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ABSTRACT

We analyze how secession movements unfold and the interdependence of regions' decisions to secede. We first model and then empirically examine how secessions can occur sequentially because the costs of secession decrease with the number of seceders and because regions update their decisions based on whether other regions decide to secede. We verify the existence of these "domino secessions" using the canonical case of the secession of southern U.S. states in the 1860s. We establish that financial markets priced in the costs of secession to geographically-specific assets (state bonds) after Lincoln's election in the fall of 1860 – long before war broke out. We then show that state bond yields reflect the decreasing costs of secession in two ways. First, as the number of states seceding increased, yields on the bonds of states that had already seceded fell. Second, seceding states with more heterogeneous voters had higher risk premia, reflecting investors beliefs that further sub-secession was more likely in these locations.

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1 Introduction

By their very nature, secession movements are highly uncertain, often unfolding over months or even years. Potential seceding regions use the arrival of information to reassess the prospect of a movement's success and to update their decisions on whether to participate. This reassessment may include news linked to the probability that other regions choose to secede. However, secession is often modeled *ex ante* – before any actual secession has occurred (Gehring and Schneider, 2020; Hierro and Queralt, 2021; Walter, 2021) or *ex post* – once all information has been accessed and coordination on this information has taken place (Alesina and Spolaore, 1997; Suesse, 2019; Desmet et al., 2022). Because these approaches compress time, they fail to capture the uncertainty over the decision on whether a region chooses to secede and how that decision might depend on time-varying factors, including the decision of other regions to participate.

In this paper, we examine how interdependence influences the size and shape of secession movements. We consider how the arrival of information about other regions' preferences to secede can change the costs and benefits of secession for all potential seceding regions, making the size (number of regions participating) and shape of the movement (whether they secede alone, all at the same time, or sequentially) endogenous. We utilize region-specific asset prices to examine secessions in real time and to test whether financial markets price in three factors shaping secession movements: (1) the probability of secession; (2) the interdependence between regions; (3) and the degree to which preferences are heterogeneous within seceding regions.

Interdependence between seceders may foster secession by raising the viability of the outside option (expanding the resources available for the new nation and reducing per-region costs) or by strengthening the bargaining position of seceders (Esteban et al., 2022). It could also increase the support for secession within regions that are considering secession, but have yet to do so (Walter, 2021). Information about participation thus plays a crucial role in secession movements. We employ a simple theoretical framework to illustrate how "news" about the distribution of preferences between and within regions shape secession movements if decreasing costs of secession are expected. These costs of secession include the difference in economies of scale, the relative viability of the newly created polity versus the existing polity, and/or potential retaliation from the existing polity. All these components are expected to decline with the number of regions seceding, so the overall costs of secession potentially also decrease with the number of seceders. *Ex ante*, regions do not know with certainty how many and which other regions will secede. Rather, they use all available information throughout the secession process (including any evolution in the viability of the outside option) to update

their priors. Expectations then drive whether regions secede. As emphasized in Meadwell and Anderson (2008), some regions condition their decision to secede on the action of others. The size and shape of the seceding polity are thus endogenous and can vary over time. In our framework, secessions can occur all at once, in a limited fashion (e.g., with only one region defecting), or in an interdependent manner, where a secession leads to further regions seceding – what we call "domino secessions." It is possible to use this typology to analyze secessions around the globe.[1]

Domino secessions are quite common in history, and they have also left an imprint on the modern world.[2] For example, the progressive dissolution of the USSR generated fractionalized polities (Suesse, 2018). The strategic interactions between regions and their representatives led to many proclamations of independence that were followed by the merger of several seceding polities to eventually create larger ones. Current events also illustrate how preferences about secession are updated in response to decisions of other regions and polities. For example, the decision of the United Kingdom to leave the European Union increased support for other countries to exit the EU (Walter, 2021). This decision also led to a re-assessment of the viability of the UK by some of its regions, most notably Scotland, which opposed exit from the EU.

