Suffrage Reform and Financial Volatility: Reconsidering the Great Reform Act

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Abstract

We argue that Consol price movements during England's reform era reflected speculative activity spurred by continental revolutions and government instability, rather than market perceptions of a significant risk to the British regime's survival. We first show that, controlling for cross-market linkages, Consol variability during the reform era was no different than it was in normal times. Next, we show that Consol risks could be diversified using a portfolio of securities whose value depended on the unreformed regime's survival—something that should not have been possible if regime survival was in serious doubt. Finally, we use daily data to examine the relationship between major events and Consol prices. We find that investors did not view threats to the reform bill's passage as if they entailed risks of default. Instead, "ordinary" political risk (i.e. a potential change in the partisan control of the government) explains much of the variability in Consol prices.

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Introduction

As Przeworski (2009, p. 292) notes, prominent theorists have argued that "... extensions of [suffrage] rights are a response of the incumbent holders of rights to revolutionary threats by the excluded ..." Acemoglu and Robinson (2000, 2006) and Boix (2003) have been particularly influential exponents of this view, in which the franchise is granted only *in extremis*. Britain's Great Reform Act of 1832 is often cited as a case illustrating the importance of revolutionary threats. This choice seems natural given the wave of revolutions in Continental Europe at the time; the surge of social unrest on the domestic front; and Prime Minister Grey's famous declaration in the House of Lords that "... The principle of my reform is, to prevent the necessity for revolution ..."[1]

We investigate how investors, rather than politicians, reacted during the reform era—a topic on which recent scholarship offers diverging views. On the one hand, financial economists conclude that the Reform Bill had little effect on securities markets (Mitchell, Brown, and Easton 2002; Campbell et al. 2018). In their view, uncertainty over which party would control government and financial spillovers from tumults on the continent had substantially larger effects. On the other hand, political economists Dasgupta and Ziblatt (2015) find that the yield of British 3% Consols increased significantly in the run-up to the reform, falling back immediately after passage; and they interpret these fluctuations as being consistent with a revolutionary threat account of the act's passage. We examine how a range of securities—not just Consols—reacted during the reform crisis, seeking to parse out the relative influence of revolutionary threats, financial spillovers, and government instability.

Financial economists routinely seek to control for financial spillovers (Rigobon 2019). Yet it has not become standard practice in historical studies to control for these potential confounders when assessing how revolutionary threats affected securities markets. We show

[1] https://hansard.parliament.uk/lords/1830-11-22

that, once one controls for financial spillovers using standard methods (cf. Dungey et al. 2005; Rigobon 2019), there is no evidence of unusual price movements or co-movements in the Consols market during the period when previous studies have argued that the British regime experienced a heightened revolutionary threat. In contrast, the same tests do show abnormal behavior in the French bond market—which was affected by an actual revolution. These results suggest that investors saw no *significant* revolutionary threat to the British regime (and also suggest that controlling for financial spillovers may be important in other studies of suffrage reform).[2]

Next, we examine whether Consol risk could be diversified. If investors perceived a revolutionary threat to the British regime, then the vast tracts of land held by the old elite, as well as all securities connected to the government's politico-economic apparatus, should have impounded that risk. However, our analysis reveals that land *appreciated* in value during most of the crisis, while a portfolio of regime-dependent securities was less risky than a portfolio of all Consols between July of 1830 and March of 1832. These results again suggest that investors saw no existential threat to the British regime (and also suggest that examining the full range of assets that revolutions would imperil may be important in other studies of suffrage reform).

Finally, we use daily data to examine the relationship between major events and Consol prices. We find that investors did not view the reform process as a fundamental threat to the stability of property rights. Instead, "ordinary" political risk (i.e. a potential change in the partisan control of the government) explains much of the variability in Consol prices. Our results are thus consistent with those showing that the partisanship of electoral victors affects stock market returns (e.g., Bialkowski, Gottschalk, and Wisniewski 2008; Sattler 2013).

[2]Therefore, our paper contributes to the literature focusing on the reaction of British securities to military and political crises in the nineteenth century (e.g., Ferguson 2006; Mitchell, Brown, and Easton 2002; Brown, Burdekin, and Weidenmier 2006; Yoon 2011; Campbell et al. 2020).

The remainder of the paper is organized as follows. In Section 1, we provide some background on the parliamentary reform process, the Swing Riots, and Britain's capital markets. In Section 2, we examine how cross-market linkages affected the Consols market in the early 1830s. Next, we use a returns-based analysis to estimate the effect of social unrest and political deadlock on Consol risk. In Section 4, we analyze how Consol prices responded to various types of non-commercial (i.e. political) risks. A final section concludes.

1 Background

The Act to Amend the Representation of the People, also known as the Great Reform Act of 1832, introduced important changes in the parliamentary representation of England. First, it reapportioned seats in the House of Commons from smaller boroughs to growing industrial towns and county constituencies. Second, it changed the franchise. In the borough constituencies, all male householders occupying property worth £10 a year were given the vote. In the county constituencies, copyholders of land and various groups of tenant farmers gained the vote. The onset of the reform movement appears to have been sparked by a combination of fortuitous circumstances that took place in 1830. These included: the fragmentation of the old Tory party after the passage of the Catholic Emancipation Act[3]; the death of George IV on June 26; the July Revolution in France; the 1830 general election; the agricultural revolts in the English countryside; and the fall of the Wellington Ministry and the establishment of the Whig administration of Lord Grey in November.

When the Reform Bill was introduced in the House of Commons on March 1, 1831, popular opinion was strongly in favor of the measure. Nonetheless, the reform process quickly ran into a roadblock on March, when the bill passed by a single-vote margin on its second reading

[3]The Roman Catholic Relief Act of 1829, also known as the Catholic Emancipation Act, permitted members of the Roman Catholic Church to sit in the parliament at Westminster.

in the House of Commons. A month later, Lord Grey asked King William IV to dissolve Parliament and called for a general election. Held under the unreformed system, the election gave the government an overwhelming majority in favor of reform. The reintroduced reform bill was steered through the Commons during the summer of 1831, but it was rejected by the Tory majority in the Lords on October 8. A slightly altered Reform Bill began a third journey through Parliament in December. The measure was defeated again in the House of Lords on May 7, 1832. Two days later, Lord Grey handed in his resignation. He was replaced by the Duke of Wellington, a staunch opponent of parliamentary reform. These events precipitated a period of social unrest known as the Days of May. The crisis was defused on May 16 with the reinstatement of Grey's government, and the king's reluctant agreement to pack the House of Lords with enough supporters to ensure the bill's passage. Facing this threat, the Lords backed down, and passed the Great Reform Act on June 4. It received royal assent three days later.

1.1 The Swing Riots

The tortuous reform process summarized above took place against against a backdrop of social agitation. Most notably, the wave of rural unrest known as the *Swing Riots* took place between August 1830 and the spring of 1831. The riots began in Kent, with the destruction of threshing machines, then quickly spread through southern England and East Anglia (Hobsbawm and Rude 1973; Tilly 1995). Holland (2005) documents some 2,818 distinct violent incidents, involving arson, machine breaking, animal maiming, and assault.[4]

The Duke of Wellington's ministry did not take any decisive action against the rioters until November 11, over two months after the first incident. Lord Grey's ministry, which took power a few days later, took more resolute action —offering hefty rewards to apprehend

[4]The name *Swing Riots* was derived from "Captain Swing", the fictitious name often signed to the threatening letters sent to farmers, magistrates, parsons, and others (Holland 2005: 5).

and prosecute offenders and appointing special commissions to try Swing-related offences. According to Hobsbawm and Rude (1973, Appendix II), 1,976 individuals were brought to trial in connection to the Swing Riots; 252 were sentenced to death (although only 19 were actually hanged); 644 were imprisoned; and 481 were transported to penal colonies in Australia. No violence took place in response to the convictions, and Swing-related disturbances entered into an inexorable decline.

Most historians seem to agree that the Swing rioters were not revolutionaries (Hobsbawm and Rude 1973; Brock 1973; Tilly 1995; Holland 2005). In their responses to the *Rural Queries of the Poor Law Commission*, local parish officials attributed the agricultural unrest mostly to unemployment, low wages and inadequate poor relief. Moreover, the rioters had little knowledge about the July revolution in France and no convincing evidence of a strong link between urban radicalism and Swing disturbances exists. That said, it remains possible that elites perceived the Swing riots as harbingers of future revolutionary threats, and supported parliamentary reform as a way to mitigate that risk (Aidt and Frank 2015). Here, we focus on how the Swing Riots affected investors.

1.2 Capital Markets in Britain

British wealth-holders in the post-Napoleonic era had several investment opportunities, including rent charges, mortgages, bank deposits, state lottery tickets, and trade credits. The three major categories, though, were government long term debt, equity shares in listed companies, and landed property. Each asset class, in turn, had its own market.

The main government security was Consols, a fixed-interest perpetual bond introduced in the early 1750s, with a nominal return of 3 per cent. This asset formed the deepest and most liquid market during the reform era. Their trading volume was large, they were long-lived, were almost infinitely divisible, and were continuously traded on the London Stock

Exchange with low transaction costs (Odlyzko 2017). Trading in equity shares of listed companies grew in importance after 1825, with the liberalization of incorporation law. As a result of directorial oversight of share transfers, the share's large denominations (with £ 100 shares being the mode), and the relatively small size of some of the listed companies, the market for corporate securities was not as liquid as the Consols market during the reform period. Finally, as Thompson (1907) notes, the amount of land changing hands by buying and selling was not sufficiently large for a highly developed land market to emerge. Small quantities of land were occasionally traded; but whole estates only came onto the market infrequently. In addition most existing holdings were encumbered by restrictions, making land a highly illiquid asset (Turner, Beckett and Afton 1997).

Each of these markets' attributes attracted different types of investors. The historical evidence indicates that few businessmen owned land on a large scale and that their landed assets comprised a small share of their total wealth (Rubinstein (1981; Nicholas 1999). Land was not only difficult and expensive to sell, but it was also very costly to manage (Offer 1991). Therefore, as an investment vehicle, it was not well suited for short-term speculators, who would buy and sell assets to obtain capital gains. Equity investors consisted mostly of wealthy individuals. High share denominations ensured that ownership resided with "respectable" people, rather than "butlers, ladies' maids, and all sorts of persons."[5] While some of these shareholders sought to obtain returns on capital, the majority of them were mostly interested in obtaining dividend payments (Rutterford 2004). Therefore, the extent of speculative investment as a gamble on the rise of share values was quite limited during the reform era (Freeman, Pearson, and Taylor 2012).[6]

The market for Consols was distinctive, as it attracted a large number of both: (1) long-

[5]cf. evidence of General Austin and John Hardin. Secret Committee on Joint-Stock Banks, BPP (1836) IX, pp. 130 and 135. Cited in Freeman, Pearson, and Taylor (2012: 68.

[6]Short-term speculation was also curtailed by by requiring company directors to own shares in the companies on whose boards they sat.

term investors, who adopted a "buy-and-hold" strategy, as well as (2) jobbers, or short-term speculators. The first group included both *institutional* investors (such as the National Debt Commissioners, the Court of Chancery, the Ecclesiastical Commissioners, and Cambridge and Oxford universities) as well as so-called "capitalists" or "annuitants", individual investors whose primary aim was to live off the steady rents provided by coupon payments.[7] Constancy of income, rather than capital gain, was the number one priority of these long-term investors. In contrast, short-term investors would exploit the liquidity of the Consols market for speculative purposes. Their simplest strategy would be to lock-in profits in the form of capital gains on their investments. But other, more sophisticated strategies were also prevalent. Trading in Consols could be conducted for regular transfer (i.e. ready money) or based on their price the ensuing account, or settling day (i.e. time bargains). The latter entailed a form of forward trading (Morgan and Thomas 1962; Michie 1999; Odlyzko 2017). So, selling Consols for cash and buying them back for the account, was another way in which short-term speculators would use the Consols market to try to make a profit.

1.3 Market Reactions in the Reform Era

A convenient way to examine investors' reactions during the reform era is to compare the performance of the different asset classes. Table 1 shows annualized price changes as well as yields for land, equity shares, and Consols between 1826 and 1836. The evidence reveals that Consol prices decreased substantially in the run-up to the reform, were mostly flat in 1831 and 1832, and then experienced a significant recovery in 1833. One might interpret this pattern as showing that frightened elites reduced their demand for Consols—likely to become worthless if the regime were overthrown—thereby reducing their prices (Dasgupta and Ziblatt 2015).

[7] According to Morgan and Thomas (1962), the number of individual investors who held Consols in 1830 were believed to number nearly 275,000 and it was estimated that 250,000 of them received less than £ 200 a year in dividends.

