The Origins of Limited Liability: Catering to Safety Demand with Investors' Irresponsibility

Guillaume Vuillemey*

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Abstract

Limited liability is a key feature of corporate law. Using data on asset prices and capital flows in mid-19th century England, I argue that its liberalization was not decided to relax firms' financing constraints, but to satisfy investors' demand for "safe" stores of value. Limited liability eliminated adverse selection about the quality of other shareholders; stocks could be held to store wealth in diversified portfolios, without extended forms of responsibility. Prices of newly issued stocks are consistent with this hypothesis. Thus, the quest for "safe" stores of value explains not only features of debt markets, but also of equity markets.

*HEC Paris and CEPR. Email: vuillemey@hec.fr.

1 Introduction

Limited liability is arguably the most important feature of corporate law (Easterbrook and Fischel, 1996). Without it – that is, with *un*limited shareholder liability –, firms would arguably not be able to raise equity capital from dispersed investors, there would arguably be no liquid market for stocks, and no separation of ownership and control. It is so central that it is typically taken for granted: all economics students are taught that limited liability is a "defining feature" of equity. However, limited liability was *not* always a feature of equity. Rather than as a "defining feature," we should think of it as an outcome of contractual and regulatory design.

The question then arises: What economic forces led limited liability to emerge? What are its costs and benefits relative to those of other contractual and regulatory arrangements? While limited liability was first granted in the early 17th century to East India Companies (Dari-Mattiacci et al., 2017), it remained a privilege granted by government charters until the mid-19th century, when it was liberalized, that is, made freely available to all companies meeting incorporation requirements[1].

The standard narrative is that limited liability was generalized during the Industrial Revolution, in order to meet *firms' demand* for capital, as it allowed companies to raise capital beyond active partners and to operate larger-scale businesses (Manne, 1967), which paved the way for subsequent sustained economic growth.

In this paper, I argue that the liberalization of limited liability was driven, not by firms' demand, but by *investors' supply* of capital. I focus on England, which was the leading economic power in the 19th century and the birthplace of the Industrial

[1]The chronology holds for many countries, including the United Kingdom, France, and the United States (where the liberalization was decided at the state level)

Revolution. I argue that the early Industrial Revolution (starting in the mid-18th century) led to a massive increase in financial wealth, while the supply of financial assets did not grow equally fast: limited liability stocks were restricted by government charters, while the supply of government bonds was declining. This situation, akin to a "savings glut" (Bernanke, 2005), led to a fall in interest rates and gave rise to a large demand for financial securities in which new savings could be invested. This is akin to a demand for "safe" assets (Caballero et al., 2017; Gorton, 2017), where "safety" is understood as a property of assets which are sufficiently immune to adverse selection so as to be suitable for storing wealth.

I argue that limited liability was the outcome of a security design problem to solve this "safe asset shortage." With unlimited liability, stock investors often had to play an active role in firms' management. Additionally, the need to personally know the "quality" of other shareholders created significant adverse selection and prevented stocks from being traded in liquid markets. In this context, limited liability eliminated adverse selection: with it, it is enough to know that a shareholder has been able to pay the price p of a stock; whether he has wealth beyond p becomes irrelevant. The outcome of this security design is stocks which are much "safer," which can be traded with high liquidity and – for uninformed savers – held in diversified portfolios or funds. In sum, limited liability helped catering to safety demand with investors' personal irresponsibility.

The implementation of this solution could not be achieved via pure bilateral contracting and required an explicit government intervention. Indeed, for liability to be completely limited, it has to be limited not only vis-à-vis contractual counterparties (such as debt creditors), but also vis-à-vis noncontractual third parties, such as tort

creditors (e.g., victims of environmental damages). The need for a political intervention to generalize limited liability raises one difficulty for identification: it is never possible to causally explain a *political* decision with purely *economic* forces. Indeed, political factors, inaccurately captured by economic variables, can always play a role. Here, I provide *economic* evidence that mid-19th century England was characterized by a severe shortage of safe stores of value, and that this shortage found an echo in *political* debates on limited liability. While I argue that this narrative is consistent with a broad range of facts – both before and after the generalization of limited liability–, I cannot assert that it is the only causal mechanism, and I cannot rule out that other forces also played a role to explain this major change in company law.[2]

To empirically show that safety demand played a leading role to explain the generalization of limited liability, I first provide macroeconomic evidence that that the early 19th century – until our main event of interest, the *Companies Act of 1862* –, was characterized by an increasing shortage of financial assets. While the leading asset for storing wealth was government-issued consols, these bonds stopped being issued following the Napoleonic wars (which ended in 1815), and were at times redeemed. As wealth continued to grow, their yields dropped, leading to a "low interest rate" environment. In this context, I estimate regressions of consol yields on consols issuance, in the spirit of Krishnamurthy and Vissing-Jorgensen (2012). Across a variety of specifications, I find a positive and significant relation: when consols are redeemed, some safety demand is left unmet, and investors are willing to bid more aggressively for the bonds that remain available, so that their yield decreases. I then explore the possibility that the prices of privately-issued assets – in this case, stocks from the subset of firms

[2]It is well-known that, during debates on limited liability, many arguments went far beyond economic arguments, incorporating social or moral concerns (Hunt, 1936; Chaplin, 2016).

benefited from limited liability due to a government charter – also obey to the same logic, as in Kacperczyk et al. (2021). I find that it is the case: when the availability of consols drops, the returns of stocks traded in the London Stock Exchange increase. This is consistent with the view that safety-seeking investors turn to limited liability stocks when government debt becomes less widely available.

Then, I hypothesize that, if investors are unable to find domestically the safe stores of value they desire, they should look for them abroad. Consistent with this view, England built up a large net external position between the early 1800s and the mid-19th century. To study these flows in greater details, I turn to data on all securities traded in the London Stock Exchange between 1800 and 1862, including foreign securities. I document that the share of foreign securities traded in London grew continuously until the 1870s. Using regressions, I show that new foreign securities appear in the London market precisely in years when the net issuance of government bonds is low. These results are again consistent with a safety-seeking behavior, while being inconsistent with the alternative view that growing English firms were scrambling for capital (in which case England would have imported, rather than exported, capital). Regarding the pre-1862 period, I finally provide anecdotal evidence, from parliamentary debates, that concerns about both low yields on safe assets and the shortage of financial assets found an echo in political debates before limited liability was liberalized.

I finally study the pricing of newly issued stocks after the Companies Act of 1862. If these stocks are issued primarily to cater to a standing demand by uninformed savers, we expect them to exhibit a relatively poor performance in the long term: safety-seeking investors could overpay for securities which provide them with stores of value, and which could now be issued without much control. Comparing stocks

issued just before and after major acts, I show that this is indeed the case: following the act of 1862, newly issued stocks experience negative cumulative excess returns at various horizons, relative to firms created before the act. I additionally show that newly-created firms have significantly lower survival rates at most horizons. These findings are consistent with the view that the pool of limited liability firms created after the Companies Act of 1862 is of significantly worse quality – and that their stocks could be sold at high prices because of the existence of a standing demand for financial assets. It is instead inconsistent with the view that limited liability suddenly allowed severely constrained firms to raise capital in order to operate positive net present value projects.

The alternative narrative I study is not just of historical interest. First, it has important implications for the interpretation of financial history. In particular, it shows that not only features of debt markets can be explained by safety-seeking behaviors, but also a central feature of equity markets. More broadly, one can hypothesize that the depersonalization of financial relations, which characterizes financial modernity (including the liberalization of limited liability) is, to a large extent, the product of safety-seeking behavior: in all cases, safety is created by eliminating the adverse selection associated with personal relationships. Second, my findings have implications for debates on corporate responsibility, by highlighting the root cause of this problem: savers could become pure financial investors precisely because they were able to strictly limit their liability, that is, their responsibility for the firms' decisions. Based on this insight, the literature on investor responsibility would benefit from more direct discussions on the optimal level of shareholder liability.

Related literature

This paper relates to several strands of the literature. A few papers and books on the origins of limited liability have discussed the role of wealthy investors pushing for it (Hunt, 1936; Jefferys, 1938; Chaplin, 2016). Bryer (1997) documents a similar force through a reading of the archives from the Mercantile Laws Commission of 1854. These works, by historians, typically focus on parliamentary debates, with little or no quantitative evidence.[3] In contrast, I take the benefit from large amounts of recently assembled data to provide statistical evidence. Previous works also lack a genuine theoretical framework, such as the one provided by theories of safe asset demand.

Instead, my paper is directly related to these theories, as well as to the recent literature on safety demand and security design. A general idea is that adverse selection concerns lead uninformed savers to demand "safe" stores of value, that is, financial securities immune from adverse selection (Gorton and Pennacchi, 1990; Caballero and Farhi, 2018). Typically, these securities are government bonds (Krishnamurthy and Vissing-Jorgensen, 2012). The literature also documents the ability of private agents to design securities to cater to safety demand, e.g., via securitization or other forms of short-term debt (Sunderam, 2015; Kacperczyk et al., 2021). I show that similar mechanisms explain the rise of limited liability, arguably the most important feature of equities.