If secession movements are not instantaneous, how can we evaluate the dynamic properties emphasized in our modeling framework? Doing so requires data that allow for the updating of beliefs and assets that are directly tied to specific regions. We demonstrate how bonds issued by regions, provinces, and states (often, though not always called "sub-sovereign debt") are particularly useful for understanding the dynamics of secessions since (1) they mirror real-time information and (2) financial market participants use this information to assess the riskiness of assets that are directly associated with seceding entities. When it comes to empirically modeling the realization of beliefs that get updated over time, the high-frequency nature of financial market data (like sub-sovereign debt) is hard to match using other types of region-specific economic data. And since regions and polities often issue debt, bond market data, in particular, provide a way of capturing a real-time assessment of the costs and benefits of secession, at least from the asset-holders' perspective. Geographically-specific bonds are of particular value for exploring secession since, per our model, they allow the researcher to

[1] See Appendix C.1 for a simplified exposition. As discussed in section 2, the time dimension allows one to distinguish between synchronous and domino secessions.

[2] The break-up of Gran Colombia provides an example of secession with these features. The Federal Republic of Central America represents another example. It was created in the wake of the wars of independence from Spain and entered into a civil war in 1838. Nicaragua, Costa Rica, Honduras, and eventually El Salvador declared their independence, leaving Guatemala and Los Altos in a union. Los Altos was eventually partitioned between Guatemala and Mexico. During the following decades several attempts were made to reconstruct a union. The third attempt united Honduras, Nicaragua, and El Salvador in a state named the Greater Republic of Central America which lasted from 1896 to 1898.

examine whether markets perceive any differences in risk if regions are threatening to secede and when such risks get priced into their bonds. Further, they allow the researcher to examine whether those risks change as other regions secede and whether markets distinguish in the degree to which a region "supports" a secession movement (within region hetereogeneity). Despite their desirable properties, to the best of our knowledge, such bonds have thus far not been utilized to study the dynamics of secession movements.

To do so, we assemble new, hand-collected weekly data on bonds issued by U.S. states from the New York Stock Exchange's archives, which we use to consider the canonical case of the secession of Southern states from the U.S. in the 1860s and examine several hypotheses that our theoretical framework poses. First, we assess whether northern and southern state bond yields diverged, and if so, when. The timing of divergence indicates when markets priced in secession risk. We find no evidence that events between 1857 and the summer of 1860 led to a divergence. Rather, our results suggest that it was Lincoln's election in the fall of 1860 that signaled to markets that secession was a strong possibility. Our empirical analysis show that yields to maturity on non-northern state bonds (i.e., bonds of southern and border states) increased by between one and four percentage points after Lincoln's election but *prior to* his taking office. In other words, bond markets were forward looking and began to price in secession risk well before Lincoln announced any new policies regarding the future of slavery in the U.S. Yields also diverged well in advance of any "shots being fired" – that is, prior to military actions such as the bombing of Fort Sumter (April 1861), an event indicating that southern states were willing to use any means necessary for securing a new polity. This event further increased the divergence between southern and northern bonds.

Second, we use our yield data and the dates when states passed ordinances of secession to test whether markets viewed these as meaningful policy actions that signaled their willingness to secede from the Union. Our empirical results show that yields rose by an additional four percentage points (on average) at the time a state passed an ordinance of secession. Further, we use the variation in the timing of secession ordinances to test the extent to which the secession of other states mattered. This allows us to capture the uncertainty regarding the final size and shape of the secession movement and how secession ordinances resolved part of this uncertainty. Regression estimates imply that the yields on southern bonds for states that had already seceded decreased as the number of states seceding increased. Financial markets appear to have interpreted increased state participation in the secession movement as increasing the likelihood that it would be successful. It may also have reflected the notion that increased participation would strengthen the viability of the seceding entity by decreasing the costs of secession. Yields for states that already seceded fell by 45 basis points for each additional state that joined the Confederacy. By contrast, as states exited the union,

yields on *U.S. government debt* rose: the tax base for paying off existing debts of the federal government decreased as the size of the union shrunk.

Finally, the support for secession ordinances differed across states. Election results provided a signal to markets on the share of the population favoring secession, a proxy of the risk of further splintering. Our results show that seceders facing more opposition against secession faced higher yields to maturity on their state bonds. We validate that further dissolution is always a possible outcome when within-region preferences are heterogeneous by examining the case of Virginia – a state that used votes from a convention of party elites to make the decision to exit the Union. It took less than a year for the northern and western counties of the state to secede from Virginia and form a new state – a result that raised the risk premium on Virginia's state bonds.

