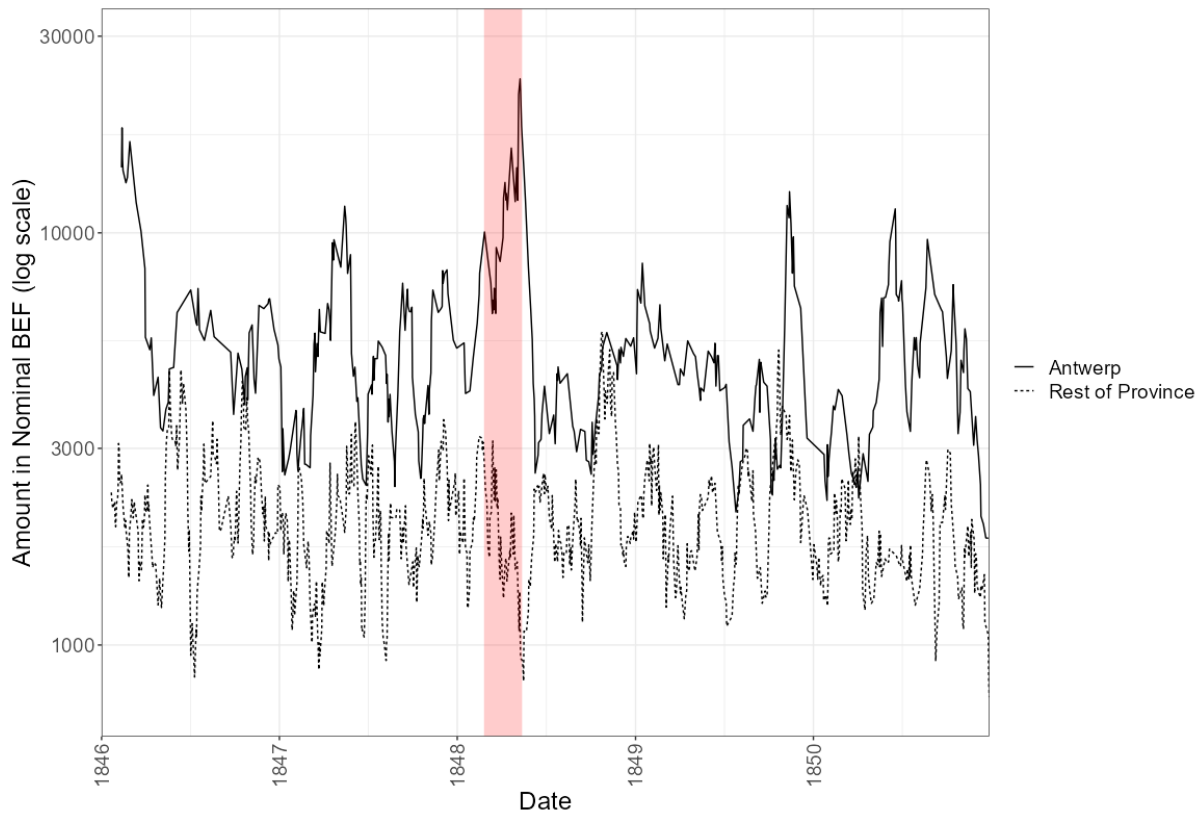
5. Banks and Notaries: Aggregate Level

The sudden halt of bill discounting and bank lending should have severely disrupted economic activity unless firms and individuals had access to liquidity from alternative sources. While Antwerp banks and notaries provided complementary products during non-crises times (Peeters and van Kooten, 2024), with banks focusing on short-term lending through discounting and notarial lending mobilizing long-term mortgage credit,¹² firms and individuals could have used notarial loans to compensate for the bank liquidity squeeze in 1848 by mortgaging (part of) their real estate portfolio. Figure 5 hints at such a scenario by showing

¹² Banks could also provide long-term funding, but they did so usually by acquiring companies' shares (Ugolini, 2021).

that the amount lent in the notarial market drastically increased during the period of banking distress.

Figure 6: Ten day moving average of total notarial lending in Antwerp and rest of the province, 1846-1850.