Table 1: Performance of Different Asset Classes, 1826-1836

	Land		Equity Shares		Consols	
	Price Change (%)	Yield (%)	Price Change (%)	Yield (%)	Price Change (%)	Yield (%)
1826	-7.21	3.07	-7.33	4.05	-0.62	3.67
1827	0.49	3.08	2.25	4.34	0.30	3.55
1828	6.28	3.27	0.10	4.16	2.36	3.48
1829	-2.73	3.18	1.92	4.33	8.23	3.30
1830	2.80	3.27	-5.61	3.83	-11.87	3.44
1831	1.82	3.33	-4.95	4.48	1.06	3.58
1832	-1.79	3.27	6.49	5.11	-0.60	3.55
1833	0.45	3.29	7.34	4.70	6.63	3.38
1834	-0.45	3.27	2.90	4.30	2.97	3.27
1835	0.91	3.30	7.30	4.39	0.27	3.29
1836	0.90	3.33	11.13	4.05	-3.97	3.35
1826-36	0.13	3.24	1.96	4.34	0.43	3.44

Notes: We calculated the yield on land with the rent index in Thomson (1907: p. 613) using the average years' purchase value during this period (28 years). Stock market data including capital appreciation, and dividend yields come from Acheson et al.'s market capitalization-weighted index (2009: p.1124). The sample excludes companies that were part of the government's politico-economic apparatus. The Consol quotations are for the account. We used the prices corresponding to the end of the month preceding the transfer of the half-yearly dividends (May and November) to calculate Consols' yields and the year-to-year price changes.

The other evidence in Table 1, however, casts doubt on this *revolutionary threat* account. First, revolutionary-threat theorists typically identify land as the most vulnerable asset in the face of a revolutionary threat. Yet, the land market underwent a price increase in 1830 and 1831, and a downturn in 1832. Moreover, land was not riskier than Consols during the reform crisis. Taking capital losses into account, the return on Consols turned negative (-0.28%) in the years 1830-1832, while the average annualized return on land was 3.32%.[8]

Unlike purely financial assets, land's rental values may have reacted differently depending on their geographical proximity to the Swing Riots. If that was the case, then the yields presented in Table 1 (based on rental values) would be masking such variation. In the Supplementary Online Appendix (Table A1), we show that neither the Swing Riots nor the share of Whig representation in the unreformed Parliament in 1832 affected agricultural rents during the reform period.[9]

[8]For the land market, we consider the calendar years 1831 and 1832 as the ones corresponding to the Reform era. Except for those that were settled on Old Michaelmas (September 29), year-long contracts between landowners and tenant farmers in nineteenth-century England would begin/end on Old Lady Day (March 25). Therefore, most of the rental values for 1830 correspond to agreements that were made before the initial onset of Swing rioting.

[9]Our results indicate that the rent per acre in the average constituency without a proximate riot exposure

Turning to the stock market, the evidence in Table 1 shows that equity shares did not decline as much as Consols did in 1830; but the reverse was true in 1831. In 1832, the prices of corporate securities rallied significantly, anticipating the 1833 recovery in Consol prices. An examination of dividend yields reveals that investors were usually compensated for buying equity shares rather than Consols. Yields of corporate securities were consistently higher than Consols' throughout the 1826-1836 period. This equity risk premium, indicates that holding government debt was perceived as being safer than investing in private-sector firms, even during the reform era. So, if there was a revolutionary threat, it was not large enough to make private investments look good relative to sovereign debt.

2 Financial Volatility in the Reform Era

The distinctive movement of the Consols market raises the question of why Consol prices were so volatile during Britain's reform era. Scholarly opinions differ. While Dasgupta and Ziblatt (2015) argue that parliamentary reform had a large impact on Consol prices, Mitchell, Brown, and Easton (2002) conclude that the event had little importance for market participants. Instead, they argue that the fall of Wellington's government and uncertainty in Europe had much more significant impacts on Consol prices.[10] In this section, we offer an account—closer to Mitchell, Brown and Easton's (2002)—according to which financial spillovers from the continent drove Consol fluctuations.

amounts to £ 1.12 (with a standard deviation of £ 0.14), while a three-standard deviation increase in the number of riots is associated with a negligible rise in the average rent per acre: £ 1.15 (with a standard deviation of £ 0.08).

[10]Campbell et al. (2018) reach a similar conclusion with regard to stock price movements on the London market between 1823 and 1870—finding that the vast majority of large movements can be attributed to European wars. For the post-1850 period, see Yoon (2011)

2.1 Threat of Revolution in Europe

In his seminal book, *The Age of Revolution*, Eric Hobsbawm highlighted the unique correlation between British and Continental politics during Reform Bill era. As he noted, the period was "... probably the only one in modern history when political events in Britain ran parallel with those on the continent ..." (1962: p. 110). The revolutionary wave of 1830-34—ignited by the overthrow of the Bourbons in France (1830)—affected many parts of Europe. Belgium (1830) won independence from Holland, Poland (1830-1) was suppressed only after military operations, and parts of Italy and Germany also rebelled. As noted above, various domestic events might have increased elites' fears of revolution in Britain. These included the initial onset of Swing rioting (August 1830); the peak of Swing rioting (November 1830); and the aforementioned Days of May (in 1832).

Britain's synchronicity with Continental Europe during the early 1830s suggests that volatility in Consols may have been driven by market reactions to foreign, rather than domestic, risks. Bolstering this idea, strong cross-market linkages already existed between Britain and Continental Europe. Dutch and French investment capital flowed in and out of Britain throughout the reform era (Michie 1999); and investors could purchase a wide range of foreign securities in the London Stock Exchange.[11] Trading in foreign securities, as Michie (1999) notes, was much more prone to manipulation and rumor than market for Consols, creating risks for the whole market. The main issue was how price-sensitive information was disseminated. However, this account, published on July 30^{th}, 1830 (two days after the French revolution of July 26-28) in the *Money Market and City Intelligence* section of the *The Times*, illustrates how quickly the London market reacted to continental events:

> The English funds are maintained with tolerable firmness, though the alarm at the events in France is spreading over a pretty considerable class of stockholders. The closing price of Consols is $\frac{3}{4}$ per cent. below that of yesterday...; while the fall of the

[11] For example, in the 1820s, the investment portfolio of Samuel Greg (a cotton mill owner) included Consols as well as Prussian Bonds, French Funds, and Peruvian Bonds (Rose 1979).

> French funds on the second day after the publication of the ordinances has been 3 per cent., and in the whole 7 or 8 per cent. Generally speaking, there is a disposition among the English capitalists to get rid of this latter stock as an investment, but there are also a few who have [bet on] the ultimate maintenance of public credit in France.

2.2 Inter-market connections

Both Consols and French *Rentes* commanded an active market in London as well as Paris.[12] Therefore, it was not uncommon for arbitrageurs to buy/sell British Consols against French rentes.[13] So, consider some mechanisms by which the French revolution might have put downward pressure on Consol prices, even if investors saw no threat of regime overthrow in Britain. First, the revolution in France caused the price of *Rentes* to fall, inducing some investors to speculate on a restoration of order (as noted in the quote above). Because the market for private loans was highly imperfect, speculators typically had to sell portions of their own portfolios to raise the funds they needed. At the time, Consols were the preferred vehicle by which speculators sought to preserve their liquidity (Morgan and Thomas 1962). Thus, most speculators would have sold Consols in order to buy Rentes. Since the drop in Rentes prices was significant and the French bond market was large, speculators should have exerted a significant downward pressure on Consol prices. Second, a good number of French investors likely needed to extract cash from their portfolios—to the extent that the French revolution shrank economic activity. If they held Consols, these investors would have sold them, as Consols were among the most liquid and stable assets at the time. Thus, French investors should have been another substantial source of downward pressure on Consol prices.

Suppose that the sort of cross-market spillovers just illustrated were important factors driving Consol prices. In this case, we should be able to predict Consol prices well using

[12] Rentes (also called rentes sur l'état) is the name commonly given to the negotiable perpetual annuities issued by the French government.

[13] For example, Michie (1999) reports that David Ricardo amassed a fortune of around £0.5m. from buying and selling Rentes through the Paris market during the Napoleonic wars.

lagged prices of Consols, *Rentes*, and other commonly traded assets. Moreover, we should be able to do just as good a job in crisis and non-crisis periods. On the other hand, if investors became significantly more worried about regime collapse during the reform crisis, then this should appear as an omitted variable in a simple regression of Consol prices on lagged asset prices. To pursue this line of analysis, we follow the standard practice in the empirical modeling of contagion literature (cf. Dungey et al. 2005; Rigobon 2019)—using vector autoregression to establish the baseline predictions and comparing the fit of the regressions in non-crisis and crisis periods.

2.3 Was it just continental spillovers?

Let $\mathbf{R}_t = (r_{1t}, r_{2t}, ..., r_{kt})'$ denote a $(k \times 1)$-vector corresponding to k different assets' returns. A k-dimensional *vector autoregressive model* of order p, or VAR(p), has the form:

$$\mathbf{R}_t = \mathbf{c} + \mathbf{\Phi}_1 \mathbf{R}_{t-1} + ... + \mathbf{\Phi}_p \mathbf{R}_{t-p} + \varepsilon_t, t = 1, ..., T$$

where $\mathbf{\Phi}_i$ are $k \times k$ coefficient matrices, and ε_t is a $(k \times 1)$ zero mean white noise vector process with covariance matrix Σ.

In terms of model-selection, we adopt the specification that maximizes the overall goodness-of-fit of the full VARs, as well as of the Consol equation. To evaluate the different models, we allow for different lag structures; we consider samples with different time spans; and, we include two additional (indirect) channels of interdependence. We present these different models, as well as the relevant test statistics in the Supplementary Online Appendix (Tables C1 and C2). Based on these analyses, we fit a k-dimensional VAR with 6 lags (i.e. $p = 6$).[14]

Our time series $\mathbf{R_t}$ consist of monthly returns for seven "endogenous" assets, as well as

[14]The most parsimonious VAR model produces qualitatively similar results. See the Supplementary Online Appendix, Figures E1 and E2).

two "exogenous" ones for the period between January 1826 to December 1835.[15] The assets include Pound Sterling, British Consols, and Bank of England stock, as well as equity return indices for the British railroad and banking industries calculated by Acheson et al. (2009). To account for the behavior of returns outside Britain, we consider French Rentes and Dutch Bonds. As our exogenous variables, we consider Gold, as well as an index of U.S. stock returns compiled by Schwert (1990).[16]

For each endogenous asset k, we are mainly interested in ε_{kt}, the residual from regressing that asset's returns on its lagged (past) values, along with the lagged return values of the other assets in the model. These residuals have a straightforward interpretation: they represent unexpected changes in an asset's performance, given all the prior available information. Therefore, one can use the estimated residuals to determine the presence of unexpected shocks, as well as the contemporaneous correlation between those shocks.

Figure 1 presents two Q-Q (quantile-quantile) plots of the residuals from two different assets, British Consols and French *Rentes*. For each of these two assets, we compare the quantiles of the residuals corresponding to the crisis period (June 1830/July 1832) with the quantiles of the non-crisis period residuals (May 1826/May 1830, and August 1832/December 1835). The graph's left (right) panel shows the Q-Q plot for Consols (*Rentes*). For ease of interpretation, and following Dungey et. al (2005), the residuals are scaled by their standard deviation from the non-crisis period.