Our research contributes to the existing literature in several ways. Theoretical models have explored a variety of determinants of secession, including cultural differences (Desmet et al., 2011, 2022), differences in income distributions (Bolton and Roland, 1997), resource booms (Gehring and Schneider, 2020), and trade (Alesina and Spolaore, 2005; Friedman, 1977). Alesina and Spolaore (1997) provide a general cost-benefit framework for understanding why two regions might split and where the size distributions of jurisdictions is endogenized. A larger polity lowers the per capita cost of providing public goods and provides for more efficient taxation, larger internal markets, and greater diversification against shocks, but these benefits from economies of scale must be weighed against the costs of divergent preferences over culture, policy, or some other factor, which can also scale with size.[3] We build on this framework using a model and empirical setting that allows for the secession of multiple regions, and thus explore the possibility that regions take into account the decision of other regions when considering secession.

Another recent strand of the literature on secession emphasizes the bargaining between the state and the seceding region (Esteban et al., 2022). We contribute to this branch by examining whether strategic interactions affect the gains of secession dynamically. In our framework, regions can update their beliefs about the benefits of the outside option relative to staying in a union, and do so in reference to other regions' choices. We focus on heterogeneity within seceding regions and between seceding regions and time-varying gains from secession, and we pioneer the use of state bonds to test whether financial markets incorporate these strategic considerations into the risk of secession.

Finally, our paper relates to a literature that utilizes asset prices to shed light on civil

[3]Related research examines what happens to secession risk when states offer "carrots" or accommodation to remain within a union (Anesi, 2012; Anesi and De Donder, 2013). Bolton and Roland (1997) suggest that fiscal accommodation may not be sufficient to prevent secession and that federal constitutions may reduce secession risk in instances where fiscal competition between two autonomous regions is relatively small.

wars. Financial assets are known to aggregate opinions and have been used in the context of the U.S. Civil War to assess the outcomes of wars and pivotal events during them. As in our paper, one branch utilizes data from bond markets. Federal bonds and Confederate bonds are used to assess what financial markets deemed as "turning points" and key battles during the Civil War (Burdekin and Weidenmier, 2001; Weidenmier, 2002; McCandless, 1996; Willard et al., 1996; Davis and Pecquet, 1990; Brown and Burdekin, 2000). Our paper complements this research by drawing attention to the events *prior* to the outbreak of war and focusing on the secession process. Another branch of the U.S. Civil War literature has relied on data from slave market transactions from Southern cities. Using this approach, Calomiris and Pritchett (2016) argue that Lincoln's nomination, Lincoln's election, and the Battle of Bull Run had an adverse effect on slave prices in the New Orleans slave market.[4] Using sub-sovereign or state bonds traded in a *northern* financial market, we affirm their findings that Lincoln's election and the Battle of Bull Run affected Southern assets prices. However, the focus of our research differs in that we analyze whether markets perceived border and southern states as having different secession probabilities and model the evolution of secession movements. In doing so, we draw attention to the sequential nature of secession, a feature of the American Civil War that has not yet been analyzed using asset prices of any type.

2 Framing Domino Secessions

2.1 Theoretical Insights

In this section, we use a simple, sequential game to define secession movements and relate them to the pricing of region-specific assets. Our framework consists of two parts: (1) regions represented by an agent deciding whether to secede and (2) financial markets assessing "secession risk." In our model, the size of the seceding polity is unknown *ex ante*. During the secession process, the number of participating regions can change as a result of the arrival of new information which, in turn, influences the pool of seceders. The framework highlights the importance of new information that affects expectations regarding the gains of secession. We then describe how the updating of expectations is reflected in the pricing of region-specific assets.