Source: ANCREC database. Shaded area represents the crisis period from 25 February 1848 until 15 May 1848.

To further examine the impact of the crisis on notarial lending, we employ a linear regression analysis. Table 3 reports the results from the regression of the amounts borrowed in notarial markets. The loan amounts have been aggregated at the monthly level, distinguishing between loans notarized in Antwerp city and those notarized in the rest of the province (L_t , expressed in the natural logarithm of the amount in BEF). The regressions are then run separately for the two geographical areas. The main variable of interest is the dummy “crisis” (D_t), which takes a value of 1 in the crisis months (February to May 1848), and of 0 otherwise. Some specifications include macroeconomic variables (M_t): these include the changes in bank stock prices (weighted by market capitalization), the yield in government bonds (as estimated from the price of a perpetual sovereign bond) and a commercial discount rate, all available at the Study Center for Companies and Exchanges (SCOB) of the University of Antwerp. We also include year fixed effects (Y) in some specifications.

Equation 1: Aggregate monthly notarial lending

$$L_t = \alpha + \beta D_t + \gamma M_t + \gamma Y + \varepsilon_t$$

The analyses confirm the increase in notarial lending during the crisis in the city of Antwerp, but no change, either positive or negative, outside of it.

The results are robust across specifications; with and without year-fixed effects, with a dependent variable in nominal amounts (thousands BEF; not shown); considering the full sample or only the 1846-1850 period (not shown); and including available macro data (changes in bank stock prices and long- and short-term interest rates in capital markets).

The size of the crisis coefficient for the city specifications increases when we include additional controls. In all cases, monthly amounts borrowed at least doubled during the crisis months.

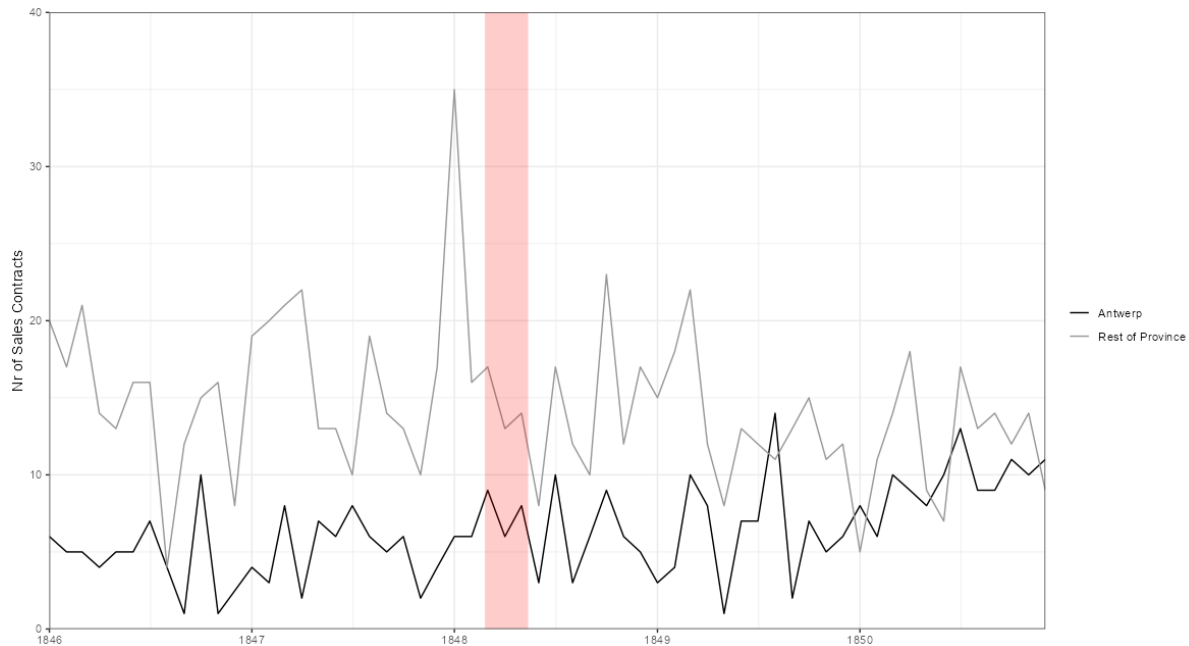
Table 3: Regression results for monthly notarial loan amounts