Finally, the paper also relates to the broad literature on investor responsibility (Rield and Smeets, 2017; Pastor et al., 2021; Pedersen et al., 2021; Oehmke and Opp, 2022). Most existing works look at whether investors are willing to sacrifice financial

[3]Some works in the marxist tradition have discussed this thesis even more informally, by showing the influence of "bourgeois wealth" on changes in the institutional environment.

return for "impact," or at whether "socially responsible" investment can have a material impact. I show that, historically, savers became pure "investors" once they were granted some "irresponsibility" through limited liability, so that "investor responsibility" may appear as a contradiction in terms. Relatedly, papers such as Akey and Appel (2021) document the use of limited liability to maximize negative externalities.

2 Theory and hypotheses

This section discusses the theoretical framework and formulates testable hypotheses.

2.1 Theoretical framework

A safe asset is an asset that is immune to adverse selection concerns (Gorton, 2017). It can be traded without prolonged analysis and, once bought, does not require continuous monitoring. In sum, it is an asset desired primarily to serve as a *store of value*. Safe assets are generally thought of as debt securities (Gorton and Pennacchi, 1990; Holmström, 2015). Indeed, debt can be made information insensitive – thus shielded from adverse selection – via a short maturity, seniority, tranching or collateral.

How about stocks? While trading of single stocks exposes uninformed investors to losses from adverse selection, this risk can be largely reduced by trading baskets of stocks or indices (Subrahmanyam, 1991; Gorton and Pennacchi, 1993). Pooling gives rise to an "information destruction effect" (DeMarzo, 2005): a trader can no longer benefit from private information on a given stock if he has to buy or sell an entire portfolio. In sum, "safety" is created by pooling: adverse selection is eliminated, and securities which were individually unattractive to uninformed savers can be combined

to create attractive stores of value. In this context, "safety" does not designate an absolute certainty of returns, but the fact that an asset is sufficiently immune to adverse selection to enable uninformed savers to store value. The existence of a large volume of savings currently invested in index securities or exchange-traded funds (e.g., for pensions) is consistent with the view that these are attractive stores of value.

I propose to interpret the liberalization of limited liability as an event which enabled uninformed savers to access precisely this kind of "safe" store of value. Before that event, unlimited liability stocks could not be held in diversified portfolios, and thus could not be attractive for uninformed savers. As long as shareholders can be held jointly liable "to the last shilling and acre," knowing the identity and resources of all other shareholders is essential.[4] As such, unlimited liability creates adverse selection about the quality of other shareholders, which prevents the emergence of a liquid market for shares (Carr and Mathewson, 1988). Relatedly, unlimited liability often implied that shareholders could not be passive, and had to personally engage in the management or governance of firms. Taken together, the lack of a liquid market and the need for active involvement implied that unlimited liability stocks could not be combined to form a diversified portfolio (Halpern et al., 1980; Easterbrook and Fischel, 1985). In sum, the ability to store wealth "safely" in a diversified portfolio did not exist (beyond shares of companies benefiting from a charter).

In this context, the main benefit from limited liability is to eliminate adverse selection about the identity of other shareholders (Halpern et al., 1980). With limited liability, only the ability of a given investor to pay the price p of a stock matters; the

[4]In England, as in most countries, the liability was not proportional to the amount of shares held. Thus, a wealthy shareholder could be held fully liable for all debts of a company, in case other shareholders were moneyless.

wealth that this investor has beyond p becomes irrelevant. Stocks can now be traded anonymously, in liquid markets, and held passively in diversified portfolios. "Safety" is created via the elimination of a key form of adverse selection, and the set of securities that uninformed investors can combine in a portfolio to store wealth expands.

For this reason, if better alternatives are unavailable, it is rational for safety-seeking investors to push for the liberalization of limited liability. For both government-issued debt and privately-designed securities, the literature has shown that an unmet demand for safe stores of value translates into "safety premia", i.e., investors are willing to accept lower yields on assets which they perceive as safe stores of value (Krishnamurthy and Vissing-Jorgensen, 2012; Kacperczyk et al., 2021). Regarding stocks, a full liberalization of limited liability could not be achieved purely by bilateral contracting and required a legal change.[5] Therefore, if limited liability is perceived as a instrument to increase the set of financial stores of value, we expect an unmet safety demand to translate not only into economically meaningful safety premia on existing safe assets, but also into increasing political pressure to change corporate law.

2.2 Testable hypotheses

When formulating testable hypotheses related to the "safety demand" mechanism, one needs to keep in mind the main alternative hypothesis: that limited liability could have been liberalized in order to allow growing firms to raise capital beyond active partners, and thus alleviate their financial constraints. The consistency of either narrative with the data can be tested both at the macroeconomic and at the microeconomic levels.

Distinguishing between the two narratives requires disentangling demand and sup-

[5]This does not mean that contracts could be used to obtain *some* limitation of liability. Hunt (1936, p. 99) notes "varied efforts to contract out of unlimited liability" in the 1840s.

ply forces. The "capital constraint" narrative assumes that England before the liberalization of limited liability was characterized by an excess *demand* for capital, i.e., projects with positive net present value could not be financed. Instead, the "safety demand" narrative assumes that there was an excess *supply* of capital, in the sense that wealth was growing faster than the set of investible securities.

At the macroeconomic level, the respective role of demand and supply forces can be inferred by looking both at asset prices and at the direction of capital flows. In terms of prices, an increasing demand for safe stores of value should translate into a lower yield on existing safe assets – and, more broadly, a decreasing level of interest rates (Krishnamurthy and Vissing-Jorgensen, 2012) – as formulated in Hypothesis 1.

Hypothesis 1. *An unmet demand for safe stores of value is associated with decreasing yields on existing safe assets.*

Instead, if the dominant fact, in aggregate, is a demand by firms scrambling to raise capital from savers, we expect this competition for scarce savings to raise yields on all securities, as well as the level of interest rates.

In terms of capital flows, an unmet demand for safe stores stores of value should lead savers to seek abroad the securities which they fail to find domestically. That is, we should observe exports of capital, and a subsequent build-up of net external assets, as described by Hypothesis 2.

Hypothesis 2. *An unmet demand for safe stores of value is associated with purchases of foreign safe assets and the build-up of net external assets.*

In contrast, if English firms have large unmet demand for capital, they should be seeking this capital abroad, and thus import capital. If this is the case, the net

external position of England should deteriorate. Both Hypotheses 1 and 2 are closely related to facts discussed in the contemporary literature, which relate asset shortages to both low interest rates and global imbalances (Caballero, 2006).

At the microeconomic level, a testable hypothesis pertains to the performance of newly-issued limited liability stocks (after limited liability is liberalized) relative to the performance of previously available stocks. If there is a large unmet demand for financial assets, investors must be willing to pay a high price for any newly issued asset that provides some relaxation of the constraint. This standing demand for stocks provides incentives to over-issue stocks, including stocks of low quality and with subsequently low performance. This is summarized in Hypothesis 3.

Hypothesis 3. *An unmet demand for safe stores of value is associated with a lower performance of newly-issued stocks (after limited liability is liberalized) relative to that of previously available stocks.*

The alternative narrative predicts the opposite. If firms suddenly benefiting from limited liability were previously faced with severe financial constraints, the relaxation of these constraints should allow them to subsequently grow faster than firms for which these constraints did not exist (because they already benefited from limited liability via a charter). Indeed, they should suddenly be able to realize projects with positive net present value.

3 Historical background and data

This section provides background information on the liberalization of limited liability in England, and describes the data sources used in the analysis.

3.1 The liberalization of limited liability

The liberalization of limited liability in England was completed through a series of acts, over a period that spans between 1855 and 1862[6].

Limited liability had existed before this period, but was only granted as a government privilege via a royal or parliamentary charter. This principle was notably affirmed in the Bubble Act in 1720, during the South Sea Bubble. A general argument for charters was that, since both limited liability and a distinct legal personality could be used to deceive investors or the general public, governments had to ensure that incorporated companies act in the public interest. This relationship to public interest also explains why, until the mid-19th century, limited liability firms were mostly building public infrastructures, such as canals and (later) railroads.

While the Bubble Act was officially repealed in 1825, the first major change to company law was the Joint Stock Companies Act in 1844, which made incorporation easier: the corporate status could be obtained via a two-stage registration process. However, there was still no limited liability, which was first liberalized in 1855 with an addendum to 1844 act (called Limited Liability Act). This act, however, had a limited impact on the issuance of limited liability stocks, notably because it restricted limited liability to companies with at least 25 shareholders. A year later, Joint Stock Companies Act of 1856 simplifies the administrative procedure to incorporate companies, and allows any group of seven shareholders to register register a limited liability company (while excluding banking and insurance firms) via a "memorandum of association." Finally, the last major step was the Companies Act of 1862: this act consolidates and

[6]For more details on the chronology and the legal process, see Harris (2000) and Hunt (1936). Throughout the paper, I refer primarily to England, even though most acts pertain to Great Britain or the United Kingdom. Historical is often not available at all geographical levels, I always make sure that I compare or normalize with variables measured at the same level.

simplifies the novelties introduced in the preceding acts. This act has been referred to as the "Magna Charta" of English company law (Palmer, 1909, p. 1). Even though the act of 1856 led to an increase in incorporations, the act of 1862 spurred a real boom: based on the estimates by Hunt (1936, p. 143-146), the paid-up capital of companies set-up between 1862 and 1865 is about 30 times larger than the one of companies set-up between 1856 and 1862. This boom took end with the failure of Overend & Gurney in 1866 and the crisis that followed it.