2.1.1 Definition of the New Polity – Regions' Decision to Secede

Regions form polities based on opposing forces. *Forces of attraction* bind regions through economies of scale while *forces of repulsion*, driven by diverging preferences, push existing

[4]See Hallwood (2017) for a critique of their use of slave prices to make such inferences.

polities apart. In each region a representative agent considers these two forces and decides whether to secede.[5] To fix ideas, we define n potentially seceding regions which have preferences that differ from the policies decided in the existing polity or "the core." We denote the distance in preferences between a region j and the core as ω_j with $\omega_j \in \mathbb{R}_+$. We rank the regions such that $\omega_1 \geq \omega_2 \geq ... \geq \omega_n$.

Seceding regions expect costs associated with secession that are represented by the discrete function $c(s)$ known to all actors, where s is the number of regions in the breakaway polity. This function encompasses all costs related to the secession and reduced realized economies of scale if a region decides to leave the core. The breakaway polity is defined as the "outside option," with preferences set to k and $k > 0$. In other words, the breakaway polity defines itself in some fundamental, programmatic way that is distinct from the core. Regions then decide whether to ascribe to the alternative program offered by the outside option.[6] The benefits of seceding equal the difference between the distance to the core and the distance to the potential new polity (for region j, $g_j = \omega_j - |\omega_j - k|$ so $g_j \in (-k; \omega_1)$). The benefits of secession follow the ranking of ω:

$$g_1 \geq g_2 \geq g_3 \geq ... \geq g_n. \tag{1}$$

Representative agents of each region use all available information and decide to secede iff:

$$c(s) < g_j. \tag{2}$$

During each sequence of the game, the following steps occur: (1) Some information is revealed on the number of regions that have seceded previously, s. Then, $c(s)$ is updated. (2) Regions decide whether to secede. The sequence ends and the information on s is then updated in the first step of the next sequence. The game ends when there is no more secession.

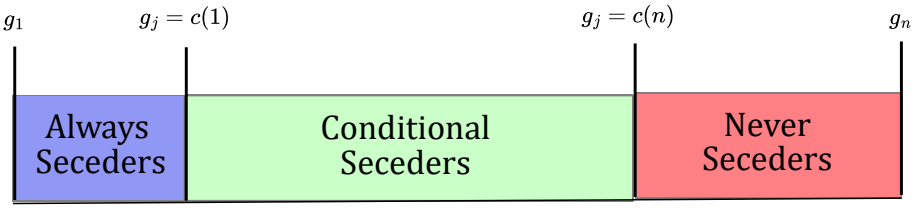
Given the structure of the game, each region belongs to one of the three distinctive groups presented in Figure 1 : (1) *Always Seceders* whose expected benefits of seceding are greater than $c(1)$; (2) *Conditional Seceders* or regions that secede depending on the actions of other regions and whose expected benefits of seceding are between $c(n)$ and $c(1)$; and (3) *Never Seceders* whose expected benefits are smaller than $c(n)$. As soon as a region belongs to *Always Seceders*, then a secession movement starts. The final participants of a secession movement are ex ante unknown to regions as they only have information on their

[5] We model regions' decisions in line with the literature. (See Esteban et al. (2022).

[6] Another possibility is to define preferences as a weighted average of the regions that are either in the breakaway polity or in the core. In this case, our model leads to two types of Bayesian updating: one concerning the costs and one concerning the preferences. Then, the dynamics arise from updating both the changing preferences of the polities (as regions secede) as well as the updating regarding the costs of seceding.

own preferences and their perception of costs given by the series $c(s)$. Depending on the structure of the costs, the secession movement can take different forms.

Figure 1: Regions, Preferences and Secession



Proposition 1 (**Domino Secessions**). *With large economies of scale, domino secessions occur. Region j secedes iff region $j-1$ secedes as it reduces the costs of secession.*