	1		2		3		4		5		6		7	
	Full sample		Antwerp city		Rest of province		Antwerp city		Rest of province		Antwerp city		Rest of province	
Crisis	1.099	**	1.431	***	0.294		1.578	***	0.042		1.610	**	0.053	
	(0.437)		(0.469)		(0.396)		(0.555)		(0.339)		(0.769)		(0.473)	
Rest of province	-0.864	***												
	(0.110)													
Crisis # rest of province	-0.472													
	(0.604)													
Post-crisis	0.096		-0.357	*	0.550	***	0.327		0.386		-0.388		0.395	
	(0.125)		(0.185)		(0.157)		(0.946)		(0.578)		(1.155)		(0.710)	
Δ bank stock prices											0.005		0.002	
											(0.022)		(0.013)	
Short-term rate											-0.201		0.041	
											(0.282)		(0.173)	
Long-term rate											0.315		0.006	
											(0.278)		(0.171)	
Year FE	No		No		No		Yes		Yes		Yes		Yes	
Intercept	10.925	***	11.046	***	9.940	***	10.907	***	8.879	***	9.896	***	8.680	***
	(0.085)		(0.096)		(0.081)		(0.255)		(0.156)		(1.671)		(1.027)	
Number of observations	240		120		120		120		120		120		120	
Adjusted R-squared	0.23		0.07		0.10		0.06		0.53		0.05		0.52	

This rise in mortgage lending could be caused by reasons unrelated to higher demand from firms and entrepreneurs suddenly excluded from bank lending. It could have originated, for instance, from an increased appetite for real estate by depositors and investors who withdrew their money from banks and stock and bond markets. Alternatively, those investors could have placed their funds in the notarial credit market by lending to other individuals or firms wanting to acquire real estate. Both scenarios would likely be reflected in an increase in the number of real estate sales contracts as additional groups of buyers entered the market. Figure 7, on the

contrary, shows that the number of contracts remained stable throughout the period. In the countryside, it even slightly decreased after an unexplained peak before the crisis. Therefore, this explanation appears unlikely.

Figure 7: Total monthly number of real estate sales contracts notarized by location of the notary, 1846-1850.



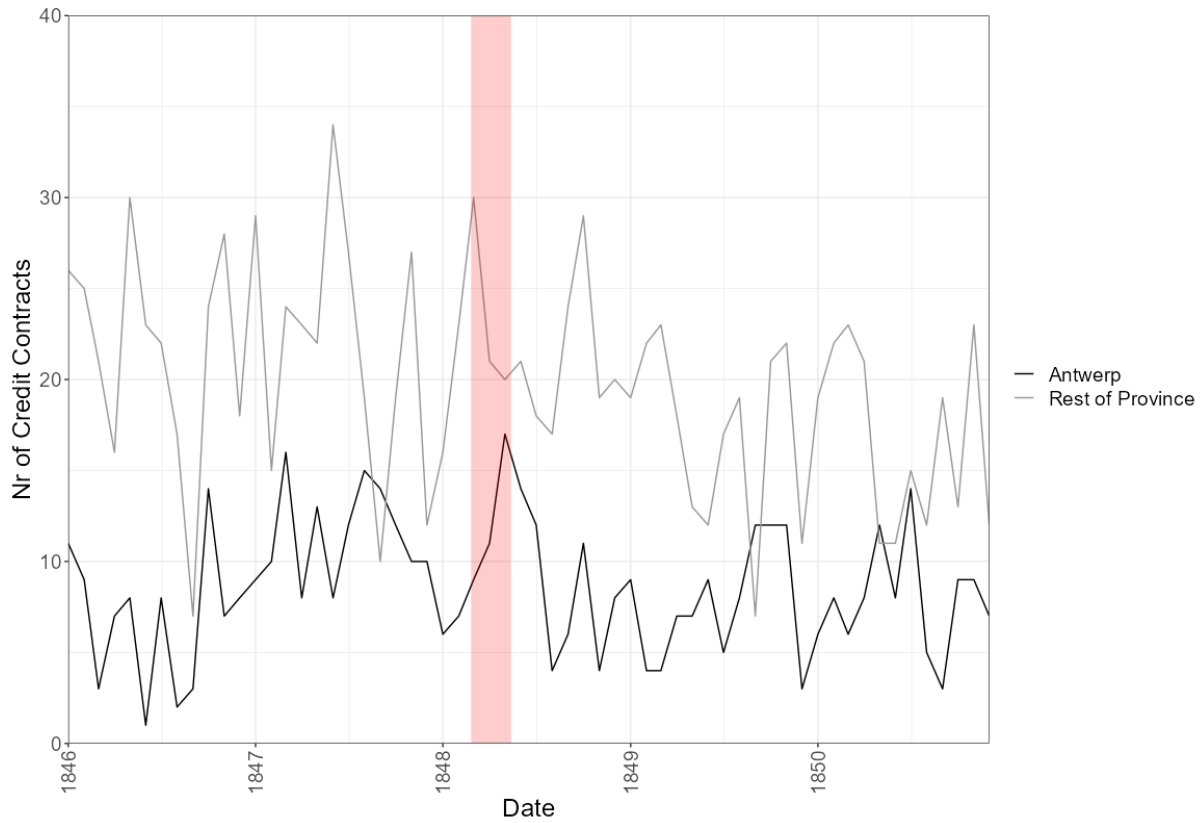
Source: NOTANT database; contains information on 8 notaries in the city of Antwerp and 30 notaries in the rest of the province. Shaded area represents the crisis period from February 25 1848 until 15 May 1848.