The impact of the various acts on the number of newly traded stocks can be seen in Figure 1.[7] Panel A plots the number of new stocks traded every year in the London Stock Exchange, and Panel B an estimate of the aggregate market capitalization. Until the Joint Stock Companies Act of 1844, the average number of newly traded stocks every year equals 11.56. This act is associated with an increase is issuance of limited liability stocks: the average number of new stocks traded every year rises to 19.22 between 1844 and 1862. However, based on this metric, there is no marked effect of the acts of 1855 and 1856. The single major change appears to be the Companies Act of 1862, after which the number of newly traded stocks rises to 68.56 per year. Given the importance of the latter act, I will always, throughout the paper, use the year 1862 for sample splits and to define the event year.

[7]The impact of the various acts on firm creation is not straightforward to measure and gave rise to different estimates by historians. This is notably because a significant fraction of companies that were provisionally registered never operated commercially (Levi, 1870). Using data on stocks actually traded, as I do, is a way to restrict attention to companies that were indeed created. Similarly, while it is generally admitted that most industrial firms did not immediately convert to limited liability when they could (a fact which is inconsistent with the dominant narrative), the phenomenon is hard to measure. Jefferys (1938) estimates that, by 1885, only 10% of what he calls "important" English firms had turned to limited liability.

3.2 Data

My empirical analysis relies on several data sources. The main dataset, obtained from Global Financial Data, contains monthly information on the securities traded in the London Stock Exchange (LSE) from 1800 to 1870, including the issuer name, prices, the number of securities outstanding, and industry classifications. The securities included in the data comprise standard stocks, non-standard stocks (preferred or guaranteed) and debt securities. Based on the securities' names, I classify all of them in these three categories (using the procedure described in Appendix A.1). Throughout the paper, my main dataset is the one comprising standard stocks, which has 192,167 stock-month observations (and 1,825 distinct securities). The dataset also comprises foreign securities traded in the LSE, and is adjusted for stock splits.

I further obtain macroeconomic data series – on capital formation, government debt, net external assets, etc. – from "A millenium of macroeconomic data for the UK." This dataset is compiled by the Bank of England from other primary and secondary sources. The detailed definition of all variables taken from this dataset is given in Appendix A.2.

Table 1 provides descriptive statistics on stocks traded in the LSE. The sample period saw a massive rise of stock markets, as the average number of stocks traded rose from 70 in the 1800-1825 period to 1,218 in the 1862-1870 period. The most significant increase in the number of traded stocks is observed after 1862, that is, once limited liability is liberalized. In terms of industries, the most significant pattern is the decline of canals and docks, which were dominant in the early period (45.9% of all stocks from 1800 to 1825), and the rise of railroads, which represent more than

half of all stocks during the "railway mania" starting in the 1840s. The sample period also saw a steady rise in the share of foreign stocks traded in London, from 13.2% in 1800-1825 period to 35.5% in the 1862-1870 period. In the early period, these foreign stocks emanate in large part from Ireland (33.8%), while the later part of the sample is characterized by a steady rise of issuers from the British Empire, notable India, Australia and Canada (respectively 14.4%, 9.0% and 8.7% of all foreign stocks in the 1862-1870 period).

4 Macroeconomic evidence

In this section, I provide macroeconomic evidence showing that England was characterized by a shortage of financial assets in the mid-19th century.

4.1 The accumulation of financial wealth

Before turning to Hypotheses 1 and 2, a prerequisite is to show that the decades before the liberalization of limited liability were characterized by a significant accumulation of financial wealth.

To do so, I rely on data on the aggregate net stock of fixed assets, estimated by Feinstein and Pollard (1988). I distinguish between dwellings and non-dwellings. As can be seen in Figure 2, the 19th century, particularly after 1840, was characterized by a significant increase in the stock of non-dwellings, relative to dwellings. Non-dwellings – which include primarily nonresidential buildings, machinery and equipment – are assets held for industrial or financial purposes. They reflect the rise of a more productive and capital-intensive economy: between 1800 and 1870, the wealth created country-wide in

non-dwellings amounts to 1,048 million pounds, as opposed to only 296 million pounds for dwellings. The differential growth path between these two types of assets highlights a structural shift. While dwellings in England were traditionally associated with the political power of the landed aristocracy, non-dwellings were increasingly held by a distinct class of enriched bourgeois (Jefferys, 1938). For this new class, access to land remained severely constrained.[8] Therefore, the wealth created by economic growth could not be easily stored through real estate. These constraints help explaining why financial stores of value were increasingly demanded.

4.2 Evidence from the pricing of government debt

I now turn Hypothesis 1, that is, I test whether the pricing of financial securities before 1862 is consistent with the existence of an unmet safety demand by wealth holders.

A natural starting point is to study the pricing of British government debt, most of which was composed of 3% consols. Consols were perpetual bonds, redeemable at the option of the government. Throughout the 19th century, they formed the deepest, most liquid and most transparent financial market in the world (Odlyzko, 2016). They are thus the main candidate for widely-demanded safe assets, much like US Treasuries today. Their outstanding amount, plotted in Panel A of Figure 3, displays a striking pattern: after increasing sharply during the Napoleonic wars (until 1815), it remained fairly stable until the 1870s. At times, consols were even redeemed. The pattern is even more striking when focusing on the debt-to-GDP ratio, which fell from about 200% in the 1820s to less that 75% in 1870. Therefore, while financial wealth was constantly increasing (Figure 2), the supply of high-quality stores of value did not

[8] At the end of the 19th century, access to land by the middle and lower classes was still extremely limited, and there was no deep property market (Thompson, 1957).

increase. This situation is precisely one that could give rise to an increasingly unmet safety demand, which should translate into asset prices.

First of all, if this is the case, consols should become increasingly expensive, so that their yield should decrease. Panel B of Figure 3 shows that this is the case: between the early 1800s and the mid-19th century, the yield on consols decreased from about 5% to close to 3%. This pattern is broadly consistent with an unmet demand for stores of value, and broadly inconsistent with the alternative hypothesis that firms in general are scrambling for scarce savings.

A second way to investigate whether the pricing of consols is consistent with an unmet demand for safety is to estimate regressions in the spirit of Krishnamurthy and Vissing-Jorgensen (2012), that is, to test whether the pricing of government debt changes with the issuance of that debt. Using annual data over the period from 1800 to 1862, I estimate

$$\Delta\text{Yield}_t = \beta \cdot (\text{Consols}_t - \text{Consols}_{t-1}) + \gamma \cdot \text{Controls}_t + \phi_{\text{decade}} + \epsilon_t, \qquad (1)$$

where ΔYield_t is the change in consol yield between $t-1$ and t, Consols_t the amount of consols at the end of year t, and ϕ_{decade} a decade fixed effect. If government debt is redeemed and there is an unmet demand for safe assets, investors should be willing to post higher bids for consols, so that yields should go down. In sum, if there is a shortage of stores of value, we expect β to be *positive*. I cluster standard errors by decades. The baseline results, presented in column (1) of Table 2, confirm a positive estimate of β, significant at the 10% level.

This baseline estimate, however, raises two main concerns. First, in Krishnamurthy

and Vissing-Jorgensen (2012), the dependent variable is not the raw Treasury yield, but the yield spread between Treasuries and other debt securities (such as corporate bonds) with similar properties apart from safety. In the context of the early 19th century, the exact same regression cannot be estimated, as there is no clear benchmark to which consol yields can be compared.[9] Equation (1) partially mitigates the concern that unobserved variables may affect the level of consol yields during specific subperiods by using the change in yields as dependent variable. To further address the concern that changes in yields could be driven not by consol issuance, but by other macroeconomic events, I reestimate Equation (1) after including variables controlling for GDP growth and the inflation rate. The results, in columns (2) and (3) of Table 2, are qualitatively unchanged relative to the baseline estimate.

Second, one could be concerned that the baseline estimate is driven by a specific part of the sample period, such as the Napoleonic wars, during which the amount of consols varies the most. In addition to clustering at the decade level, I reestimate Equation (1) after adding decade fixed effects. The results, in column (4) of Table 2, still show a positive estimate, slightly larger in magnitude, and significant at the 5% level. Therefore, all regression results are consistent with the existence of an unmet demand for consols.

4.3 Evidence from the pricing of stocks

Apart from consols, whose supply did not increase for several decades, another major asset class in which increasing financial wealth could be invested were limited liability

[9] In the dataset "A millenium of macroeconomic data for the UK," the first measure of corporate bond yields, computed using railway debentures, is available from 1854. A number of recent papers have also computed safety premia using swap rates as a benchmark (Kacperczyk et al., 2021), but swap rates are also not available for the 19th century.

stocks – that is, stocks of companies benefiting from government charters. In the British economy, these stocks were the only ones that could be considered for passive investment and held in a diversified portfolio. Even if these stocks are not "safe" in the usual sense, they could still be perceived by investors, in the absence of alternatives, as instruments to store financial wealth. A natural question is whether their pricing reflects this "store of value" status.