Compared to tranquil times, asset prices should be more unpredictable during a crisis. Therefore, if investors perceived a threat to the stability of the regime whose bonds they

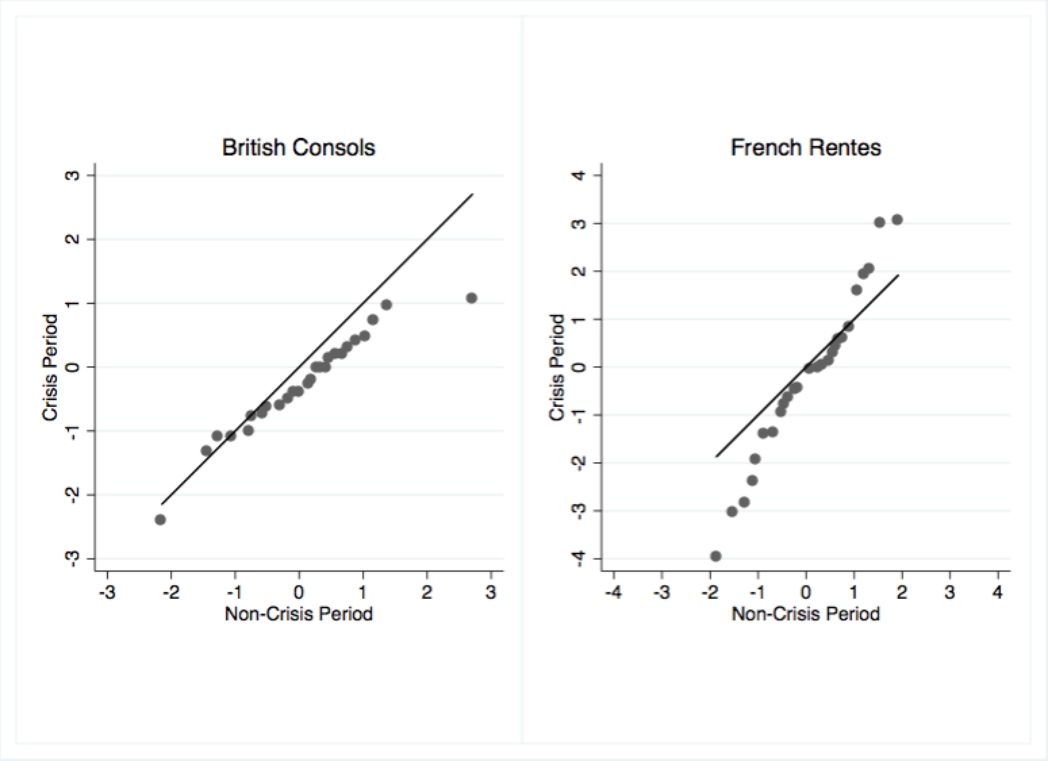
[15]There are 45 coefficients per equation, giving a total of 315 coefficients to be calculated. We estimate these parameters using the ordinary least-squares (OLS) method.

[16]To make sure the data are stationary, we calculate each asset's cumulative returns as: $r_{kt} = ln\left(\frac{v_t^k}{v_{t-1}^k}\right)$, where ln is the natural logarithm operator, and v^k represents the total return from holding asset k between the periods t and $t-1$ (which correspond, in this case, to two consecutive months). Both the Consol and French Rentes series are stationary. See the Supplementary Online Appendix for a battery of statistical tests on unit roots, stationarity, and fractional integration (Tables B1-B5).

traded, we should see larger forecast errors (i.e. outliers) during the crisis period as opposed to the non-crisis period. Consider the behavior of French *Rentes* first. The right panel of Figure 1 shows a significant difference between crisis and non-crisis periods in France. The estimated slope coefficient of a regression of quantiles corresponding to the crisis period on the ones for the non-crisis period is 1.87 (z-score=25.32). Moreover, the lowest quantiles of the crisis distribution show much larger losses than the corresponding quantiles in the non-crisis distribution. Moreover, the largest negative "outliers" (i.e. unexpected price drops) during the crisis period corresponded to the outbreak of the revolution (July 1830), the purge of the *Legitimists* (September 1830), Lafitte's downfall (February 1831), and Perier's appointment as President of the Council of Ministers (March 1831). The decline in *Rentes* prices is also striking if one compares France with Britain: they fell 37% in value from the beginning of the crisis to the nadir, which is much bigger than for Consols. Table D1 in the Supplementary Online Appendix the shows annualized returns for French 3% *Rentes*, as well as monthly price changes vis-a-vis Consols for the period between 1826 and 1836 (Figure D1). It seems that market participants dealt with French *Rentes* as if they perceived a substantial new threat to that investment, one that corresponded well to a conventional history of the revolution.

In contrast, there is no evidence that market participants viewed Consols as subject to a similar threat. As the left panel shows, the crisis and non-crisis distributions for Consols are quite similar (i.e. the points in the Q–Q plot lie approximately on the reference line). The estimated slope parameter when the quantiles corresponding to the crisis period are regressed on the non-crisis period ones is statistically indistinguishable from one at conventional levels (p-value=0.164).

Figure 1: Q-Q (quantile-quantile) Plots



In the case of England, as Aidt and Franck (2015) note, the process that culminated in the Great Reform Act could have failed at a number of hurdles. It is thus possible to conceive alternative "windows" corresponding to the crisis period. We consider four different sub-periods that overlap with the reform era as well as the revolutionary events in France (March 1829/July 1832; June 1830/August 1831; October 1830/June 1831; September 1831/April 1832). These dates include moments before any reform had been introduced, as well as moments at which the bill's fate was in doubt.[17] For each of these sub-periods, the estimated slope parameter when the crisis quantiles are regressed on the non-crisis ones is statistically indistinguishable from one at conventional levels (see the Supplementary Online Appendix, Table E1). In sum, once cross-market spillovers are taken into account, the variability in Consol prices during the reform era was no different than that of normal times. These

[17]For example, the period between March 1829-July 1832 also includes the political uncertainty related to the Catholic Emancipation question.

results are robust under all the different VAR model specifications discussed above (see the Supplementary Online Appendix, Figure E1).

We should also consider the contemporaneous propagation of shocks between Consols and French *Rentes*. If the French revolution *directly* increased perceptions of a revolutionary threat to the British regime, then one should expect to see a heightened correlation between these two assets during the crisis period—as both would have lost value in the event of revolution. In contrast, if the co-movements between these assets did not intensify during the Reform era, then one should conclude that fluctuation in Consol prices reflected ordinary cross-market spillovers. An examination of the relationship between these assets' residuals obtained from our VAR model indicates that Consols and French Rentes tended to move in tandem; yet, their co-movement did not increase during the reform crisis (see the Supplementary Online Appendix, Figures E2 and E3).

Taken together, the results presented in this section show that purely financial spillover or contagion, co-produced by imperfections in the financial system and investors' efforts to cover their losses after the French revolution, can explain overtime trends in Consol prices. Indeed, whereas market participants treated French *Rentes* as if the French revolution posed a serious threat to the regime's ability to repay its debts, they did not treat Consols as if they perceived a similar threat to the credibility of British debt. Using a simple battery of lagged asset prices, Consols continued to be just as predictable during the reform crisis, as before or after that crisis (Figure 1). Moreover, there was no significantly increased co-movement of Consols and French *Rentes* during the crisis. None of these results is consistent with a revolutionary threat perspective.

3 Political Risk and Consol Prices

The evidence of foreign contagion highlights the importance of distinguishing between Consol price fluctuations that were the result of different sources of risk. Idiosyncratic risk (also known as diversifiable, or residual risk) should affect a specific security (in this case Consols). In contrast, systematic risk denotes vulnerability to events which affect aggregate outcomes, rather that just a particular security or asset class. We examine how a particular factor—the risk of regime instability—affected Consol returns during the reform era.[18]

3.1 Risk Exposure

A risk of revolutionary overthrow should have affected any security whose worth hinged on the unreformed regime's stability, including sovereign debt (such as Consols and Reduced Annuities), currency (pounds sterling), and stocks connected to the government's politico-economic apparatus, such as the Bank of England and the East India Company (Acheson et al. 2009). Therefore, we can use these regime-dependent securities to construct a portfolio with an explicit factor exposure.

If investors thought that the unreformed regime faced an existential threat, then an all-Consols investment strategy should have been as risky, but not riskier than, one based on a portfolio of regime-dependent securities. On the other hand, Consol risk premia in excess of the *Regime* portfolio's returns would indicate that price movements in the Consols market did not respond exclusively to the risk of regime downfall. Instead, the finding that Consols exhibited more risk than the *Regime* portfolio would suggest that other factors might be confounding one's ability to interpret Consol price variability as stemming from increased threat perceptions.

[18]Classical investment theory assumed that there was a single type of systematic risk, called market risk. Over time, however, other risk factors in the returns on stocks and bonds were identified. From this perspective, a factor is any common (systematic) driver of securities' returns.

3.2 Risk Decomposition

Risk decomposition allows one to explicitly examine the impact of individual factors on the return variation of risky assets. Following the capital asset pricing model (CAPM), the expected return from an all-Consol investment strategy during period t is

$$E(R_{ct}) = R_f + \beta_c[E(R_{it}) - R_f]$$

where R_f is the return from a risk-free asset, $E(R_{it})$ is the expected return from the factor index, and β_c is $cov\ (R_c, R_i)/\sigma^2(R_i)$. Thus β_c provides a measurement of the volatility of an all-Consol investment strategy relative to the *Regime* portfolio.

The parameter β can be estimated using an ordinary-least-squares (OLS) regression of the form:

$$R_{ct} = \alpha_c + \beta_c R_{it} + \varepsilon_{ct},$$

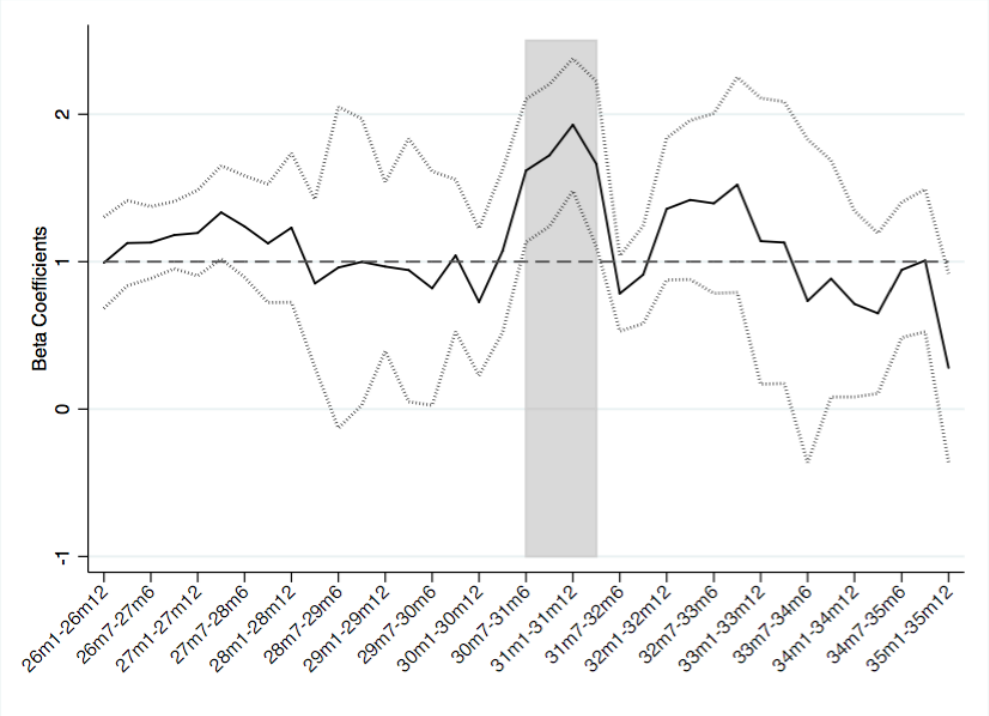
where $\alpha_c = R_f(1 - \beta_c)$, and ε_{ct} is an error term. If the estimated β_c is equal to one, it means that the all-Consols investment strategy was as volatile as the *Regime* portfolio. If the estimated β_c is greater than one, it means that an all-Consols investment strategy was more volatile than the one based on a portfolio of regime-dependent securities. Specifically, $\beta_c > 1$ would indicate that when the *Regime* portfolio returns went up, then the returns to the all-Consols investment strategy went up more; and when the *Regime* portfolio returns went down, the returns to the all-Consols investment strategy went down by a larger amount.

To allow for the possibility that the β_c parameter varied over time, we estimate rolling regressions using 12-month periods, incrementing the starting month in quarterly intervals. So, our first estimate corresponds to the period between January 1826-December 1826, the second to the period between April 1826-March 1827, and so on. For each estimation window, we also calculate β_c's standard error, so that we can obtain 95% confidence intervals.

3.3 Consol Risk

We empirically estimate the time-varying β_c coefficients using the sample of monthly Consol prices between January 1826 and December 1835. The factor index is an equally weighted portfolio composed by Consols, 3% Reduced Annuities, Pound Sterling (cash), the Bank of England, and the East India Company.[19] Figure 3 displays our results. The solid black line shows the β_c coefficients. The dotted lines represent 95 percent confidence intervals around these estimates. The situation where the all-Consols investment strategy carried the same risk as the *Regime* portfolio (i.e. $\beta_c = 1$) is represented by the black dotted line.

Figure 2: Consol Excess Risk (1826-1835)



The graph shows that investing exclusively in Consols usually carried the same risk as investing in the portfolio of regime-related assets.[20] The β_c coefficient, however, is significantly

[19] In both cases, we focus on total returns; namely, we consider not only the capital appreciation on the two alternative strategies, but also on the income received on these investments. The income consists of interest in the case of bonds as well as dividends in the case of the Bank of England and the East India Company.