Instead, we argue the increase in notarial lending was driven by borrowers leveraging properties they already owned to obtain capital, notably in the city of Antwerp. While the number of credit contracts slightly increased compared to levels before the crisis (Figure 8), regressions using the number of loans as a dependent variable do not show a clear effect of the crisis: the coefficients of the crisis dummy remain statistically insignificant in most specifications. The increase in amounts lent is driven by larger loans, rather than by a rise in the number of contracts.

The analysis of the aggregate amounts suggests that the notarial credit market expanded during the banking crisis and that this was not driven by a flight to real estate markets as alternative investments. This supports our first hypothesis, namely that notarized credit substituted (at least partially) for bank lending during the crisis. This substitution, however, seems to have taken place only in the city of Antwerp, also providing support to our second hypothesis. The remaining question is then: what caused these aggregate changes? Was it supply or demand

driven? Were there signs of tightening in the market and did the population of lenders or borrowers change?

Figure 8: Total monthly number of credit contracts notarized by location of the notary, 1846-1850.



Source: NOTANT database, contains information on 5 notaries in the city of Antwerp and 30 notaries in the rest of the province. Shaded area represents the crisis period from February 25 1848 until 15 May 1848.

6. Loan Level Analysis

To understand what drove the increase in notarized lending during the crisis, we analyze the data at the loan-level. This allows us to gauge changes in the loan's terms and conditions, such as interest rate, maturity, or repayment requirements. A tightening of one or several of these can be interpreted as the presence of credit constraints and/or an increase in risk awareness.

Equation 2 shows the regression model used for loan size, where L_{it} represents the size of loan i (in natural logs) provided at time t ; D_t is the crisis dummy (equal to 1 from 25 February to 15 May 1848, zero otherwise); R_i indicates where the loan was registered (equals 0 if registered in Antwerp city, 1 otherwise). Several specifications also include the interaction between the loan registration place and the crisis variable ($D_t * R_i$). The rest of variables contain loan

controls (C_i), macroeconomic controls (M_t : interest rates and change in banks stocks prices) and year and notary fixed effects.

The loan controls include the share of women among lenders and borrowers ('gender composition'), the loan's maturity in years, the effective rate (i.e. the loan's interest rate, or the conditional rate when the latter is agreed and lower), and a dummy on whether the loan is provided in coins instead of banknotes or other means of payments.