To test this hypothesis, I reestimate Equation (1) using the yearly stock market return as dependent variable. If limited liability stocks are perceived as an alternative to consols for the storage of wealth, then stock returns are expected to increase (due to higher demand) when the supply of consols decreases. That is, the sign of β is expected to be *negative*. To measure the market return, I compute the average return on all British stocks traded in the LSE in both December of years $t-1$ and t. The results are in Panels A and B of Table 3, respectively for unweighted and weighted (by market capitalization) returns. The estimated β is consistently negative, and statistically significant in seven out of eight regressions. This is consistent with the view that limited liability stocks are perceived as a store of value for financial wealth.

4.4 Evidence from international capital flows

I then turn to Hypothesis 2, that is, I test whether capital flows are consistent with the existence of an unmet safety demand.

First of all, if an unmet demand exists, investors should seek abroad the financial stores of value that they do not find domestically, and England should build up a positive external position. In Figure 4, I plot net external assets, normalized by nominal GDP. This ratio increases from about 2% in 1815 to above 60% in the 1860s.

This massive and almost continuous increase is consistent with large exports of capital by British savers. Instead, if the dominant fact prior to the introduction of limited liability had been a shortage of domestic capital, we would have expected net imports of capital.

Beyond this aggregate fact, I can use stock-level data to test whether more stringent shortages of safe assets leads to more import of securities from abroad. To do this, I exploit the fact that limited liability stocks issued abroad could also be traded in the LSE. Specifically, I reestimate Equation (1), using the yearly number of new foreign stocks traded in the LSE as dependent variable. If foreign stocks are perceived as an acceptable store of value for financial wealth, we should expect them to be bought more when the availability of domestic safe assets goes down, which is the case when domestic consols are redeemed. In other terms, we expect the coefficient β to be *negative*. The estimation results, presented in Table 4, show that this is indeed the case, across all specifications, and with significance levels of at least 5%. Therefore, the evidence we gather from capital flows is consistent with the one obtained using asset prices.

4.5 Evidence from parliamentary debates

The economic results documented so far – the low yields on existing safe assets and the lack of sufficient financial stores of value – found a clear echo in the parliamentary debates and, more broadly, in policy debates surrounding the liberalization of limited liability. Therefore, while it is impossible to uniquely identify the cause of this event, a reading of the debates strongly suggests that safety demand was indeed a leading force. The purpose in this section is not to provide a complete overview of the debate,

but only a few quotes supporting my narrative.

The place where arguments based on safety demand appear the most clearly is perhaps the Mercantile Laws Commission of 1854. In front of this commission, E. W. Richards, then professor of political economy at Oxford, declared that "The deficiency complained of in not that of lack of capital, but of investment of capital" (Jefferys, 1938, p. 52). The commission also notes: "There were many professional gentlemen, members of the House, [...], wanting secure and remunerative investments for their savings" (Jefferys, 1938, p. 52). Studying specifically the works of this commission, Bryer (1997, p. 40-41) cites this word by Cobden: "What we wanted in this country was greater facility for the employment of capital." Regarding the early 1860s, Jefferys (1938, p. 55) reports newspaper articles discussing the "vast amount of English capital lying idle" (*The Observer*).

While policy debates confirm that the lack of financial stores of value was a key concern, they also cast doubts on the alternative narrative, according to which lifting financial constraints for growing firms was the leading motive to liberalize limited liability. In many instance, industrial firms were explicitly opposing limited liability. This can be seen in a survey run by the 1854 commission, in which the majority of industrialists speak against limited liability (Chaplin, 2016, p. 226). Jefferys (1938, p. 53) describes this period as the "victory of the investing classes over the industrialists."

5 Microeconomic evidence

In this section, I provide stock-level evidence related to the period that follows the liberalization of limited liability.

5.1 The pricing of newly issued stocks

Specifically, I turn to Hypothesis 3, that is, I test whether the performance of newly-issued stocks – after the act of 1862 – is worse relative to that of previously available stocks.

To do so, I compare the pricing of stocks created in the four-year period before and after the three major acts changing company law over the sample period: the Joint Stock Companies Act of 1844, the Limited Liability Act of 1855, and the Companies Act of 1862. For horizons $H = 1, ..., 5$ years, I compute cumulative excess returns as

$$\text{CumExReturns}_{i,H} = \sum_{t=1}^{H} (R_{i,t} - R_{m,t}), \tag{2}$$

where $R_{i,t}$ is the yearly stock return of a firm i created at $t = 0$, computed between the end of years $t-1$ and t[10], and $R_{m,t}$ is the yearly unweighted market return, computed as the average return of all stocks with prices available at the end of years $t-1$ and t. I then estimate, separately for horizons $H \in \{1, ..., 5\}$,

$$\text{CumExReturns}_{i,H} = \alpha + \beta \cdot \text{Treated}_i + \epsilon_i, \tag{3}$$

where Treated_i is equal to one for firms created in the four years following a major act (including the year of the act), and to zero for firms created in the previous four years.

Equation (3) is not a difference-in-differences regression, because firms for which $\text{Treated}_i = 1$ cannot be observed before major acts (since they have not yet been

[10] In case the price of a stock is missing for the month of December, I compute returns using the last available price.

created). This equation compares the performance – relative to the market – of firms created just before and after the adoption of major acts. To warrant an interpretation in terms of difference-in-differences, the missing difference is the one accounting for pre- vs. post-event comparisons. In other terms, a concern could be that the time periods following major acts are systematically different for the performance of firms. While I cannot completely rule out this concern, I mitigate it in two ways. First of all, by using excess returns as dependent variable. This means that, even if the business conditions improve or degrade following major acts, these changes are not a concern if they affect the market as a whole. Second, I cluster standard errors by year when estimating Equation (3). Ultimately, if the estimated value of β is significantly different from zero, the most likely interpretation is that the unobserved quality of the pool of firms created before and after the acts is different.

The estimates are reported in Table 5. While no clear pattern – either in terms of sign or significance – emerges around the act of 1844 (Panel A), later acts are associated with negative cumulative excess returns for newly created firms created. Following the act of 1855 (Panel B), these negative returns are statistically significant only at the 5-year horizon. In contrast, following the act of 1862 – i.e., the one that unleashes the creation of limited liability firms – cumulative excess returns are negative and statistically significant for four out of five horizons (Panel C). This first finding is consistent with the view that investors are overpaying for newly-issued stocks, and realizing only later that these stocks are not of the same quality that those issued before the generalization of limited liability. This is exactly what we would expect if some private agents are issuing stocks primarily to cater to a safety demand by investors who are imperfectly able to assess their quality.

5.2 Survival of new firms

One potential concern with the exercise in Table 5 is that it incorporates a survival bias. Indeed, cumulative excess returns at a horizon H can only be computed for firms that have survived at least H years. In case firms born before and after major acts have markedly different survival rates, Equation (3) may end up comparing pools of firms which are differentially selected. For example, the negative estimate of β in Panel C of Table 5 could be explained by a survival bias if firms born before 1862 have a much lower survival rate than firms born afterwards: in that case, we would end up comparing the very best firms born before 1862 with the average firm born after 1862.

To show that this is not the case – and that the bias actually goes in the opposite direction – I estimate a model similar to the one of Equation (3), with a dummy variable equal to one if the stock of firm i is still traded at age H, and zero otherwise. Since the dependent variable is a dummy variable, I estimate a probit model.

The estimation results are reported in Table 6 and illustrated graphically in Figure 5. While there is no differentiated patterns for the survival rate of new firms around the acts of 1844 and 1855, the survival rate of firms born after 1862 is markedly lower than the one of firms born before that date. Close to 90% of firms born before 1862 reach the age of 4 years, while fewer than 70% of firms born after 1862 do so. These patterns confirm the above results that new limited liability firms created after 1862 are of significantly worse quality than firms born before. They are inconsistent with the view that new stock issuers were (on average) severely constrained firms waiting to realize positive net present value projects. These findings also reinforce the ones on excess returns, since they highlight a source of severe bias working against

finding statistically significant results in Panel C of Table 5: since newly created firms disappear at a faster rate, the surviving ones may have been expected to be of higher quality. But even with this bias, these news firms are found to perform worse – in terms of stock returns – at most horizons.

The lower survival rate of firms created after 1862 suggests a last remark: the number of failures is in part due to the burst of the 1862-1865 "bubble" and to the 1866 crisis. This existence of this crisis, triggered by the failure of Overend & Gurney (see Sowerbutts et al., 2016, for an overview) does not weaken the above results, but is consistent with them. If limited liability had repealed costly financial constraints, we would have observed a boom of profitable firms – a "good boom," in the terminology by Gorton and Ordoñez (2020). Instead, the existence of a standing demand for safe assets is a factor that can give rise to bubbles (Caballero, 2006). The boom of limited liability firms after 1862 can be interpreted in this light: it amounts to an unsustainable supply of private financial stores of value.[11] The fragility of the private supply of safe assets has been documented in recent contexts (Kacperczyk et al., 2021) and provides a rationale for government intervention (Stein, 2012). Similarly, one can interpret the rise of securities market regulations after the crisis of 1866 as a policy intervention to make the issuance of private assets more stable. Investor protection laws are fundamentally government interventions that enhance the ability of private safety to be supplied to savers in need for stores of value.