[20] A regression for the whole period (January 1826-December 1835) indicates that the β_c coefficient is 1.038

different from unity at the 95% confidence level for the period starting in July of 1830 and ending in March of 1832 (marked in grey in Figure 3). More specifically, the β_c coefficient for this sub-period is 1.43 (z-score 8.06), implying that the all-Consol investment strategy was 43% more volatile than investing in the *Regime* portfolio.

Why were Consol returns more volatile than the *Regime* portfolio? Was sovereign debt significantly more likely to be repudiated by a new post-revolutionary regime than other regime-dependent securities? If this were true, then another common form of British sovereign debt, 3% Reduced Annuities, should also have been significantly more volatile than the *Regime* portfolio during the crisis period. But, as we show in the Supplementary Online Appendix, (Figure F1), this was not the case. Moreover, if investors thought the risk of revolution and debt repudiation was high, then they should have no longer demanded a risk premium for holding stocks in private-sector firms during the reform crisis. But, as we showed in Table 1, they continued to demand such a risk premium.

Our results, however, make sense when investors' speculative activities are considered. As noted in Section 2, both speculators and French investors had strong incentives to sell Consols, exerting a downward pressure that did not affect other regime-dependent securities. In addition to events in Continental Europe, the July of 1830-March of 1832 period witnessed, among other things, the aftermath of George IV's death, the Swing Riots, the fall of Wellington's ministry, the cholera morbus outbreak, the activities of the political unions, and the protracted parliamentary reform process. All of these events could have arguably spurred speculative actions in the Consols market. The following account, published on 25 August 1831 in the *The Times*, illustrates how the overpricing of Consols was regarded as a short-term anomaly caused by speculative moves: "There is an advantage, in the present state of the Stock-market, in investments in 3 per Cents Reduced, compared with Consols, of about $\frac{1}{4}$ per cent. This ought to be generally known, as the difference is worth something;

(z-score 13.17), with the riskiness adjusted to that of the minimum variance portfolio.

the rate of interest and the security being of course precisely the same. This would imply, and such, we believe, the fact, that Consols being the stock to which the time bargains are wholly confined, have been raised by speculation above their proportionate value ..." (cited in Odlyzko 2015, p. 32).

4 What Moved Consol Prices?

Nineteenth-century investors relied on business journalists to procure information on financial and commercial activities. Their preferred source in the 1830s, before such venues as the *Economist* and the *Banker's Magazine* were founded, was the the *The Times*' *Money Market and City Intelligence* section. This was particularly true in the case of *jobbers*.[21] We thus rely on the coverage provided by this news outlet to obtain detailed information on major political risks affecting the Consols market during the reform era.

We focus on transactions conducted in the London Stock Exchange during the period between January 8, 1830 and December 31, 1832. The exchange operated 6 days a week, excepting a few holidays, and Consols had an official record of trades on almost every trading day that it was open for trading. We obtained data on Consol prices from the daily quotes reported in the *Times*. We use forward prices (i.e. the price of Consols at the ensuing account) to address the issue of measuring the effects of *expectations* about political events.[22] During the period under study, trading in Consols "for money" was suspended ("shut") for about a month preceding the transfer of the half-yearly dividends to allow the Bank of England to prepare its accounts for the payouts (Klovland 1994; Odlyzko 2017). Therefore, an additional advantage of using Consol prices quoted 'for account,' rather than prices quoted

[21] As Mead (1844) notes, unlike long-term investors, these persons were "... continually 'dabbling in the funds,' buying in and selling out alternatively, from time to time, according as the prices of Stock may be in their favour ..." (p. 15). In his view, for such persons, the *Money Market and City Intelligence* was by far "... the most interesting part of a newspaper ..." (p.15).

[22] Consol account settlement days were spaced at an average of about 6 weeks apart during this era.

for cash trading, is that we have an uninterrupted record of transactions. Finally, we adjust the daily prices to account for the accrued dividend element in the market price.[23]

4.1 News and Consol Volatility

We can use a form of extreme-value analysis to examine the linkage between public information and Consol prices between 1830 and 1831 (cf. Cutler, Poterba, and Summers 1989). Table G1 in the Supplementary Online Appendix lists the 20 largest one-day Consol positive and negative movements during this period, along with the *Money Market and City Intelligence* account of the non-commercial factors that affected these price changes. On some days, the newspaper offers no clear explanation for the Consols rise/decline. But, in some other days, important information connected to non-commercial risks is provided. The most commonly cited factors were foreign events (11 instances), the fate of the reform bill (3 instances), and uncertainty about government turnover (3 instances). Nine out of the top-10 one-day losses were contemporaneous with the Swing Riots. Yet, one exception (November 8, 1830), the newspaper does not mention social unrest as a source of Consol price changes.

To probe the relationship between political risk(s) and market valuations in a more systematic way, we rely on the media coverage provided by the *Money Market and City Intelligence* to identify the days in which stories about political risks affecting the Consols market were published. Once again, we focus on the period between January 8, 1830 and December 31, 1832. Next, we combine these data with the daily Consol prices quoted 'for account' described above. Finally, we compare the variability of Consol returns between "news" versus "non-news" days. [24]

[23]Dasgupta and Ziblatt (2015) also examine fluctuations in Consol prices using daily data. But, they do not adjust for the accrued dividend element in the market price. By neglecting this factor, as Klovland (1994) notes, one would obtain spurious effects on the calculated yield. They also seem to be unaware that their source provides data on Consol prices quoted for cash trading, rather than prices quoted 'for account', to be settled later (a form of forward trading). This is another important weakness in their analysis.

[24]Our approach is closely related to Roll (1984), who examines the connection between articles about

We classified the newspaper's account of the factors that affected Consol prices into five categories: (1) military conflict in Continental Europe; (2) spread of cholera morbus; (3) the Reform Bill's fate; (4) changes in the British government's composition; (5) other/no discernible event. To construct this classification, we conducted word searches in the *Money Market and City Intelligence* section of *The Times* using the newspaper's built-in digital engine. A similar search for stories about Swing riots in this particular section of the newspaper yielded no results.[25] For overlapping dates, returns were assigned hierarchically to category (3) (Reform Bill) first, then to categories (4), (1), and (2), respectively.[26] As such, every day in our sample is assigned to each of these five mutually exclusive categories.

A total of 290 stories in categories (1)-(4), and 633 in category (5) were published in the *Money Market and City Intelligence* during the sample period of the analysis. Of these accounts, 105 belong to the first category (prospects for war/peace in the continent), 71 to the second one (cholera pandemic),[27] 77 to the third one (Reform Bill), and 37 to the fourth one (government changes). The number of stories in (1) confirms that uncertainty in European affairs was considered to be quite important vis-a-vis domestic politics.[28]

oranges published in the *Wall Street Journal* and the variability of orange juice futures returns, as well as to Elmendorf, Hirschfeld, and Weil (1996), who study the effect of news on weekly Consol prices between 1900 and 1920.

[25]https://www.gale.com/preview/c/the-times-digital-archive. The search term for category (1) was "war OR peace;" for (2) we used the term "cholera OR quarantine;" we searched for "reform" for (3); and the search terms for (4) were "election" and "ministry." After retrieving the results, we conducted a manual check on each story's content to make sure that the events occurred in Continental Europe and/or Great Britain (for example, we ignored discussions of government changes in Argentina or Brazil).

[26]One of our goals is to disentangle the effect of foreign versus domestic factors. Therefore, by placing in the *domestic* catergories (3) and (4) stories that mentioned both foreign and domestic events as the source of Consol price fluctuations, we are erring in the side of caution.

[27]The Asiatic cholera pandemic reached the continent in 1829, spreading widely in Central Europe during 1830-1831. In Great Britain, the first cases occurred in the autumn of 1831, followed by a major epidemic in the summer of 1832 (Underwood 1947). Throughout Europe, people's lives were affected by quarantine measures, compulsory hospitalizations, and the sealing-off of entire cities by *cordons sanitaires*. In several European capitals, these rigid policing measures raised violent opposition (Evans 1988). Even though such opposition did not snowball into revolution, it had a distinct impact on the regions' public health, business activity, and trade patterns.

[28]Recall that whenever a story mentioned both war/peace in Continental Europe and politics in Britain as the source of Consol changes, we classified the account using the latter rather than the former account.

We used intra-day price changes to compute the Consol volatility in days with a certain type of newspaper report. Specifically, we took the natural logarithm of the ratio of the closing price at time t to the closing price at time $t-1$. This measure is equivalent to the percentage change of Consol returns relative to the previous day, allowing us to control for differing yields across time periods. Next, we pooled these intra-day changes across all days in each of our five categories, and calculated their standard deviation.

Table 2 presents a comparison between the variability of Consol returns on dates with news classified in each of the categories described above. The annualized standard deviation for the days in category (5) is almost exactly the same as the one for Consol prices for the whole period between 1826-1835 examined above (6.19% versus 6.26%). Therefore, it provides a reliable baseline to evaluate the relative volatility of the days in the other categories.[29] We can easily reject the null hypothesis that the variance of returns is equal for days in categories (1)-(4) and days with "other/no discernible event" news stories.

Table 2: News and Variability of Consol Prices

	War/Peace in Europe	Cholera	Reform Bill	Change in Gov.	Other/No News
	(1)	(2)	(3)	(4)	(5)
Standard Deviation	0.50	0.28	0.55	0.73	0.35
of Returns	(105)	(71)	(77)	(37)	(632)
	Comparison Among			F-Statistic	p-value
Levene's Test	Cols. (1)-(4) vs. (5)			19.61	0.000
for Equal Variances	Col. (1) vs. (5)			17.73	0.000
	Col. (2) vs. (5)			1.22	0.268
	Col. (3) vs. (5)			25.36	0.000
	Col. (4) vs. (5)			5.92	0.015
	Col. (3) vs. (4)			25.22	0.616

[29]To obtain the annualized figure, we simply multiply the daily standard deviation by the square root of 305 (the number of trading days in a year during the period under study).

Volatility is higher during periods associated with stories about war/peace in Europe, as well as the Reform Bill, than during "other/no discernible" news periods. In both cases, however, volatility is lower than during days when stories about the government's survival were published. In the case of the "cholera" category, its volatility is lower than the variability of returns on days in category (5). Most stories were published at the peak of the epidemic in Britain. As a result of the imposition of quarantine/isolation measures, the bond market came to a complete standstill, and Consol prices experienced little movements at that time.

The *Money Market and City Intelligence*, however, did not seem to be overly concerned with the threat of revolution in Britain. First, they never explicitly mentioned such a risk. Second, they never mentioned the on-going Swing riots as a factor affecting the market. Third, it does not appear that their mentions of the reform bill were tacit acknowledgments of a revolutionary threat. Otherwise, volatility on days with stories about the reform bill should have been higher than volatility on days with stories about Ministerial instability –but, as the last row in Table 2 indicates, this was not the case.[30]

4.2 Political Uncertainty and Consol Prices

In this section, we run a "horse race" regression in which proxies for extraordinary uncertainty (about the unreformed regime's survival) and proxies for uncertainty over partisan control of government are used to predict the first and second-moment components of the Consol returns distribution over the period between January 8, 1830 and December 31, 1832. Specifically, we adopt the following Generalized Autoregressive Conditional Heteroscedastic-

[30]If all 922 days in our sample had experienced the same volatility as the 37 days in which stories about government instability were reported, then the overall variance of returns would have been roughly 93% higher than the variance actually observed. A similar calculation indicates that the observed volatility would have only been 44% higher if the 922 days in our sample had experienced the same price volatility as the 77 days in which stories about the unreformed regime's survival were reported.

ity (GARCH) model:

$$r_t = \alpha + X_t\beta + \epsilon_t,$$
$$\epsilon \sim N(0, h_t^2),$$
$$h_t^2 = exp(\eta + Z_t\lambda) + \gamma_1\epsilon_{t-1}^2 + \gamma_2 h_{t-1}^2$$

where r_t is the percentage change in Consol returns relative to the previous day, X_t is matrix of covariates affecting Consol returns in day t; β is a column vector of parameters to be estimated; ϵ_t is an error term; h_t^2 is the conditional variance of ϵ_t; Z_t is a is matrix of covariates affecting Consol volatility in day t; λ is a column vector of parameters to be estimated; and γ_1, and γ_2 are the coefficients of a GARCH(1,1) specification.[31]

We proxy elite perceptions of a revolutionary threat using the data on contentious collective action collected by Horn and Tilly (2000).[32] We consider Swing riots and other contentious gatherings separately. In the case of the former, we use the classification in Horn and Tilly to restrict our attention to gatherings demanding the extension of the franchise.[33] A steady stream of events would have likely made a greater impression on investors than a few isolated incidents. The data are coded on a daily basis; so, for each observation in our sample, we calculate the cumulative number of events that took place within the past

[31]To examine the potential existence of long memory, or fractional integration, in the series of daily returns we estimate the parameters of an ARFIMA model with the fractional difference parameter and a constant. Both the Akaike information criterion and the Bayesian information criterion select a specification with one autoregressive term and one moving-average term. The fractional difference parameter, $d = -0.072$ (with a standard deviation of 0.056). Therefore, we cannot reject the null d=0 in the series. See the Supplementary Online Appendix for additional statistical tests on unit roots, stationarity, and fractional integration (Tables G2 and G3).