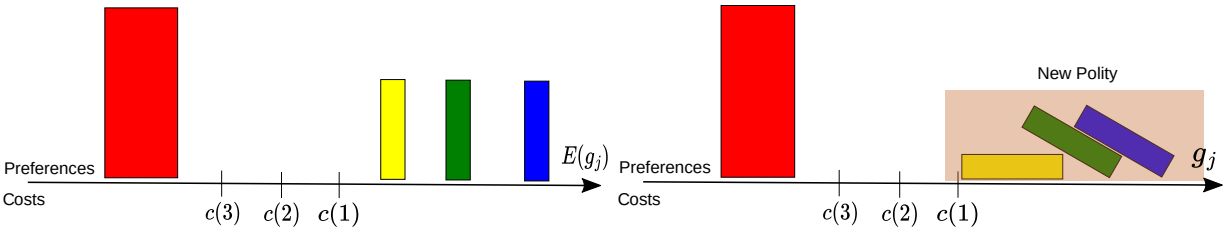
Proof. See Appendix A.1 □

Secession dynamics are determined by the updating of information, with the exact pattern of the secession movement (i.e., which regions participate) depending on how information changes the perception of costs ($c(s)$) and benefits (distribution of g_j). Secession movements can take different forms: (1) *solo secessions*, when a region's secession is not followed by additional regions seceding; (2) *synchronous secessions*, when multiple regions secede simultaneously; and (3) *domino secessions*, when differences in preferences are large enough that all regions do not secede at the same time but also small enough so that the update in cost is sufficient to trigger further secessions.

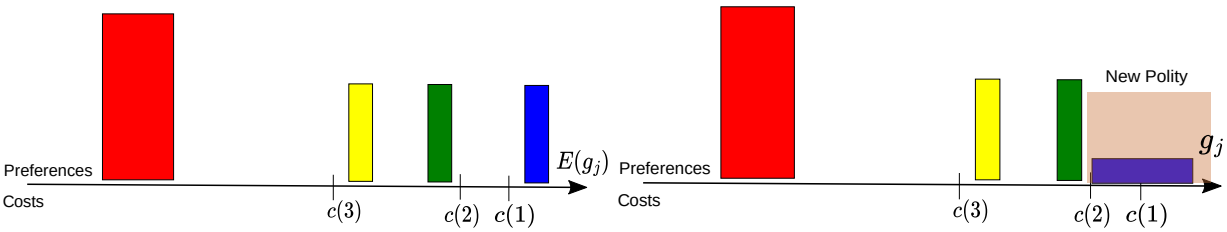
We represent these different forms of secession movements in Figures 2 and 3. In these Figures, each domino is a region. The red larger domino is the core. The regions may be placed on an axis representing their preferences. The value attributed to the expectations regarding the benefits of seceding may then be compared to the values of the function $c(s)$. Hence, the axis may be read as: "given its preferences, region j would secede iff there are x regions in the new polity" with x being the value associated with the first tick on the left of region j. In Figure 2a, the potentially seceding regions have similar preferences. As a consequence, they secede simultaneously without having to observe if they could form a larger breakaway state with another region: synchronous secessions. In Figure 2b, regions differ substantially in terms of preferences so that the secession of the first region does not lead to further secession: a *solo secession* occurs.

Figure 3 illustrates domino secessions. If $g_1 > c(1)$, then in the first sequence of the game, region 1 (blue) secedes. This region's secession induces other regions to update their beliefs about whether to join region 1 and exit the core. If region 1 and region 2 are sufficiently similar, then region 2 updates its expectations and joins region 1 even if it would never have

Figure 2: Secession and the Outside Option – Secession in One Step



(a) Example of Synchronous Secessions - The left figure shows the situation before the game is played. The right figure shows the outcome of the secession movement: all regions secede at the same time. The game ends after one sequence.



(b) Example of Solo Secession - The left figure shows the situation before the game is played. The right figure shows the outcome of the secession movement: only the blue region secedes. The game ends after one sequence.

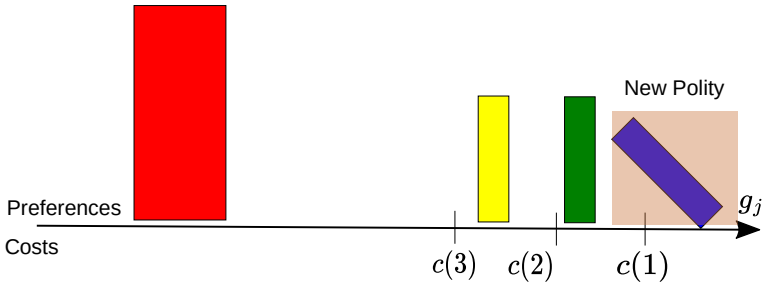
Note: Red represents the core. Blue, green, and yellow represent potentially seceding regions 1, 2, and 3, respectively. The x-axis represents the costs for $s = 1$, $s = 2$ and $s = 3$ and compares it to the value of g_1, g_2, g_3. Depending on how close potentially seceding regions are, different patterns of secessions may occur for the same value of g_1.

seceded by itself. In that case, region 2 secedes only because it benefits from lower costs than in an individual secession. Later in the game, other regions who have yet to secede will consider similar trade-offs. As a result, a domino pattern to a secession movement can occur.