Overall, the findings in this section give support to Hypothesis 3. They are consistent with the existence of a large standing demand for financial assets, to which stock

[11] The link between the liberalization of limited liability and the crisis of 1866 has been recognized by a number of authors. King (1936, p. 230) refers to the post-1962 period as a "limited liability mania." Cottrell (1980, p. 54) also notes this link.

issuers catered with stocks of significantly poorer quality.

6 Implications of the findings

The findings from the previous sections have two types of implications: for the interpretation of modern financial history and for debates on investors' responsibility.

6.1 Interpretation of modern financial history

First, my findings extend the literature on safety demand and security design in a novel way: they show that investors' demand for safety can explain not only features of debt markets (Gorton, 2017), but also a key feature of equity markets. This finding opens the door to a broader interpretation of modern financial history, which has been characterized by two concomitant facts: (i) the rise of financial wealth, as opposed to real estate, and (ii) the depersonalization of wealth (Weber, 1981). Classically, financial commitments were inherently personal, linked to specific individuals or families. For example, two shareholders in a company were not perfect substitutes because, whatever the company did, they were personally liable (there was no separate legal personality of the company, which could be held liable). This personnalization of financial relations prevented wealth from being tradable in liquid markets. In contrast, depersonalization was a necessary step for proper financial markets to emerge.

In the context of business organization, the depersonalization of financial relations was achieved precisely when companies were granted limited liability (as well as a separate legal personality, which is closely linked). My findings suggest that this process was driven by some form of "safety demand." However, one may hypothesize

that the more general process of depersonalization in modern financial history can itself be explained by a demand for safety of wealth holders.

In theories of safe assets, such as Gorton and Pennacchi (1990), what creates safety is the elimination of a form of adverse selection: uninformed agents are then willing to trade assets that they would not trade otherwise, or at a discount. In our case, limited liability eliminates adverse selection about the identity (and resources) of other shareholders in a firm. But there is no reason the same logic would not apply to other forms of depersonalization of financial relations. By definition, when relations are personal, the identity of specific agents or counterparties matter. When this is the case, there is always a potential for adverse selection about the "quality" of these agents. As soon as this adverse selection is costly for wealth holders, it should give rise to a demand for "safety," that is, the elimination of adverse selection in this asset class. Depersonalization – achieved through contractual or regulatory innovations – is precisely a way to grant this safety: the identity of agents no longer matters when wealth is depersonalized.

In sum, we can hypothesize that modern financial history, often interpreted as the rise of depersonalized wealth, is even more fundamentally linked to safety demand. It can be that it is a general safety demand by wealth holders (apart from holders of real estate) that led to various forms of depersonalization of financial activities. If so, the explanatory power of safety demand theories would be greatly enhanced, and would go far beyond debt markets – where it is presently confined.

6.2 Responsible investors: A contradiction in terms?

Second, my findings highlight the root cause of the "investor responsibility" problem and have implications for debates about it (Pastor et al., 2021; Oehmke and Opp, 2022). I show a tension between being an "investor" and being "responsible." Being "responsible" requires active monitoring of firms, participation in their governance, and the inability to evade long-term consequences via sales in liquid markets. I show that it is precisely when they could stop assuming these responsibilities that savers could become pure "investors." Limited liability made the separation between "investing" and "responsibility" possible: irresponsibility for large losses or damages turned savers into financial investors. The literature on investors' responsibility would presumably gain from exploring this tension in greater detail.

This point has legal implications. Indeed, limited liability could not be introduced by bilateral contracting, but required a rewriting of company law. This is because it requires the limitation of liability not only vis-à-vis contractual creditors, but also vis-à-vis all noncontractual third parties potentially affected by the firm (such as victims of negative externalities). Only a law could impose the limitation of liability vis-à-vis the latter agents, which were thus (in the long term) the main losers from generalized limited liability. In the mid-19th century, this was not perceived as a issue, since externalities – such as environmental damages – were much smaller than today (Priest, 1991). In sum, the liability regime we currently have was designed when the tension between "investing" and being "responsible" was less acute than today.[12] A debate about whether investors' liability for torts should be revised (as raised by Hansmann

[12]Several papers document that limited liability is used to maximize externalities harming third parties. Ringleb and Wiggins (1990) provide evidence in the chemical industry, Akey and Appel (2021) on industrial pollution, and Vuillemey (2021) in the shipping industry.

and Kraakman, 1991) is thus legitimate.

7 Conclusion

This article provides empirical evidence that the main force leading to the generalization of limited liability was a large accumulation of financial wealth during the early Industrial Revolution, which gave rise to a strong demand by investors for tradable financial securities. Limited liability made stocks sufficiently "safe" (by setting an upper bound on potential losses) and information-insensitive (with respect to the identity of other shareholders), so that they could become much more widely traded and held by passive investors. There is an analogy with recent history, which experienced another "savings' glut", originating from emerging economies and leading to contracting innovations – such as securitization – through which investors' demand for safe stores of value could be met. As was the case for limited liability stocks, this private supply of safety proved fragile, and later required public interventions.

These findings have two types of implications. First, they suggest a broader reading of modern financial history, where many features of financial markets – including equity markets – can be read as emanating from a general demand for "safety," itself spurred by the rise of financial wealth. Financial innovations leading to the modern depersonalization of wealth removed some forms of adverse selection – as there was no need to care any more about the identity of specific asset holders – and thus created "safety". Second, the findings highlight a tension between being a pure "investor" and being "responsible" for the decisions of a company. The literature on investor responsibility would gain from exploring this tension, as well as liability regimes, in

greater detail.

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Table 1 – Stocks traded in the London Stock Exchange – Descriptive statistics

This table presents descriptive statistics on securities traded in the London Stock Exchange over the period from 1800 to 1870, and for several subperiods. It first reports the average number of securities in a given month and the average share of non-UK securities among them, for three groups (standard stocks, non-standard stocks and debt securities), as well as for all securities pooled together. It also reports the average industry shares among all standard stocks (for the top-10 industries only) and the average country shares among non-UK standard stocks (for the top-10 countries only). These shares are not weighted by market capitalization. Additional details on data sources are provided in Appendix A.

	1800-1825	1826-1843	1844-1861	1862-1870	All years
Standard stocks					
Average number	52	204	272	678	226
Average share of non-UK	0.055	0.131	0.231	0.261	0.145
Non-standard stocks					
Average number	4	12	75	268	62
Average share of non-UK	0.344	0.192	0.173	0.225	0.238
Debt securities					
Average number	16	54	65	271	70
Average share of non-UK	0.305	0.668	0.705	0.718	0.551
All securities					
Average number	85	270	412	1,218	383
Average share of non-UK	0.130	0.244	0.289	0.355	0.236
Industry shares (among all standard stocks) – in %					
Banks	3.53	11.55	9.36	18.90	13.01
Canals and Docks	47.24	30.53	11.07	4.05	15.88
Commercial Services & Supplies	4.80	1.58	0.85	1.74	1.69
Gold mining	0.49	0.98	1.33	2.33	1.56
Insurance	15.46	16.48	12.33	9.40	12.43
Mining	1.64	5.55	8.30	10.25	7.85
Railroads	1.86	11.37	39.82	18.58	22.03
Shipping	0.07	0.79	1.44	3.05	1.79
Utilities - Gas	4.47	9.37	6.39	7.02	7.15
Utilities - Water	7.18	3.76	1.69	2.35	2.87
Country shares (among non-UK standard stocks) – in %					
Australia	1.92	12.26	18.40	15.37	15.80
Brazil	3.68	14.54	5.71	6.91	7.53
Canada	4.00	8.59	7.99	7.09	7.58
Ireland	52.96	25.05	13.77	17.56	17.86
Mexico	13.60	21.57	3.38	2.24	5.65
United States	14.40	2.65	5.30	3.25	4.09
France	0	1.13	17.54	6.31	9.51
India	0	0.65	3.69	9.24	5.83
South Africa	0	2.87	2.05	3.20	2.68
Belgium	0	0	4.83	2.08	2.74

Table 2 – Consol supply and consol yields

This tables regresses changes in consol yields between $t-1$ and t on the net supply of government debt in year t. Some regressions include controls for the growth rate of the GDP and the inflation rate. The last column includes decade fixed effects. The sample period is from 1800 to 1862. Standard errors, clustered at the decade level, are reported in parentheses. *, ** and *** denote respectively statistical significance at the 10%, 5% and 1% levels. Additional details on data sources are provided in Appendix A.

	Δ Yield	Δ Yield	Δ Yield	Δ Yield
Issuance of consols	4.397*	4.266*	4.578*	6.605**
	(1.959)	(2.169)	(2.330)	(2.492)
GDP growth		0.315	-0.370	-0.629
		(0.573)	(0.607)	(0.666)
Inflation rate			0.935*	1.154**
			(0.433)	(0.386)
Decade cluster	Yes	Yes	Yes	Yes
Decade FE	No	No	No	Yes
Adj. R2	0.061	0.050	0.058	0.003
Obs.	62	62	62	62

Table 3 – Consol supply and stock returns

This tables regresses stock returns between $t-1$ and t on the net supply of government debt in year t. In Panels A and B, the dependent variables are respectively the unweighted and weighted stock market returns between $t-1$ and t, computed using all stocks that are traded in December of both $t-1$ and t. Some regressions include controls for the growth rate of the GDP and the inflation rate. The last column includes decade fixed effects. The sample period is from 1800 to 1862. Standard errors, clustered at the decade level, are reported in parentheses. *, ** and *** denote respectively statistical significance at the 10%, 5% and 1% levels. Additional details on data sources are provided in Appendix A.