Equation 2: individual loan analysis

$$L_{it} = \alpha + \beta_1 D_t + \beta_2 R_i + \beta_3 (D_t * R_i) + \gamma_i C_i + \theta_t M_t + \gamma_t Y_t + \gamma_j N_j + \varepsilon_{it}$$

Table 4 estimates the impact of the crisis on the size of individual loans. Nominal loan amounts are transformed into logarithm form (natural logarithm). Interest rates and the change in bank stock prices are expressed in percentage points and maturity is measured in years. We also include some variables on the share of women among the loan parties (gender composition), and differentiate between the share among lenders and borrowers. These are expressed in percentages. The rest of the variables are dummies taking values 0 and 1. Specifications shown in columns 4 and 5 include notary and year-fixed effects.

Consistent with the analysis of aggregate amounts, the estimations show that loans became larger during the crisis, but only if they were notarized in the city of Antwerp. In specification 5, furthermore, we distinguish between the location of lenders and borrowers, which we interact with the crisis variable. This suggests that the location of the lender and borrower mattered: in normal times, loans provided to borrowers or by lenders living in a city (Antwerp in most cases, but also other towns with a population above 5,000) were considerably larger (over 40%) than loans provided to non-city borrowers or by non-city lenders. In specifications 1 to 3, this is reflected in the negative coefficient for the variable "Rest of province". During the crisis, loans by city lenders to city borrowers became even larger (over 400% compared to loans between non-city parties in normal times).

The observation that urban borrowers in particular borrowed notably larger sums during the crisis months is consistent with the fact that banks were more present in urban areas. As bank lending contracted, urbanites relying on banks were primarily those looking to alternative credit sources. The increase in loan size also indicates that urban lenders did not have a problem meeting this sudden surge in demand, as the terms and conditions remained largely similar.

Table 4: Individual loan size regressions

	1	2	3	4	5
	Ln(size)	Ln(size)	Ln(size)	Ln(size)	Ln(size)
Crisis	0.26 *	0.92 ***	0.86 ***	1.15 ***	0.13
	(0.135)	(0.209)	(0.212)	(0.294)	(0.561)
Rest of province		-1.01 ***	-0.80 ***	-0.27	0.08
		(0.064)	(0.068)	(0.283)	(0.288)
Rest of province # crisis		-1.10 ***	-1.01 ***	-1.02 ***	-0.04
		(0.258)	(0.269)	(0.265)	(0.489)
Maturity			0.04 ***	0.05 ***	0.05 ***
			(0.008)	(0.008)	(0.008)
Effective rate			-0.09 *	-0.15 ***	-0.18 ***
			(0.053)	(0.055)	(0.054)
Payment in coins			-1.00 ***	-0.89 ***	-0.82 ***
			(0.093)	(0.101)	(0.100)
Crisis # city lender					
# city borrower					
0 # 0 # 1					0.68 ***
					(0.164)
0 # 1 # 0					0.39 ***
					(0.097)
0 # 1 # 1					0.59 ***
					(0.114)
1 # 0 # 1					0.59
					(1.067)
1 # 1 # 0					0.66
					(0.431)
1 # 1 # 1					1.80 ***
					(0.515)
Intercept	7.56 ***	8.27 ***	8.82 ***	9.54 ***	9.11 ***
	(0.032)	(0.054)	(0.266)	(0.542)	(0.540)
Gender composition	No	No	Yes	Yes	Yes
Macro controls	No	No	No	Yes	Yes
Notary FE	No	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes
N	1 439	1 439	1 028	1 028	1 028
Adjusted R ²	0.00	0.18	0.30	0.35	0.38

*** p<.01, ** p<.05, * p<.1

For a similarly-sized loan, changes in terms and conditions such as the loan interest rate and its maturity can indicate varying risk perceptions (either systemic or individual), or different degrees of liquidity. Thus, in case of liquidity constraints or higher risk perceptions in the economy, we would expect individual loans to have a shorter maturity or higher interest rates. For a given loan, its different characteristics are simultaneously agreed between lender and borrower.