[32]Contentious gatherings are defined as occasions on which at least ten or more persons assembled in a publicly-accessible place and either by word or deed made claims that would, if realized, affect the interests of some person or group outside their own number. These gatherings include almost every event that could be considered a disturbance, disorder, riot, or protest in addition to the numerous meetings, rallies, marches, processions, celebrations, and other sanctioned assemblies during which people made claims (Horn and Tilly 2000)

[33]The categories in Horn and Tilly (2000) are ELECTION, GOVERNMENT, PARL-REFORM, and REFORM+GOVT.

7, 15, and 30 days (see the Supplementary Online Appendix, Tables H4 and H5). To the extent that these variables are valid proxies, and revolutionary threat perceptions drove the bond market, we should find that Consol prices dropped following spikes in the number of contentious gatherings.

We also account for parliamentary votes on the issue of franchise extension. As Aidt and Franck (2015) note, the Reform Act could have failed at a number of hurdles, including its second reading (March 23 1831), as well as the Lord's explicit rejection of the Bill (October 8, 1831). We construct a dummy variable that takes a value of 1 in the three days around a key parliamentary vote on Reform Bills between 1831 and 1832, and zero otherwise.

With regard to government turnover, we consider parliamentary elections (held in 1830, 1831, and 1832). In this era, elections were held over a period of months, not on a single day. Thus, our election dummy takes the value of one for each day between the first (July 29) and last (September 1) day of the 1830 election; between the first (April 28) and last (June 1) day of the 1831 election; and after the first (December 10) day of the 1832 election; and zero otherwise.[34] We also explicitly consider the two periods when party control of government changed. The first one consists of the formation of the reform-friendly government under the leadership of Earl Grey in November 1830. The Duke of Wellington's incensed speech against reform on November 2 unleashed a confidence crisis that led to his resignation two weeks later. The second government crisis occurred during the so-called Days of May in 1832. Most historians date the beginning of this crisis on May 7, the day on which the House of Lords considered the Reform Bill. Indeed, as Fraser (2013) notes, the placards in the street of London, which anticipated the debate were proved right: "Seventh of May, Crisis Day." As noted above, the crisis ended when Lord Grey was reinstated as Prime Minister on May 16. We thus include a dummy variable that takes a value of 1 for the periods between November 2-November 14, 1831 as well as between May 7-May 16, 1832, and zero otherwise.

[34]The last contest of the 1832 elections took place after the period under study (January 8, 1833).

As each of the changes in government were pursuant to votes of no confidence in the House of Commons, or their analog in the House of Lords, our analyses control for both ways that a British government could fall—by losing elections and by losing votes of no confidence.

Table 3 reports the effect of social unrest and political instability on the first (Top Panel) and second (Bottom Panel) moments of the Consol returns.[35] The first model (column 1) follows the GARCH(1,1) specification described above. We include our three proxies for elite perceptions of the revolutionary threat (Swing Riots, Contentious Gatherings, and Reform Votes) in the return equation. In the volatility equation, we include our two measures of political instability (Elections, and Government Turnover), as well as three additional control variables. The first one, *Foreign News*, takes the value of 1 for days in which the *Money Market and City Intelligence* published a story about military conflict in Continental Europe; and zero otherwise. The second one, *Settlement* takes the value of one settling days; and zero otherwise. The third one, *Shutting*, takes the value of one when trading in Consols "for money" was suspended ("shut"); and zero otherwise.

An examination of the ARCH(1) and GARCH(1) terms shows that their coefficients sum up to a number less than one, which is required to have a mean reverting variance process. With regard to the returns equation, the results indicate that its expected intra-day percentage change is essentially zero. The findings also suggest that neither social upheaval nor key parliamentary votes on franchise extension had a systematic effect on the Consol prices. These results do not change if we use a shorter time window to calculate the cumulative number of Swing riots/contentious gatherings (see the Supplementary Online Appendix, Tables H4 and H5).

[35]Robust standard errors are presented in parentheses. $*$ indicates significance at a 10% level; $**$ indicates significance at a 5% level; $***$ indicates significance at a 1% level. Table G1 in the Supplementary Online Appendix provides descriptive statistics for all the variables included in our models.

Table 3: Political Uncertainty and Consol Prices

Consol Returns				
Swing Riots	-0.001	-0.001		
	(0.000)	(0.000)		
Contentious Gatherings	0.001	0.001		
	(0.000)	(0.000)		
Reform Bill Vote	-0.032	-0.033		
	(0.051)	(0.050)		
Volatility			0.096	
			(0.116)	
Constant	-0.009	-0.009	-0.013	-0.015
	(0.011)	(0.011)	(0.013)	(0.010)
Consol Volatility				
Swing Riots		0.002	0.002	0.001
		(0.002)	(0.002)	(0.000)
Contentious Gatherings		0.002	0.002	0.001
		(0.001)	(0.001)	(0.000)
Reform Bill Vote		-0.031	-0.000	0.047
		(1.214)	(1.282)	(0.222)
Elections	0.777*	0.695	0.751*	0.142**
	(0.421)	(0.433)	(0.417)	(0.065)
Government Turnover	3.065***	2.788***	2.867***	0.946***
	(0.575)	(0.596)	(0.596)	(0.355)
Foreign News	2.296***	2.115***	2.092***	0.466***
	(0.302)	(0.352)	(0.359)	(0.168)
Settlement	2.128***	1.922**	1.936**	0.364
	(0.783)	(0.880)	(0.844)	(0.301)
Shutting	-0.133	-0.219	-0.233	-0.075
	(0.326)	(0.327)	(0.326)	(0.049)
Constant	-4.845***	-4.710***	-4.719***	-0.384***
	(0.413)	(0.423)	(0.413)	(0.140)
ARCH(1)	0.188***	0.194***	0.190***	-0.099***
	(0.046)	(0.050)	(0.048)	(0.032)
EARCH(1)				0.296***
				(0.086)
GARCH(1)	0.680***	0.657***	0.660***	0.853***
	(0.059)	(0.067)	(0.064)	(0.054)
Observations	922	922	922	922

Regarding the second-moment components of the Consol returns distribution, the results indicate that Consol prices exhibited more volatility during days associated with stories about war/peace in Europe, as well in the two periods when party control of government changed. These findings are consistent with the analysis presented in the previous section. Substantively, they indicate that, in the case of government instability, the estimated daily standard deviation of Consol returns would increase by 0.53. The daily standard deviation of the returns in our sample is 0.41. Therefore, while the effect of events of this kind on Consol prices was not negligible, it was not extraordinarily large.[36]

The unreformed regime's survival chances could also have affected Consol prices and volatility. We test this conjecture in our second model, reported in column 2. In this case, we include our proxies for revolutionary threat in both the return and the volatility equations. The results indicate that neither riots nor parliamentary votes had an effect on the security's volatility. In addition, the coefficients of elections and government turnover are still positive and statistically significant after we control for revolutionary threats in the volatility equation. More importantly, note that if both *Swing Riots* (cf. Aidt and Franck 2015) and *Foreign News* are interpreted as good proxies for perceived revolutionary threats, then we should expect the coefficients of both variables to be statistically significant. Yet, this is not the case.

We further probe the potential indirect effects of revolutionary threats on Consol prices in our third model (reported in column 3). Specifically, we consider the possibility that the risk premium depends on the conditional variance:

$$r_t = \alpha + \delta h_t^2 + \epsilon_t,$$

where h_t^2 is defined as before. The coefficient of the conditional variance in the returns

[36] In the case of *Foreign News*, the estimated increase in the Consol returns' daily standard deviation amounts to roughly 0.44.

equation is not statistically significant. Therefore, revolutionary threats as measured by Consols' conditional variance do not affect the security's average prices.

Finally, in our fourth model, we examine the asymmetric effect of shocks on volatility. We exclude our proxies of the revolutionary threats in the return equation, and estimate the volatility equation using the following E-GARCH process:

$$ln(h_t^2) = \eta + Z_t\lambda + \gamma_1\xi_{t-1}^2 + \gamma_2 ln(h_{t-1}^2) + \gamma_3(|\xi_{t-1}^2| - \sqrt{\frac{2}{\pi}}),$$

where $\xi_t = \frac{\epsilon_t}{h_t^2}$, which is distributed as $N(0,1)$. The negative γ_1 coefficient implies that negative innovations (unanticipated price decreases) are more destabilizing than positive innovations. The effect, however, is smaller than the symmetric effect (0.278). In fact, the relative scales of the two coefficients imply that the symmetric effect dominates the negative leverage. The results indicate that neither riots nor parliamentary votes had an effect on Consol price volatility. More importantly, the estimated effects of elections and government turnover are robust when we consider the asymmetric effect of shocks on volatility.

Conclusion

Did fears that Britain's regime would be toppled by revolution drive Consol prices during Britain's reform era? Recent work in political science has suggested as much (Dasgupta and Ziblatt 2015), while work in financial economics comes to a different conclusion (Mitchell, Brown and Easton 2002). We have reconsidered Consol price movements during the reform crisis, highlighting the role of two factors—financial spillovers and government turnovers—that might confound efforts to attribute Consol yield spikes to revolutionary fears.

We first show that Consol yields did not exhibit unusual behavior during the reform era, once one controls for financial spillovers via a battery of lagged asset prices. The same

controls applied to French *Rentes*, however, show abnormal negative returns. In other words, our analyses suggest that investors did see a revolutionary threat to *Rentes* but did not see a similar threat to Consols.

Bolstering this first finding, we also examine other assets that should have been at risk in the event of revolution—including land and regime-dependent securities such as Bank of England stock. We show that land prices *increased* during most of the reform crisis and that regime-dependent securities varied enough in their behavior during the crisis so that investors could still benefit from intra-regime diversification.

Turning to our second factor, government turnovers, we show that uncertainty about European affairs and about partisan political control of Britain's cabinet were systematically related to movements in Consol prices. In contrast, neither riot intensity nor reform bill votes showed any systematic effect on the Consols market. We thus offer an alternative explanation of the volatility of Consol prices during the reform period. We argue that financial spillovers, coupled with ordinary political risks, drove the Consols market in the early 1830s. Therefore, we conclude that Britain's *perilous question* did not pose a fundamental threat to the stability of the regime or property rights.

Our findings also have implications for the emerging literature that uses historical financial market data to explore political reactions to revolutionary threats. While we focus on Britain's Great Reform Act, our approach is general enough to accommodate other similar episodes. We thus recommend that future studies examine the entire range of assets that would be at risk from revolution and take financial spillovers into account.

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Supplementary Online Appendix to "Suffrage Reform and Financial Volatility: Reconsidering the Great Reform Act"

Appendix is for online publication only.

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Appendix Contents

A Threat Perceptions and Agricultural Rents

How did threat perceptions affected agricultural rents during the reform period? The geographical variation of rental values can be captured using the information in Clark (1998). We merged the observations corresponding to the years 1831-1832 with the data on Swing riots compiled by Aidt and Franck (2015), for 35 of the county constituencies that returned MPs to the House of Commons. We restricted our analysis to leases whose value was determined on the basis of market conditions. The resulting sample consists of a total of 1,028 observations, with 353 corresponding to 1831 and 675 for 1832. With respect to its geographical coverage all 35 county constituencies are represented in the sample.[1]

Table A1, columns (1)-(4), show our estimates of the relationship between the number of Swing riots that happened within a radius of 10 kilometers from each constituency and agricultural rents.[2] Column (1) shows a specification without any control variables. To account for potential confounders, we augment equation (1) with a battery of control variables. Following Aidt and Franck (2015), we include indicators capturing political, institutional, economic, and demographic of each constituency (reported in their Table II, column (5)), as well as contextual variables associated with the 1831 Whig electoral victory (cf. their Table VIII, column (5)).[3] The results are reported in column (2). In column (3) we show a specification where counties with less than 10 observations are excluded from the analysis. Finally, to capture rental agreements that were closer to the peak of the Swing riots, we restrict our analysis to the year 1831 in the specification reported in column (4). According to Aidt and Franck (2015), threat perceptions induced voters to support for pro-reform politicians. We examine the effect of the share of seats won by Whigs in the 1831 election on rental values in column (5). Most year-long contracts between landowners and tenant farmers in nineteenth-century England would begin/end on Old Lady Day. Given the timing of the 1831 elections (28 April-1 June), we only include in our analysis the observations corresponding to 1832.