Panel A: Unweighted market return

	Market return	Market return	Market return	Market return
Issuance of consols	-2.475***	-2.661***	-2.681***	-2.042**
	(0.609)	(0.624)	(0.696)	(0.640)
GDP growth		0.448	0.491	0.446
		(0.300)	(0.374)	(0.312)
Inflation rate			-0.0588	-0.151
			(0.248)	(0.315)
Decade cluster	Yes	Yes	Yes	Yes
Decade FE	No	No	No	Yes
Adj. R2	0.052	0.064	0.048	0.101
Obs.	62	62	62	62

Panel B: Weighted market return

	Market return	Market return	Market return	Market return
Issuance of consols	-2.313**	-2.549***	-2.494**	-1.490
	(0.642)	(0.660)	(0.696)	(0.787)
GDP growth		0.570*	0.449	0.240
		(0.288)	(0.397)	(0.363)
Inflation rate			0.165	0.297
			(0.232)	(0.220)
Decade cluster	Yes	Yes	Yes	Yes
Decade FE	No	No	No	Yes
Adj. R2	0.060	0.101	0.088	0.088
Obs.	62	62	62	62

Table 4 – Safe asset supply and purchases of foreign securities

This tables regresses the number of newly traded foreign securities in the London Stock Exchange in year t on the net supply of government debt in year t. Panel A is for standard stocks only, and Panel B for all securities (standard stocks, non-standard stocks and debt securities). Some regressions include controls for the growth rate of the GDP and the inflation rate. The last column includes decade fixed effects. The sample period is from 1800 to 1862. Standard errors, clustered at the decade level, are reported in parentheses. *, ** and *** denote respectively statistical significance at the 10%, 5% and 1% levels. Additional details on data sources are provided in Appendix A.

Panel A: Standard stocks only

	New stocks	New stocks	New stocks	New stocks
Issuance of consols	-64.31	-71.44*	-90.54**	-93.33*
	(43.87)	(34.03)	(33.68)	(43.13)
GDP growth		25.90**	56.66***	58.25**
		(8.496)	(14.89)	(17.61)
Inflation rate			-42.95*	-47.42*
			(18.75)	(21.27)
Decade cluster	Yes	Yes	Yes	Yes
Decade FE	No	No	No	Yes
Adj. R2	0.004	0.031	0.083	0.032
Obs.	59	59	59	59

Panel B: All securities

	New securities	New securities	New securities	New securities
Issuance of consols	-127.4**	-127.6**	-140.1***	-94.01**
	(36.90)	(36.89)	(36.10)	(36.77)
GDP growth		0.494	27.94	24.15
		(10.24)	(21.07)	(19.63)
Inflation rate			-37.47	-46.59
			(25.64)	(26.19)
Decade cluster	Yes	Yes	Yes	Yes
Decade FE	No	No	No	Yes
Adj. R2	0.015	-0.001	0.000	0.112
Obs.	62	62	62	62

Table 5 – Cumulative excess returns of new firms around major acts

This table regresses cumulative excess returns of new firms during their first five years. It compares firms created in the four-year period following the adoption of major acts ("Treated" group) with firms created in the 4-year period preceding these acts. Panel A is for the Joint Stock Companies Act of 1844, Panel B for the Limited Liability Act of 1855, and Panel C for the Companies Act of 1862. Excess returns are computed relative to the unweighted market return. Standard errors, clustered at the year level, are reported in parentheses. *, ** and *** denote respectively statistical significance at the 10%, 5% and 1% levels. Additional details on data sources are provided in Appendix A.

Panel A: Around the Joint Stock Companies Act of 1844

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	-0.0430	-0.0309	-0.0265	0.106	0.220
	(0.0336)	(0.0772)	(0.118)	(0.130)	(0.149)
Year cluster	Yes	Yes	Yes	Yes	Yes
Adj. R2	-0.004	-0.006	-0.008	-0.007	0.001
Obs.	164	149	120	101	90

Panel B: Around the Limited Liability Act of 1855

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	-0.0698	-0.108	-0.148	-0.158	-0.237*
	(0.0558)	(0.0659)	(0.0810)	(0.117)	(0.122)
Year cluster	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.002	0.004	0.009	0.006	0.016
Obs.	111	100	97	87	82

Panel C: Around the Companies Act of 1862

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	-0.135***	-0.151**	-0.216**	-0.202*	-0.131
	(0.0147)	(0.0454)	(0.0728)	(0.0922)	(0.0769)
Year cluster	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.013	0.010	0.018	0.013	0.002
Obs.	475	428	385	356	329

Table 6 – Survival of new firms around major acts

This table reports estimates from probit regressions, in which the dependent variable is a dummy variable equal to one if the stock of a firm is traded in a given year, and zero otherwise. It compares firms created in the four-year period following the adoption of major acts ("Treated" group) with firms created in the 4-year period preceding these acts. Panel A is for the Joint Stock Companies Act of 1844, Panel B for the Limited Liability Act of 1855, and Panel C for the Companies Act of 1862. Excess returns are computed relative to the unweighted market return. Standard errors, clustered at the year level, are reported in parentheses. *, ** and *** denote respectively statistical significance at the 10%, 5% and 1% levels. Additional details on data sources are provided in Appendix A.

Panel A: Around the Joint Stock Companies Act of 1844

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	0.491*	0.0819	0.0619	-0.0206	0.0426
	(0.294)	(0.269)	(0.238)	(0.232)	(0.231)
Adj. R2	0.025	0.001	0.000	0.000	0.000
Obs.	180	180	180	180	180

Panel B: Around the Limited Liability Act of 1855

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	-0.319	0.104	0.0586	0.110	0.0857
	(0.347)	(0.270)	(0.262)	(0.244)	(0.238)
Adj. R2	0.013	0.001	0.000	0.001	0.001
Obs.	121	121	121	121	121

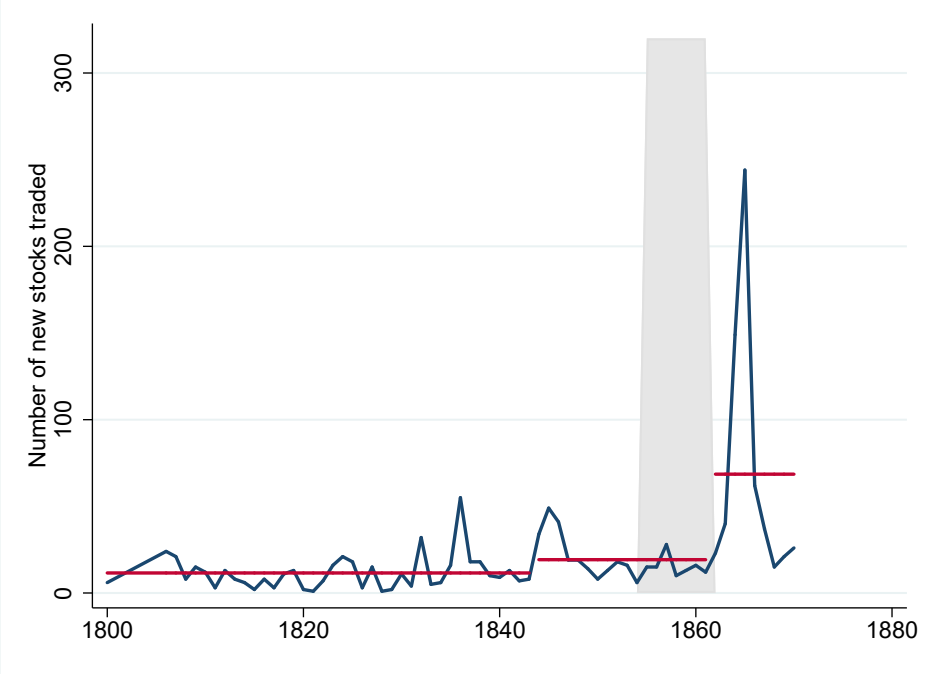
Panel C: Around the Companies Act of 1862

	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
Treated	-0.0557	-0.447*	-0.644***	-0.718***	-0.309
	(0.295)	(0.266)	(0.249)	(0.237)	(0.199)
Adj. R2	0.000	0.007	0.014	0.017	0.004
Obs.	508	508	508	508	508

Figure 1 – New stocks and market capitalization traded in the London Stock Exchange

This figure shows the growth of limited liability stocks in the London Stock Exchange, over the period from 1800 to 1870. Panel A plots the number of new standard stocks traded every year, and Panel B the market capitalization (computed using standard stocks only, and excluding stocks with data anomalies, as explained in Appendix A.1). In Panel A, the horizontal bars represent subperiod averages, before the Joint Stock Companies Act of 1844, between this act and the Companies Act of 1862, and after this act. The period from 1855 to 1862, during which limited liability is liberalized, is shaded in grey. Additional details on data sources are provided in Appendix A.