We perform additional analyses using a loan's interest rate and maturity as dependent variables (tables 5 and 6). The 'effective' rate that we use is the lowest rate agreed in the loan contract when several rates are foreseen in case of late repayment¹³. While there is a risk of endogeneity in using the different loan characteristics as dependent and independent variables in the various

¹³ 42 percent of the loans in our sample include two interest rates, with a higher one to be applied in case of late payment of the interest due every year. For these loans, the 'effective' rate is the lowest of the two rates mentioned.

analyses, specifications that do not include them as explanatory variables show similar findings.

Most specifications using the loan's effective interest rate as a dependent variable show a positive and significant impact of the crisis on the pricing of loans registered in the city (between 0.2 and 0.4 percentage points). This seems to be due to loans provided during the crisis by lenders residing in cities to borrowers also residing in cities, as shown in specification 5.

Table 5: Interest rate regressions

	1		2		3		4		5	
	Effective rate		Effective rate		Effective rate		Effective rate		Effective rate	
Crisis	0.24 ***		0.66 ***		0.79 ***		0.73 ***		0.50	
	(0.069)		(0.115)		(0.124)		(0.170)		(0.329)	
Rest of province			-0.14 ***		-0.18 ***		0.04		0.16	
			(0.035)		(0.043)		(0.164)		(0.169)	
Rest of province # crisis			-0.65 ***		-0.80 ***		-0.82 ***		-0.57 **	
			(0.142)		(0.158)		(0.153)		(0.287)	
Ln(size)					-0.03 *		-0.05 ***		-0.06 ***	
					(0.019)		(0.018)		(0.019)	
Maturity					-0.02 ***		-0.02 ***		-0.02 ***	
					(0.005)		(0.005)		(0.005)	
Payment in coins					0.09		0.06		0.07	
					(0.058)		(0.061)		(0.061)	
Crisis # City lender										
# City borrower										
0 # 0 # 1									0.21 **	
									(0.097)	
0 # 1 # 0									0.14 **	
									(0.057)	
0 # 1 # 1									0.21 ***	
									(0.068)	
1 # 0 # 1									-0.02	
									(0.628)	
1 # 1 # 0									0.11	
									(0.254)	
1 # 1 # 1									0.52 *	
									(0.304)	
Intercept	4.18 ***		4.28 ***		4.70 ***		4.83 ***		4.74 ***	
	(0.016)		(0.030)		(0.174)		(0.325)		(0.327)	
Gender composition	No		No		Yes		Yes		Yes	
Macro controls	No		No		No		Yes		Yes	
Notary FE	No		No		No		Yes		Yes	
Year FE	No		No		No		Yes		Yes	
N	1 439		1 439		1 028		1 028		1 028	
Adjusted R ²	0.01		0.04		0.08		0.19		0.20	

*** p<.01, ** p<.05, * p<.1

We assume that credit tightening could also be reflected in shorter maturities (to minimize credit and liquidity risk). Table 6 shows the results of similar specifications using maturity as a dependent variable. Contrary to what we obtain in the case of interest rates, the crisis does not affect loan maturities significantly. The crisis variable is statistically insignificant in most

specifications, except in interaction the location of lenders and borrowers: during the crisis, lenders located in cities provided loans with longer maturities to non-city borrowers. The results point at the absence of a tightening in this dimension and, for city lenders loaning to non-city borrowers, possibly even an easing.

Table 6: Loan maturity regressions

	1	2	3	4	5
	Maturity	Maturity	Maturity	Maturity	Maturity
Crisis	-0.34 (0.479)	0.12 (0.817)	0.06 (0.824)	0.31 (1.146)	-1.62 (2.212)
Rest of province		0.51 ** (0.249)	1.09 *** (0.279)	0.60 (1.095)	0.09 (1.135)
Rest of province # crisis		-0.66 (1.008)	-0.53 (1.045)	-0.54 (1.035)	0.73 (1.929)
Ln(size)			0.67 *** (0.119)	0.80 *** (0.121)	0.83 *** (0.124)
Effective rate			-0.73 *** (0.203)	-0.75 *** (0.213)	-0.69 *** (0.214)
Payment in coins			0.57 (0.380)	0.23 (0.406)	0.17 (0.407)
Crisis # City lender # City borrower					
0 # 0 # 1					-0.70 (0.651)
0 # 1 # 0					-0.44 (0.386)
0 # 1 # 1					-0.84 * (0.454)
1 # 0 # 1					1.69 (4.209)
1 # 1 # 0					3.55 ** (1.697)
1 # 1 # 1					0.60 (2.044)
Intercept	9.64 *** (0.114)	9.28 *** (0.210)	5.63 *** (1.474)	4.29 * (2.404)	4.71 * (2.418)
Gender composition	No	No	Yes	Yes	Yes
Macro controls	No	No	No	Yes	Yes
Notary FE	No	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes
Number of observations	1 439	1 439	1 028	1 028	1 028
Adjusted R- squared	-0.00	0.00	0.06	0.13	0.13