[1] Norfolk and Buckinham are the two counties with the largest number of observations (197 and 172, respectively); while there are 19 counties with less than 10 observations.

[2] Our main results remain unchanged if we use 20,30,40, or 50 kilometers instead of 10.

[3] The whole set of variables includes: *Whig share 1826, Whig share 1826 Squared, Reform support in 1830, County constituency, Narrow franchise, Patronage index, Emp. fract. index, Agriculture (emp. share), Trade (emp. share), Professionals (emp. share), Population, Population density , Thriving economy, Declining economy, Petitions against Catholic relief, Petitions for Catholic relief, Petitions against slavery, Petitions against reform, Petitions for reform, Growth in poor law expenses, Special commission,* and *Share of harsh sentences.*

Table A1: Threat Perceptions and Agricultural Rents

	(1)	(2)	(3)	(4)	(5)
Area	1.116***	1.092***	0.965***	0.836***	1.168***
	(0.141)	(0.137)	(0.186)	(0.274)	(0.105)
Riots within 10km	0.127	-0.501	0.096	-0.146	
	(0.101)	(0.361)	(0.114)	(0.150)	
Area * Riots	0.001	0.001	0.003	0.014*	
	(0.004)	(0.004)	(0.004)	(0.007)	
Whig Share 1831					0.051
					(0.059)
Area * Whig Share					0.001
					(0.002)
Constant	3.383	36.891	5.126	13.080*	-2.461
	(3.358)	(91.369)	(3.975)	(6.501)	(4.907)
R^2	0.83	0.85	0.77	0.75	0.89
Observations	1028	1028	944	353	675

Robust standard errors, clustered at the county level, in parentheses. $*$ indicates significance at a 10% level; $**$ indicates significance at a 5% level; $***$ indicates significance at a 1% level.

The dependent variable in all the models is the rental value of each property measured in pounds. For ease of interpretation, we also include in all models, each property's size, as well as its interaction with our main covariates of interest. As such, the latter represents the marginal change in rent in the pounds per acre metric. Overall, the point estimate on *Area* is quite stable across all the specifications in Table 1. We can calculate the average rent in pounds per acre in 1831 and 1832 using the estimates of the models presented in columns (4) and (5), respectively. In the former case, the rental value (evaluated at the means of the independent variables) amounts to £ 0.84. For the year 1832, the calculated average rent in pounds per acre is £ 1.17[4] These estimates match almost exactly the calculations in Thompson (1907), and in Turner, Beckett and Afton (1997). Both studies use other sources to compute their rental values (mostly from private estate records). Therefore, we can be confident that the sample of plots of land held by charities is representative of agricultural rentals during this period.

[4]The average area for the 1831 observations is 32.5 acres; and, for the 1832 observations is 29.04.

Regarding threat perceptions, the results presented in Table A1 indicate that neither the Swing riots nor the share of Whig representation in the unreformed Parliament in 1832 had an effect on agricultural rents during the reform period. For example, consider the findings presented in column (1). The estimated rent per acre in a constituency that was not exposed to any riots within a radius of 10 km is £ 1.12 (with a standard deviation of £ 0.14). Based on these estimates, a three-standard deviation increase in the number of riots would be associated with a negligible rise in the average rent per acre: £ 1.15 (with a standard deviation of £ 0.08). The largest effect of Swing riots on agricultural rents corresponds to the model where the analysis is restricted to the year 1831 (column 4). Even in this case, rental values in places with and without riots are statistically indistinguishable. The estimated rent per acre in a constituency that was exposed the average number riots amounted to £ 1.04 (with a standard deviation of £ 0.21), compared to £ 0.84 (with a standard deviation of £ 0.27) in places without any riots.

B Stationarity Tests

Table B1: Unit Root Tests - Consols

	Augmented Dickey-Fuller				
	Test	Critical Values			Conclusion
	Statistic	(1%)	(5%)	(10%)	
$Z(t)_t$	−10.228	−4.034	−3.447	-3.147	Reject
$Z(t)_m$	−10.273	−3.504	−2.889	-2.579	Reject
$Z(t)$	−9.831	−2.597	−1.950	-1.611	Reject
	Phillips-Perron				
$Z(t)_t$	−10.202	−4.034	−3.447	-3.147	Reject
$Z(t)_m$	−10.251	−3.504	−2.889	-2.579	Reject
$Z(t)$	−9.812	−2.597	−1.950	-1.611	Reject

Notes: The null hypothesis is that the series contains a unit root. MacKinnon (1991) critical values. $Z(t)_t$: model with trend and a constant term; $Z(t)_m$: model with a constant term; $Z(t)$: model with no constant and no trend.

Table B2: Stationarity Tests - Consols

	KPSS Results		
	Lags	Statistic	Conclusion
Trend Stationarity	1	.048	Do not reject
Level Stationarity	1	.048	Do not reject
	1%	5%	10%
Critical Values (Trend)	0.216	0.146	0.119
Critical Values (Level)	0.739	0.463	0.347

Notes: The null hypothesis is that the series is stationary. Maximum number of lags chosen by Schwert (1989) criterion.

Table B3: Unit Root Tests - French Rentes

	Augmented Dickey-Fuller				
	Test	Critical Values			Conclusion
	Statistic	(1%)	(5%)	(10%)	
$Z(t)_t$	−9.621	−4.034	−3.448	-3.148	Reject
$Z(t)_m$	−9.660	−3.504	−2.889	-2.579	Reject
$Z(t)$	−9.541	−2.598	−1.950	-1.611	Reject
	Phillips-Perron				
$Z(t)_t$	−9.709	−4.034	−3.448	-3.148	Reject
$Z(t)_m$	−9.759	−3.504	−2.889	-2.579	Reject
$Z(t)$	−9.543	−2.598	−1.950	-1.611	Reject

Notes: The null hypothesis is that the series contains a unit root. MacKinnon (1991) critical values. $Z(t)_t$: model with trend and a constant term; $Z(t)_m$: model with a constant term; $Z(t)$: model with no constant and no trend.

Table B4: Stationarity Tests - French Rentes

	KPSS Results		
	Lags	Statistic	Conclusion
Trend Stationarity	1	.041	Do not reject
Level Stationarity	1	.041	Do not reject
	1%	5%	10%
Critical Values (Trend)	0.216	0.146	0.119
Critical Values (Level)	0.739	0.463	0.347

Notes: The null hypothesis is that the series is stationary. Maximum number of lags chosen by Schwert (1989) criterion.

Figure B1: Fractional Integration Tests

Consol Returns

Geweke/Porter-Hudak

Power	Ords	Est d	StdErr	t(H0: d=0)	P>t	Assym. SE	z(H0: d=0)	P>z
0.4	7	-0.234	0.175	-1.337	0.252	0.434	-0.540	0.589
0.45	9	-0.061	0.228	-0.267	0.799	0.346	-0.176	0.860
0.5	11	0.100	0.236	0.421	0.685	0.293	0.340	0.734
0.55	14	-0.124	0.198	-0.628	0.543	0.244	-0.511	0.609
0.6	18	0.265	0.222	1.196	0.250	0.204	1.301	0.193

Philips

Power	Ords	Est d	Std Err	t(H0: d=0)	P>t	z(H0: d=1)	P>z
0.4	6	0.573	0.373	1.536	0.175	-1.633	0.103
0.45	8	0.542	0.250	2.170	0.062	-2.019	0.044
0.5	10	0.516	0.212	2.429	0.036	-2.388	0.017
0.55	13	0.287	0.184	1.562	0.142	-4.009	0.000
0.6	17	0.511	0.163	3.128	0.006	-3.142	0.002

Robinson

Power	Ords	Est d	Std Err	t(H0: d=0)	P>t
0.4	7	-0.288	0.146	-1.978	0.083
0.45	9	0.155	0.266	0.581	0.574
0.5	11	-0.024	0.233	-0.102	0.920
0.55	13	-0.124	0.197	-0.631	0.538
0.6	17	0.266	0.219	1.214	0.241

French Rentes Returns

Geweke/Porter-Hudak

Power	Ords	Est d	StdErr	t(H0: d=0)	P>t	Assym. StdEr	z(H0: d=0)	P>z
0.4	7	-0.234	0.177	-1.323	0.257	0.434	-0.540	0.589
0.45	9	0.061	0.241	0.254	0.808	0.346	0.177	0.860
0.5	11	0.051	0.185	0.277	0.789	0.293	0.175	0.861
0.55	14	0.131	0.138	0.945	0.365	0.244	0.537	0.592
0.6	18	0.263	0.181	1.456	0.166	0.204	1.291	0.197

Phillips

Power	Ords	Est d	Std Err	t(H0: d=0)	P>t	z(H0: d=1)	P>z
0.4	6	0.282	0.173	1.634	0.153	-2.743	0.006
0.45	8	0.432	0.230	1.874	0.098	-2.506	0.012
0.5	10	0.385	0.189	2.040	0.069	-3.031	0.002
0.55	13	0.348	0.137	2.547	0.024	-3.667	0.000
0.6	17	0.436	0.178	2.456	0.025	-3.623	0.000

Robinson

Power	Ords	Est d	Std Err	t(H0: d=0)	P>t
0.4	7	-0.183	0.146	-1.258	0.244
0.45	9	0.102	0.206	0.493	0.632
0.5	11	0.067	0.162	0.410	0.689
0.55	13	0.131	0.137	0.953	0.357
0.6	17	0.261	0.179	1.463	0.161

C VAR Model Selection

Table C1: VAR with Different Specifications

Specification	k	p	Sample	R^2 Consol
(1)	2	3	1826m5 - 1835m12	0.18
(2)	2	6	1826m8 - 1835m12	0.18
(3)	2	12	1827m2 - 1835m12	0.27
(4)	2	12	1827m2 - 1850m12	0.17
(5)	3	3	1826m5 - 1835m12	0.17
(6)	3	6	1826m8 - 1835m12	0.34
(7)	5	3	1826m5 - 1835m12	0.24
(8)	7	3	1826m5 - 1835m12	0.26
(9)	7	6	1826m8 - 1835m12	0.60
(10)	9	6	1826m8 - 1835m12	0.60

(1) Consol, Rentes ; (2) Consol, Rentes; (3) Consol, Rentes ; (4) Consol, Rentes; (5) Consol, Rentes, Dutch; (6) Consol, Rentes, Dutch; (7) Consol, Rentes, Dutch, Pound, Bank England; (8) Consol, Rentes, Dutch, Pound, Bank England, British Railroad, British Banks; (9) Consol, Rentes, Dutch, Pound, Bank England, British Railroad, British Banks; (10) Consol, Rentes, Dutch, Pound, Bank England, British Railroad, British Banks, Gold, US Stock.