Panel A: Number of new stocks traded



Panel B: Market capitalization

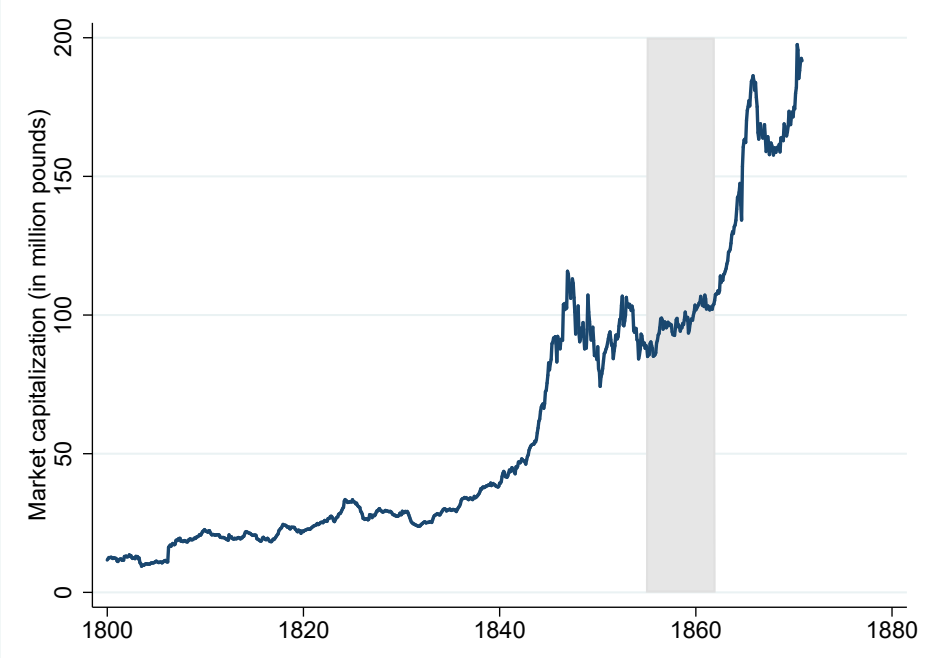


Figure 2 – Capital formation in the UK

This figure shows data on capital formation in the UK over the period from 1800 to 1870. The capital stock (in million pounds) is split between dwellings and non-dwellings. The dashed vertical line in 1850 corresponds to the date when there is a coverage gap in the data, from Great Britain to the United Kingdom. The period from 1855 to 1862, during which limited liability is liberalized, is shaded in grey. Additional details on data sources are provided in Appendix A.

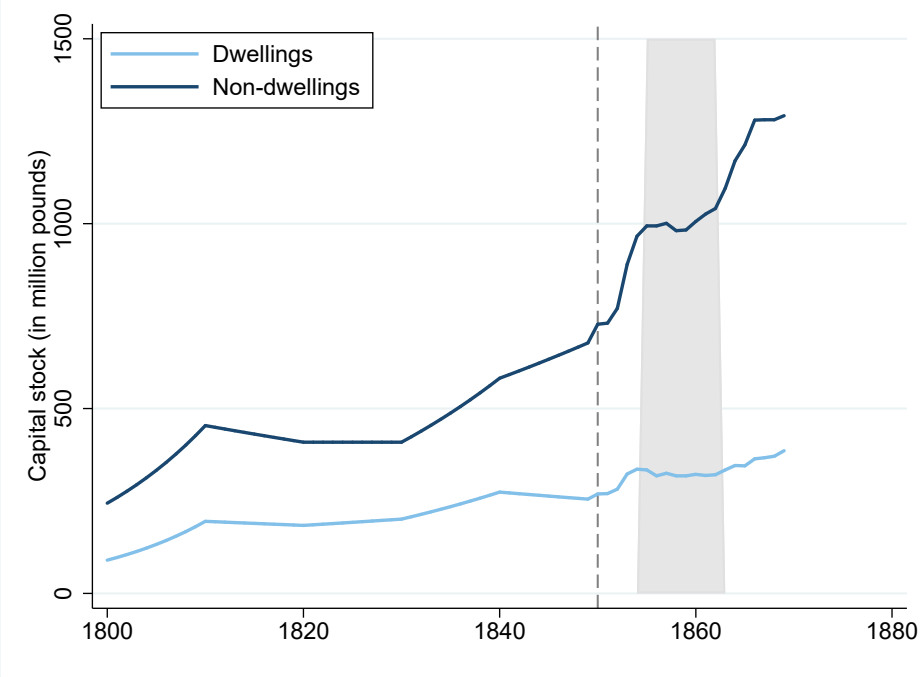
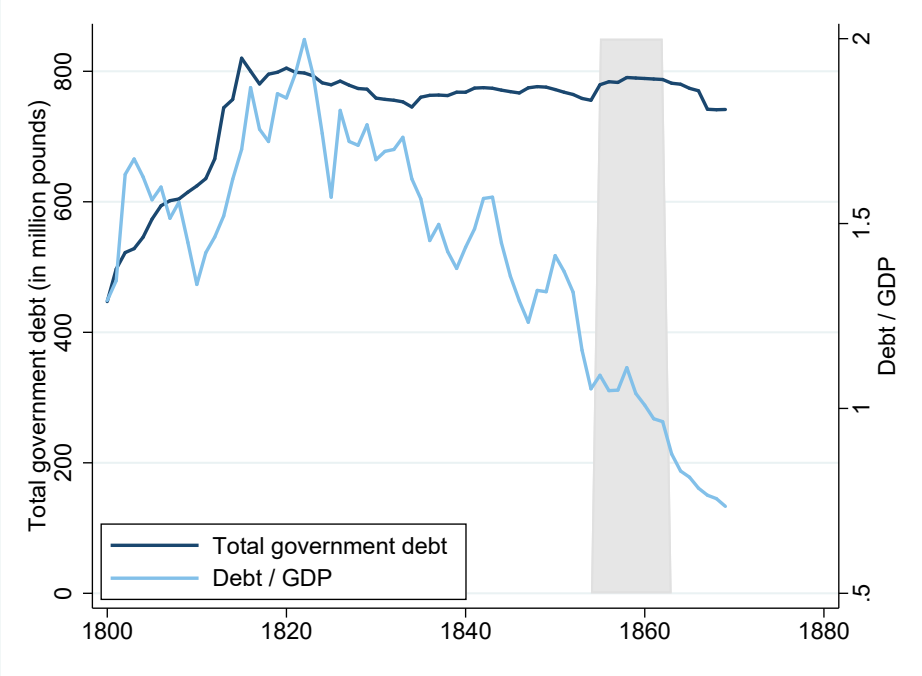


Figure 3 – Amount and yield of UK government debt

This figure shows data on the national public debt of the UK over the period from 1800 to 1870. Panel A shows the total government debt amount (in million pounds) and panel B the yield on consols (in %). The period from 1855 to 1862, during which limited liability is liberalized, is shaded in grey. Additional details on data sources are provided in Appendix A.

Panel A: Total government debt



Panel B: Yield on consols

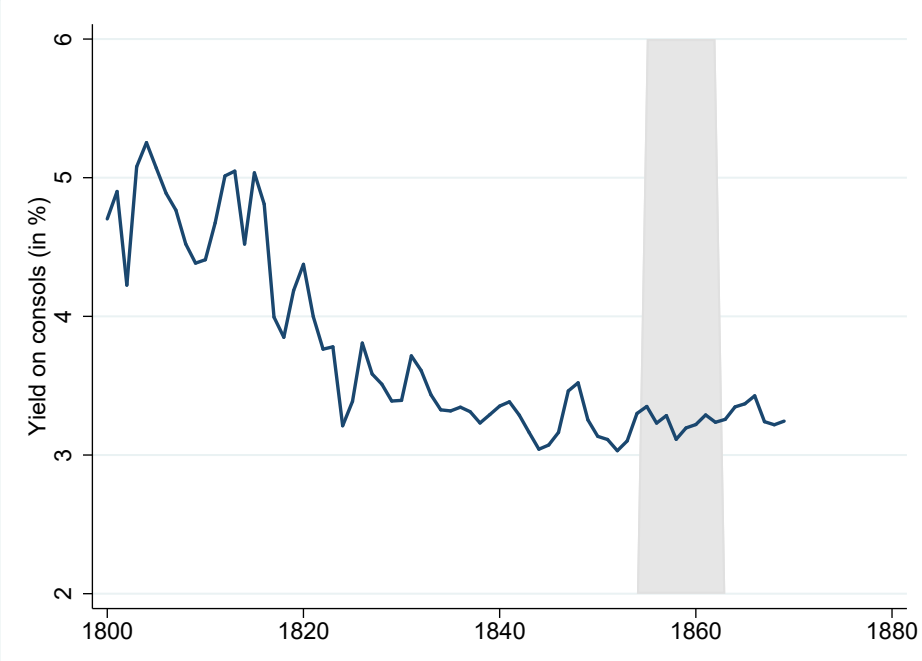


Figure 4 – Net external assets / GDP in the UK

This figure shows data on net external assets in the UK, normalized by nominal GDP, over the period from 1800 to 1870. The period from 1855 to 1862, during which limited liability is liberalized, is shaded in grey. Additional details on data sources are provided in Appendix A.