*** p<.01, ** p<.05, * p<.1

These loan level regressions paint a picture of demand and (limited) supply shock to the notarial credit market during the banking crisis. Urban borrowers borrowed larger sums, against largely the same conditions as before the crisis. We assume that these borrowers are mostly urbanite merchants cut off from bank credit. However, a closer study of the notarial contracts also show another way in which the notarial market helped ease the strain on banks, namely by injecting liquidity into banks. In our sample, there were five loans to Eduard Jozef Cogels, an Antwerp nobleman and board member of the Banque de Belgique and the insurance company *L'Escaut*.

Between 13 March 1848 and 17 April 1848, Cogels and his wife Julia Dymphna Du Bois borrowed 373,000 Belgian Francs from several nobles and another Insurance Compagnie (Securitas), using their extensive estates around Brussels as collateral. Furthermore, these are the only appearances of the Cogels-Du Bois couple in our sample: there is no evidence of them borrowing before the crisis or after its peak. While we do not know why Cogels and his wife suddenly borrowed so much, it is possible that they used their connections to either compensate for loss of access to bank loans, or to add liquidity to the Banque de Belgique of which he was a board member. While Cogels' borrowing is extreme, our results hold when we exclude those loans from the sample.

7. Robustness Checks and Additional Evidence

Our results remain robust across specifications and robustness tests. Using the size of loans in thousands BEF instead of their logarithm shows no differences in the direction, significance, or effect size, both for the aggregate (monthly) and loan-level analyses. Adding lagged values of monthly lending or macroeconomic variables in the cross-section regressions did not affect the direction or significance of the coefficient on the crisis variable. Focusing on the second period or on the entire sample (both for the aggregate and loan-level analyses) did not change the main results, either. Results were also robust to alternative crisis definitions (measured by bank deposit outflows or spanning a shorter period), and to using the main interest rate agreed in the contract.

8. Conclusions

Recent research has highlighted the role of non-bank lending in industrializing economies, while historical research has underscored the complementarity and joint evolution of bank and non-bank credit markets over time. Using a unique, newly collected database of notarized loans in Antwerp, we examine how the largest non-bank credit market – notarized lending – responded to a banking crisis. Our findings show that notarized lending substituted bank lending during this period.

As banks tightened lending in 1848, we find that borrowers turned to the notarial loan markets for liquidity, although this response geographically. In the city of Antwerp, new notarial lending increased during the crisis months, partially offsetting the decline in bank lending. However, this compensatory effect was absent in other parts of the province.

Borrowers from larger municipalities, who typically faced stricter terms and conditions before the crisis, were able to secure larger loans during the crisis, although at a higher price, while borrowers in smaller towns could benefit from longer maturities. This combination of factors suggests that the notarial credit market experienced both a positive supply and demand shock during the period of banking distress.

Overall, our results suggest that notarized lending supported the economy during the bank run. The observed effects were driven by lending in urban areas where banks were more active before the crisis. As such, in this paper, we provide new evidence that notarized lending served as a vital alternative to bank lending during a bank crisis caused by an exogenous shock.

Further research could explore the structural or cyclical differences between rural and urban areas, and the role of the socio-economic situation of lenders and borrowers, to better understand these heterogeneous developments. Additionally, to deepen our understanding of the financial transformations and the expansion of banking in the nineteenth century, research on later periods is needed to confirm if the substitution effect persisted as bank lending became relatively more important to firms and households.

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