Table C2: Model Comparison

Comparison	LR	df	p	R^2 Consol
(5) vs. (1)	484.32	16	0.000	0.17 vs. 0.18
(6) vs. (2)	513.97	31	0.000	0.34 vs. 0.18
(9) vs. (6)	2489.19	244	0.000	0.60 vs. 0.34
(10) vs. (9)	43.81	14	0.000	0.60 vs. 0.60

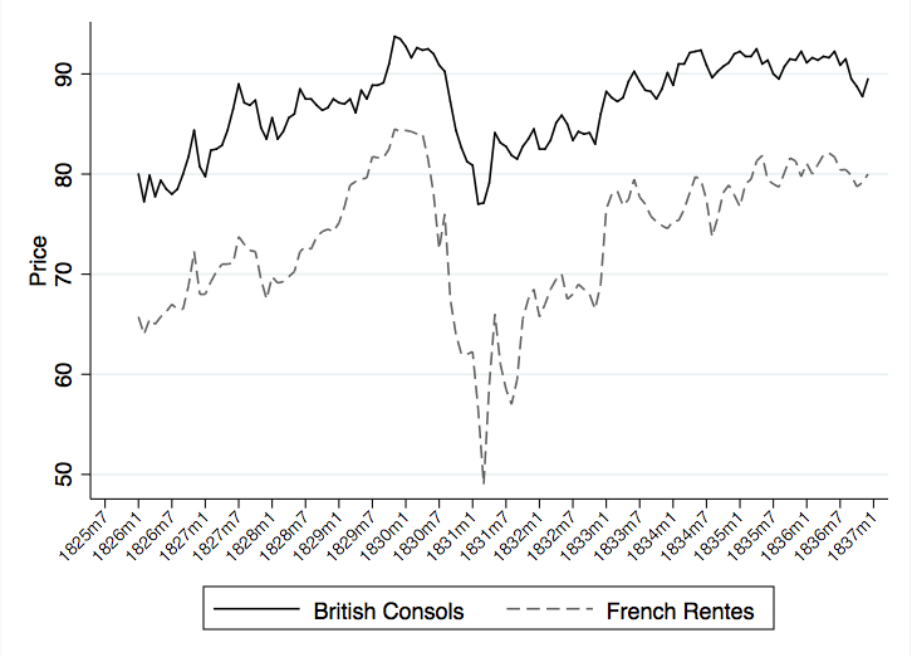
D French Rentes

Table D1: Annualized Returns, 1826-1836

	French 3% Rentes		
	Cap. Appr.	Yield	Tot. Ret.
1826	3.42	4.41	7.83
1827	-0.72	4.44	3.72
1828	10.00	4.04	14.04
1829	13.45	3.56	17.01
1830	-26.41	4.84	-21.57
1831	10.48	4.38	14.86
1832	0.74	4.35	5.08
1833	8.05	4.02	12.08
1834	4.49	3.85	8.34
1835	2.37	3.76	6.13
1836	0.32	3.75	4.07
1826-36	2.38	4.13	6.51

Source: www.globalfinancialdata.com

Figure D1: British and French Bond Prices, 1826-1836.



E Inter-market Connections

Table E1 shows the estimated slope parameter when the crisis quantiles are regressed on the non-crisis ones for the following sub-periods: March 1829/July 1832; June 1830/August 1831; October 1830/June 1831; and September 1831/April 1832.

Table E1: British Consols Q-Q Regression Slopes

Specification	Crisis Period	Coefficient	99% Conf.	Interval
(1)	1829m3 - 1832m7	0.99	0.93	1.07
(2)	1830m6 - 1831m8	1.11	0.88	1.37
(3)	1830m10 - 1831m6	0.89	0.61	1.16
(4)	1831m9 - 1832m4	0.84	0.37	1.30

Figure E1 presents the Q-Q (quantile-quantile) plots of the residuals generated using the model specification that minimizes the goodness-of-fit of the Consol equation (model 1 in Table C1); namely, a 2-dimensional VAR with 3 lags for the period between January 1826 to December 1835.

Figure E1: Q-Q (quantile-quantile) Plots

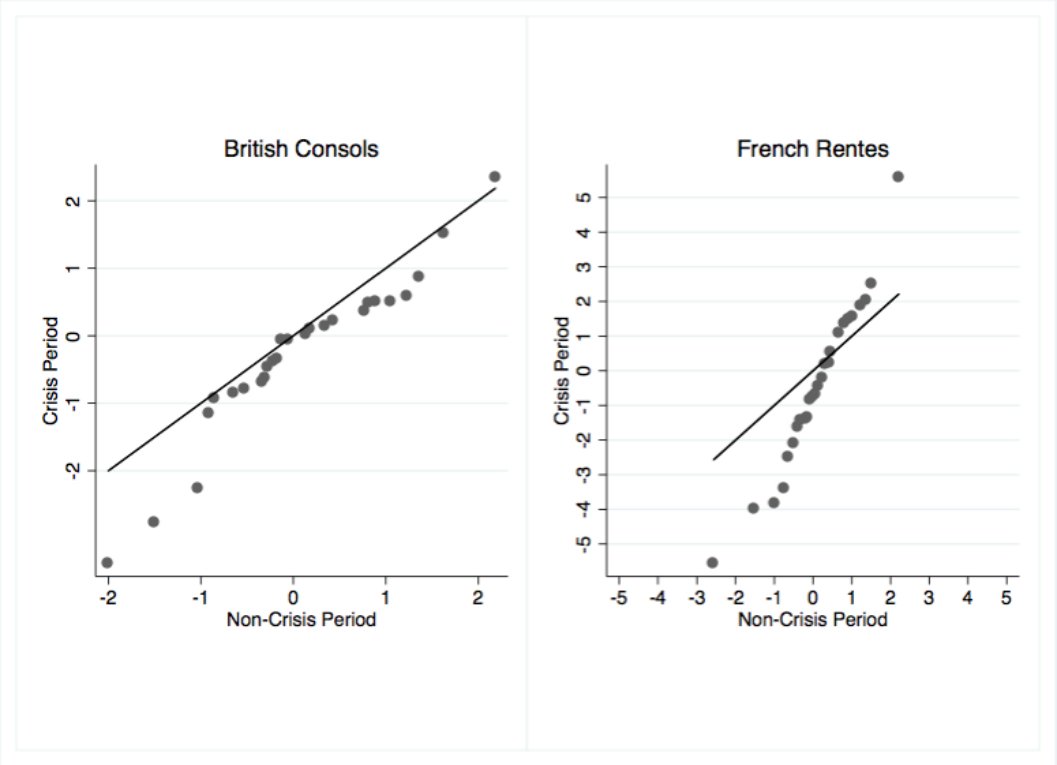
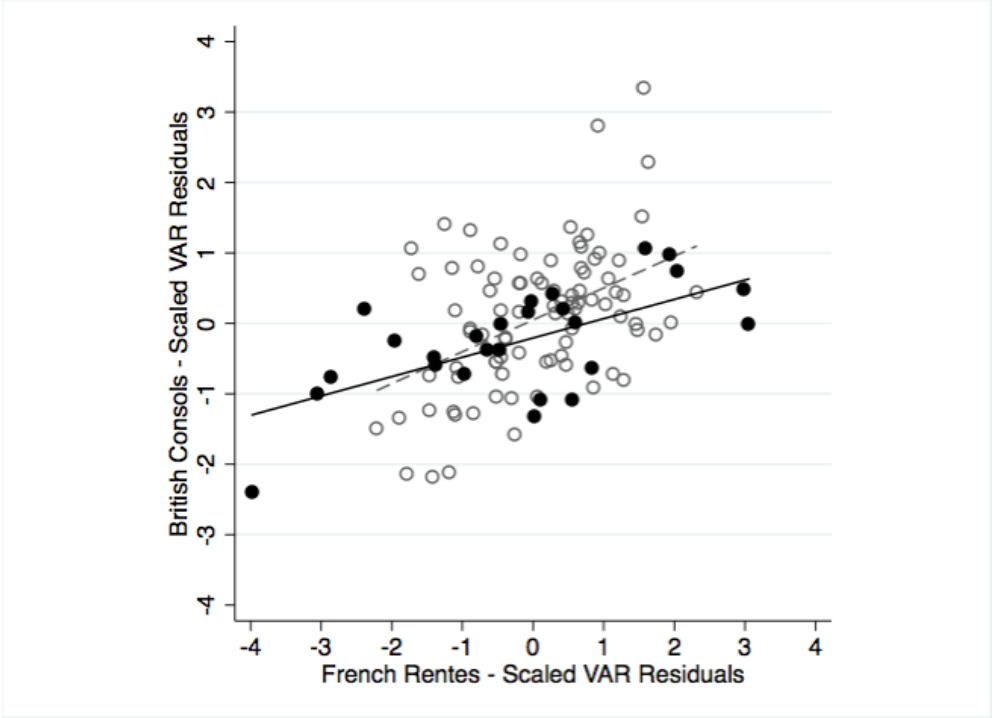


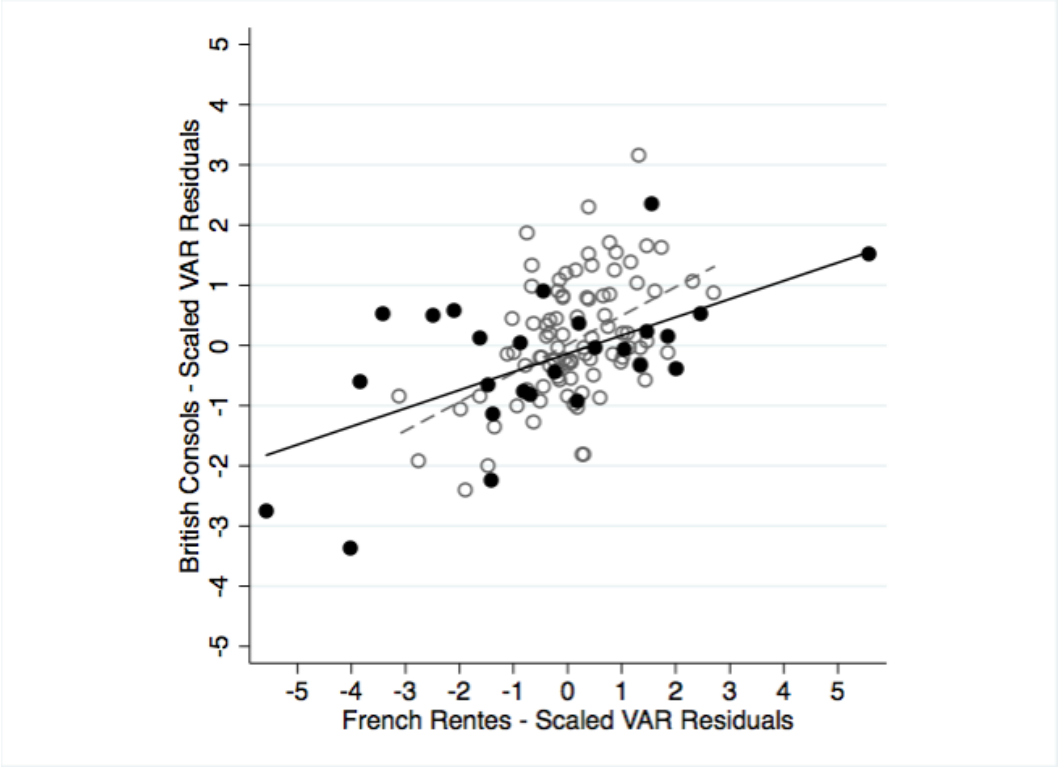
Figure E2 presents the relationship between the residuals of Consols and French Rentes (scaled by their standard deviation from the non-crisis period) obtained from our VAR model. The black dots correspond to observations from the crisis period, while the gray hollow circles correspond to those from the non-crisis period. The solid black line is the least-squares regression line for the observations corresponding to the crisis period, while the gray dashed line is the least-squares regression line for the non-crisis period.

Figure E2: Contemporaneous Propagation of Shocks



The estimated coefficients associated with the residuals of French *Rentes* are positive and statistically different from zero: 0.274 (z-score 3.62) and 0.453 (z-score 3.93) for the crisis and non-crisis periods, respectively. Visual inspection confirms that the non-crisis period's slope is steeper than the one for the crisis period. A test of the equality of the slope parameters of the crisis versus the non-crisis periods, however, indicates that the null hypothesis that both coefficients are statistically similar cannot be rejected at conventional levels (p-value=0.195). Figure E3 shows the results of a similar exercise generated using the model specification that minimizes the goodness-of-fit of VAR model.

Figure E3: Contemporaneous Propagation of Shocks



F Risk Decomposition

Table F1: Consol Excess Risk

3% Reduced Annuity	0.361^{***}
	(0.123)
Crisis Period	0.533^{***}
	(0.084)
Constant	0.647^{***}
	(0.143)
R^2	0.58
Observations	37

Robust standard errors in parentheses. $*$ indicates significance at a 10% level; $**$ indicates significance at a 5% level; $***$ indicates significance at a 1% level.

The dependent variable is the Consols' time-varying β_c coefficient estimated using the procedure described on pp. 21-22 of the manuscript. The variable *3% Reduced Annuity* is the time-varying β coefficient for this security estimated using the procedure described on pp. 21-22 of the manuscript. The variable *Crisis Period* takes the value of 1 for the period between July 1830-March 1832, and zero otherwise. The estimated β coefficient of the 3% Reduced Annuities throught this period is 1.059 (see Figure F1 below). Therefore, according to the results presented in Table F1, we should expect $\hat{\beta}_c = 0.647 + 0.361 * 1.059 = 1.029$ when *Crisis Period*=0; and $\hat{\beta}_c = 0.647 + 0.533 + 0.361 * 1.059 = 1.562$ when when *Crisis Period*=1.