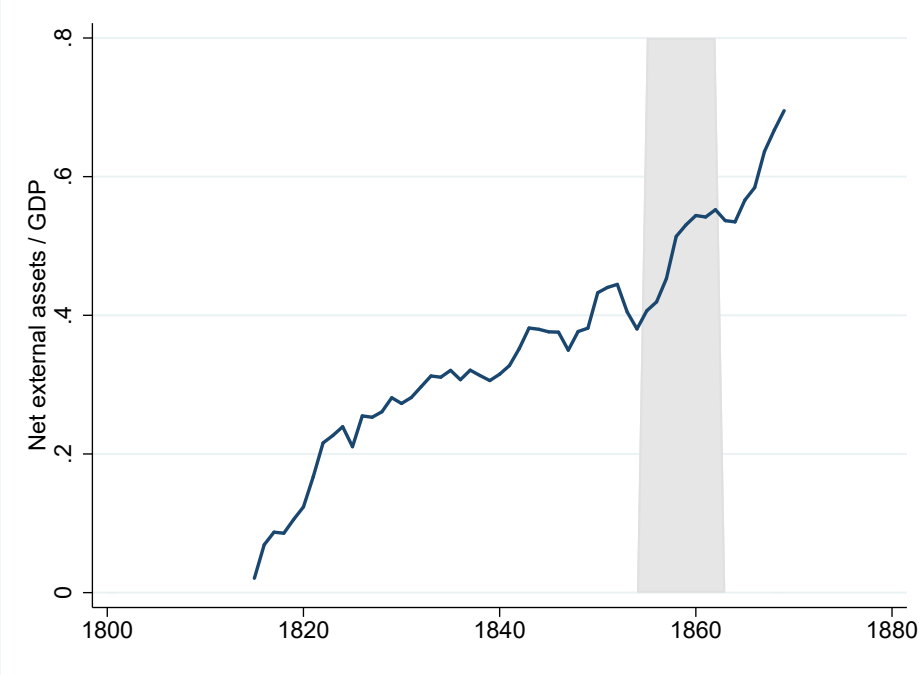
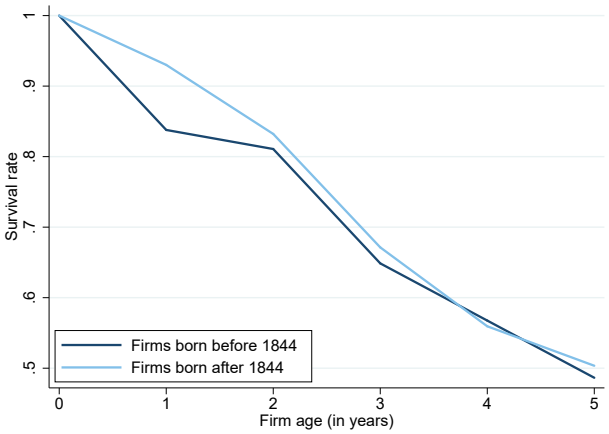


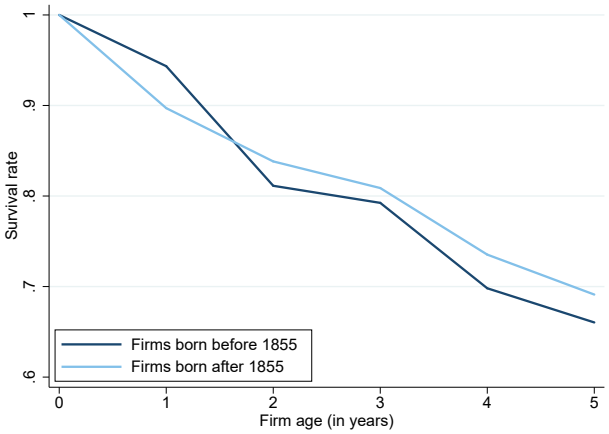
Figure 5 – Firm survival rate around major acts

This figure plots survival rates of firms born in the 4-year period before and after three major acts. Panel A is for the Joint Stock Companies Act of 1844, Panel B for the Limited Liability Act of 1855, and Panel C for the Companies Act of 1862. Additional details on data sources are provided in Appendix A.

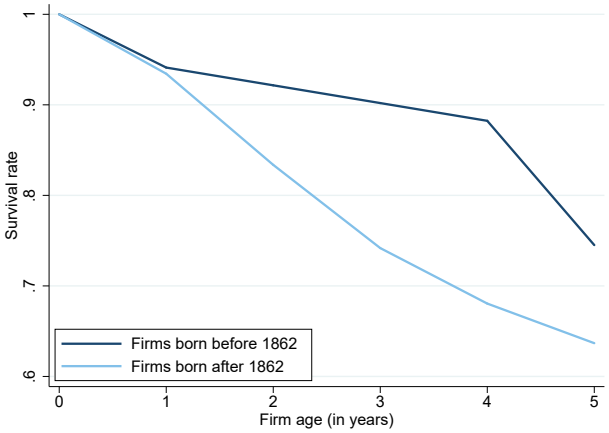
Panel A: Around the Joint Stock Companies Act of 1844



Panel B: Around the Limited Liability Act of 1855



Panel C: Around the Companies Act of 1862



A Data sources

This appendix provides details on the data sources used in the analysis.

A.1 Securities traded in the LSE

Over the period from 1800 to 1870, there are 300,774 security-month observations in the Global Financial Data dataset, for 3,136 unique firms. Out of them, 2,046 securities have been issued in the UK and 1,090 from abroad. Before conducting my empirical analysis, I prepare the data as follows:

- **Distinction between three types of securities:** The dataset incorporates observations for securities other than stocks. While my main focus is on equities *stricto sensu*, I also isolate a separate dataset for debt securities, and another one for non-standard stocks (mostly preferred stocks). From the raw data, debt securities are identified by searching, in the securities' names, for the following words: "Bond(s)," "Debenture(s)," "Certificate(s)," "Loan(s)," "Annuity(ies)," "Perpetuity(ies)," "Rente(s)," "Debt," "Obligation(s)," "Consols," "Promissory Note(s)." Among the remaining securities, I identify non-standard stocks by searching, in the securities' names, for the sign "%" and for the following words: "Preferred," "Guaranteed." Among the remaining securities, I manually check that all securities are most likely to be standard equity. Importantly, I do not drop any security. All of them end up in one of the three datasets: for standard stocks (i.e., my main dataset), for non-standard stocks, or for debt securities.

- **Calculation of aggregate market capitalization:** While the price data used to compute returns is of high-quality, some observations for the number of shares and/or the market capitalization (at the stock level) are missing or problematic. To obtain an estimate of the aggregate market capitalization, I proceed as follows: (i) I restrict to standard stocks, (ii) I drop securities for which the reported number of shares outstanding is always zero, (iii) I drop observations for which market capitalization is always problematic, in the sense that it is markedly different from the product of the share price and of the number of shares, (iv) if the number of shares outstanding is sometimes missing, I replace missing observations with the closest non-missing one, (v) after correcting this information, I drop observations for which the reported market capitalization still appears problematic, (vi) if prices for a given stock are not available for less that 24 months, I linearly interpolate the market capitalization from available values (I

drop stocks with prices not available for periods above 24 months). I then sum the capitalization of all remaining stocks to obtain an estimate of the aggregate market capitalization. This gives a lower estimate, since this only includes stocks with reliable information.

A.2 A millennium of macroeconomic data for the UK

The macroeconomic data series I use come from the dataset called "A millennium of macroeconomic data for the UK", itself compiled by the Bank of England from many primary and secondary sources. I use the version 3.1 (finalized on 30 April 2017).

From this dataset, I use the following series:

- **Amount of consols**: This is the consolidated funded debt of the UK from Mitchell (1988, Table "Public finance 7", p. 600-603). Raw data are from the *Sessional Papers of Parliament* and from the *Return Related to National Debt*.
- **Capital stock**: This is the net stock of domestic reproducible fixed assets, at market prices, as given by Feinstein and Pollard (1988, Tables VI and VII). The data is broken down between dwellings and other types of fixed assets. Non-dwellings include: industrial and commercial buildings; other non-residential buildings and works; plant, machinery and equipment; rolling stock and vehicles; ships. There is no information on the types of securities through which these assets are ultimately held by the household sector. Until 1850, data are available every decade; starting in 1850, on a yearly basis. Furthermore, the coverage until 1850 is for Great Britain, and for the United Kingdom afterwards. I disregard this gap, whose impact on the estimates is minor (see the dashed line in Figure 2).
- **Inflation**: This is measured as the yearly percentage change in the Cost of Living Index from Clark (2010).
- **Net external assets**: The series starts in 1815. The figure for 1815 is from Imlah (1958), and the increment for all subsequent years is from the current account statistics provided by Mitchell (1988, Table "National Accounts 15", p. 869-873). The variable "Overall Balance on Current Account" is adjusted to exclude flows of "Bullion and Specie."
- **Nominal GDP**: This is the nominal GDP of the UK at market prices. The main source is Broadberry et al. (2015). See the sheet entitled "Notes on GDP estimates" in the dataset for additional details on the data construction.

- **Yield on consols**: This is the yield on 3% Consols, computed as a yearly average from end-of-month data. The data data from 1800 to 1822 is from Neal (1990), the data from 1823 to 1860 is from Odlyzko (2016), and the data from 1861 to 1870 is from the NBER Macrohistory database.