Figure F1: 3% Reduced Annuities Excess Risk (1826-1835)

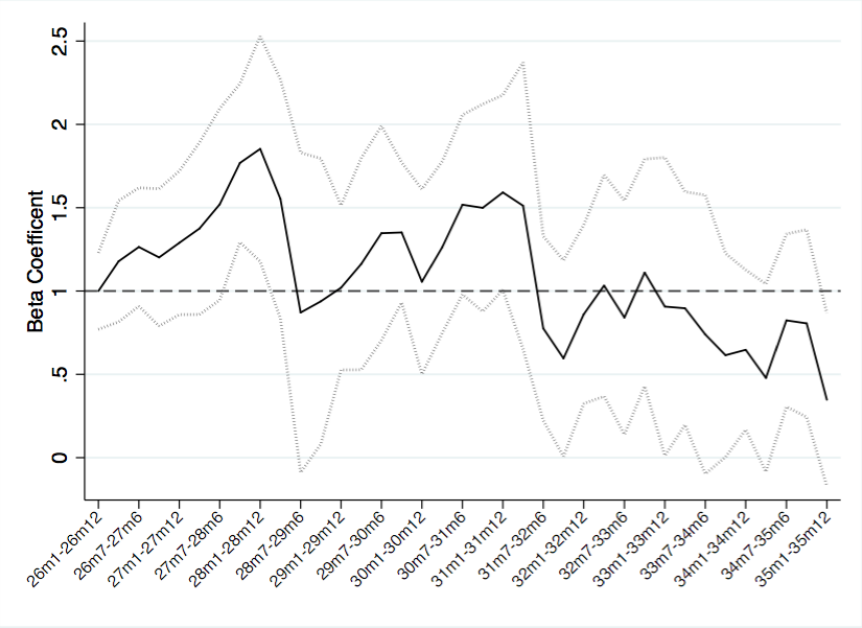
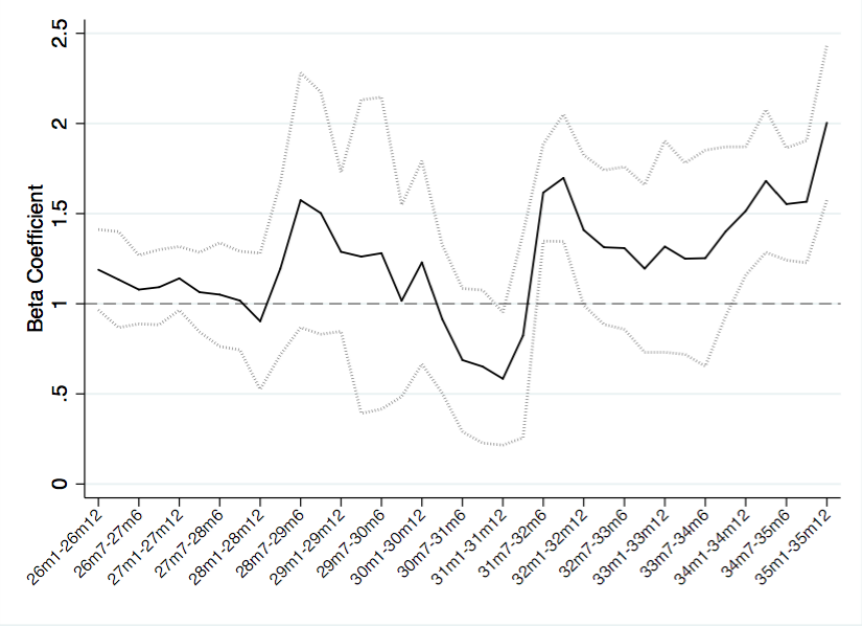


Figure F2: Bank of England/East India Company Excess Risk (1826-1835)



G Largest Movements in Consol Prices

Table G1: Largest Movements in Consol Prices, 1830-1832

Positive Returns		
Date	Change	Main reason given in Money Market and City Intelligence Account
10 Nov. 1830	3.69	Market acknowledges "groundless fear"/Ministry's determination to remain in power
9 May 1831	1.83	Peace in Europe/Success of Reform Bill
11 Nov. 1830	1.79	Rebound from previous days
8 Sept. 1830	1.48	State of affairs in France
11 Apr. 1831	1.41	Rise in French Funds
12 Jan. 1832	1.38	Good news on Belgian Treaty
25 Mar. 1831	1.36	"... better prospects at home and abroad ..."
24 Mar. 1831	1.29	"... difficult to say what is the real cause ..."/Opposite reactions to Reform Bill vote
5 Apr. 1831	1.28	" ... confidence ... on the subject of reform ..."/Peace in Europe
9 Nov. 1830	1.10	Explanation of Royal visit to London/End of panic
Negative Returns		
Date	Change	Main reason given in Money Market and City Intelligence Account
8 Nov. 1830	-2.19	Postponement of King's visit to London/Tranquility could not be guaranteed
4 Sept. 1830	-1.98	"... still without any definite cause ..."
4 Nov. 1830	-1.68	Rumours of Wellington resignation/Monetary Policy
3 Nov. 1830	-1.65	Negative reaction to King's speech regarding Belgium
4 Aug. 1831	-1.53	State of affairs in France/State of affairs in Holland
20 Oct. 1830	-1.48	"... no obvious cause ..."/Rumor: military assistance to Dutch
19 Oct. 1830	-1.46	Bullish speculators/State of affairs in Ireland
30 Aug. 1830	-1.38	Events in Brussels
6 Aug. 1831	-1.24	Conflict between Dutch and Belgian Troops
16 Nov. 1830	-1.19	Fall of Wellington/Liberal administration may tax Funds

Dates corresponding to the time when the Swing riots were at the height of their activity (August 1830-February 1831) are highlighted in bold.

H Political Uncertainty and Consol Prices

Table H1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Daily Change in Price	-.008	0..411	-2.19	3.69
Swing Riots	8.125	36.868	0	228
Contentious Gatherings	59.892	80.457	0	371
Reform Bill Vote	0.022	0.149	0	1
Elections	0.085	0.279	0	1
Government Turnover	0.003	0.057	0	1
Foreign News	0.130	0.336	0	1
Settlement	0.027	0.159	0	1
Shutting	0.186	0.389	0	1

Table H2: Unit Root Tests

	Augmented Dickey-Fuller				
	Test	Critical Values			Conclusion
	Statistic	(1%)	(5%)	(10%)	
$Z(t)_t$	-26.766	-3.960	-3.410	-3.120	Reject
$Z(t)_m$	-26.720	-3.430	-2.860	-2.570	Reject
$Z(t)$	-26.724	-2.580	-1.950	-1.620	Reject
	Phillips-Perron				
$Z(t)_t$	-26.605	-3.960	-3.410	-3.120	Reject
$Z(t)_m$	-26.564	-3.430	-2.860	-2.570	Reject
$Z(t)$	-26.570	-2.580	-1.950	-1.620	Reject

Notes: The null hypothesis is that the series contains a unit root. MacKinnon (1991) critical values. $Z(t)_t$: model with trend and a constant term; $Z(t)_m$: model with a constant term; $Z(t)$: model with no constant and no trend.

Table H3: Semi-Parametric Tests of Fractional Integration

Geweke/Porter-Hudak								
Power	Ords	Est d	StdErr	t(H_0: d=0)	$P > t$	Assym. SE	z(H_0: d=0)	$P > z$
0.4	16	0.462	0.241	1.921	0.077	0.219	2.109	0.035
0.45	22	0.094	0.199	0.470	0.644	0.175	0.533	0.594
0.5	31	0.047	0.148	0.318	0.753	0.140	0.335	0.737
0.55	43	0.072	0.122	0.589	0.559	0.114	0.629	0.530
0.6	61	0.026	0.107	0.242	0.810	0.093	0.278	0.781
Philips								
Power	Ords	Est d	StdErr	t(H_0: d=0)	$P > t$		z(H_0: d=1)	$P > z$
0.4	15	0.891	0.160	5.568	0.000		-0.658	0.511
0.45	21	0.565	0.167	3.392	0.003		-3.110	0.002
0.5	30	0.474	0.139	3.400	0.002		-4.490	0.000
0.55	42	0.378	0.110	3.439	0.001		-6.282	0.000
0.6	60	0.270	0.101	2.659	0.010		-8.824	0.000
Robinson								
Power	Ords	Est d	StdErr	t(H_0: d=0)	$P > t$			
0.4	15	0.462	0.241	1.921	0.073			
0.45	21	0.093	0.199	0.470	0.643			
0.5	31	0.055	0.142	0.386	0.702			
0.55	43	0.050	0.120	0.416	0.679			
0.6	61	0.069	0.112	0.616	0.540			

Table H4: Political Uncertainty and Consol Prices
Time window of Swing riots/contentious gatherings: 15 Days

	Consol Returns			
Swing Riots	-0.000	-0.000		
	(0.001)	(0.001)		
Contentious Gatherings	0.001**	0.001**		
	(0.000)	(0.000)		
Reform Bill Vote	-0.026	-0.024		
	(0.049)	(0.052)		
Volatility			0.101	
			(0.120)	
Constant	-0.015	-0.015	-0.014	-0.015
	(0.011)	(0.011)	(0.014)	(0.010)
	Consol Volatility			
Swing Riots		0.001	0.001	0.000
		(0.004)	(0.004)	(0.001)
Contentious Gatherings		0.002	0.003	0.000
		(0.002)	(0.002)	(0.000)
Reform Bill Vote		-0.198	-0.119	-0.008
		(1.491)	(1.307)	(0.217)
Elections	0.740*	0.647	0.713*	0.127**
	(0.420)	(0.442)	(0.427)	(0.064)
Government Turnover	2.915***	2.587***	2.752***	0.845**
	(0.571)	(0.670)	(0.640)	(0.348)
Foreign News	2.318***	2.200***	2.146***	0.459***
	(0.305)	(0.345)	(0.350)	(0.169)
Settlement	2.180***	2.063**	2.025**	0.363
	(0.781)	(0.847)	(0.815)	(0.299)
Shutting	-0.144	-0.162	-0.151	-0.061
	(0.326)	(0.332)	(0.326)	(0.044)
Constant	-4.878***	-4.809***	-4.793***	-0.378***
	(0.416)	(0.428)	(0.410)	(0.129)
ARCH(1)	0.186***	0.186***	0.185***	-0.102***
	(0.045)	(0.047)	(0.047)	(0.032)
EARCH(1)				0.291***
				(0.082)
GARCH(1)	0.686***	0.676***	0.673***	0.855***
	(0.058)	(0.062)	(0.061)	(0.050)
Observations	922	922	922	922

Robust standard errors in parentheses. $*$ indicates significance at a 10% level; $**$ indicates significance at a 5% level; $***$ indicates significance at a 1% level.

Table H5: Political Uncertainty and Consol Prices
Time window of Swing riots/contentious gatherings: 7 Days

	Consol Returns			
Swing Riots	-0.001	-0.001		
	(0.001)	(0.001)		
Contentious Gatherings	0.001***	0.001***		
	(0.000)	(0.000)		
Reform Bill Vote	-0.027	-0.025		
	(0.047)	(0.055)		
Volatility			0.093	
			(0.121)	
Constant	-0.016	-0.016	-0.013	-0.015
	(0.010)	(0.010)	(0.014)	(0.010)
	Consol Volatility			
Swing Riots		0.002	0.002	0.001
		(0.009)	(0.009)	(0.001)
Contentious Gatherings		0.001	0.004	0.001
		(0.005)	(0.005)	(0.001)
Reform Bill Vote		-0.415	-0.142	0.028
		(1.752)	(1.531)	(0.211)
Elections	0.737*	0.722*	0.768*	0.130**
	(0.410)	(0.426)	(0.419)	(0.063)
Government Turnover	2.781***	2.689***	2.751***	0.803**
	(0.604)	(0.844)	(0.784)	(0.343)
Foreign News	2.322***	2.295***	2.212***	0.461***
	(0.299)	(0.337)	(0.342)	(0.175)
Settlement	2.193***	2.151***	2.102***	0.383
	(0.764)	(0.820)	(0.796)	(0.295)
Shutting	-0.127	-0.122	-0.125	-0.055
	(0.322)	(0.334)	(0.330)	(0.042)
Constant	-4.868***	-4.842***	-4.837***	-0.361***
	(0.416)	(0.448)	(0.424)	(0.127)
ARCH(1)	0.185***	0.187***	0.183***	-0.098***
	(0.045)	(0.046)	(0.046)	(0.031)
EARCH(1)				0.282***
				(0.083)
GARCH(1)	0.684***	0.680***	0.681***	0.862***
	(0.059)	(0.063)	(0.061)	(0.049)
Observations	922	922	922	922

Robust standard errors in parentheses. $*$ indicates significance at a 10% level; $**$ indicates significance at a 5% level; $***$ indicates significance at a 1% level.