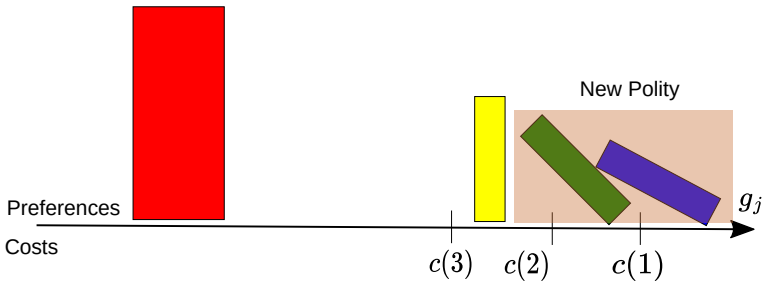
Domino secessions occur even if we relax the assumption that seceder $j-1$ joins the polity formed by the j regions having a higher g. Relaxing this assumption just suppresses an additional *force of attraction* that would make secession more likely for some states. In that case, the costs of seceding decrease as the core becomes smaller due to the secessions of other regions. If previous secessions dramatically reduce economies of scale with the core, then a region may secede by itself even without realizing the economies of scale of joining a new coalition with other seceders. A region secedes if $\omega > c'(s)$, with $c'(s)$ being an alternative discrete cost function accounting for shrinkage of the core. This case emerges when the costs decrease faster than ω and yet the preferences of seceders are not so close as to compel seceders to stick together.[7]

[7]The dissolution of the USSR is an example illustrating such dynamics. Independent Republics did not "stick together." Yet the secessions of some Republics created momentum for other secessions as the USSR became weaker.

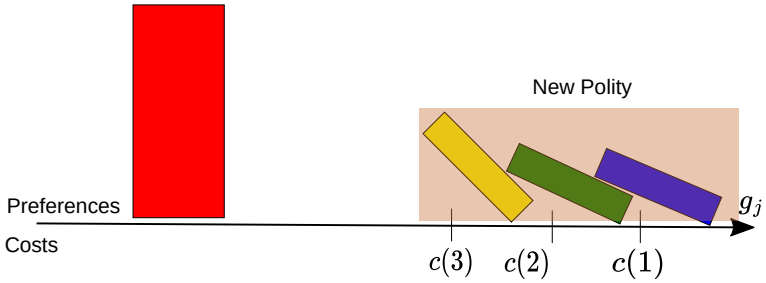
Figure 3: Secession and the Outside Option – Secession in several steps: domino secessions



(a) Sequence 1: The blue region secedes as it gets information on its distance to the core.



(b) Sequence 2: The green region joins the blue region and secedes.



(c) Sequence 3: The yellow region joins the two other regions and secedes.

Note: Red represents the core. Blue, green, and yellow represent potentially seceding regions 1, 2, and 3, respectively. The x-axis represents the values of the costs for $s = 1$, $s = 2$ and $s = 3$ and the values of $\omega 1$, $\omega 2$, $\omega 3$ to facilitate their comparison.

As a secession movement unfolds, some members of a seceding region may also challenge the decision to secede.[8] So far, we have associated regions with something akin to American states, however one can imagine a different structure, where regions are "groups." Groups would then consist of factions within a region or some smaller geographical unit. We can therefore extend our model to consider that a group $j-1$ decides on secession according to its preferences for a whole region, R, composed of groups $j-1$ and j. Several regions then follow the decision of a single representative but may organize to reject this change if they

[8]Scotland's position after Brexit nicely illustrates that dynamic (Walter, 2021).

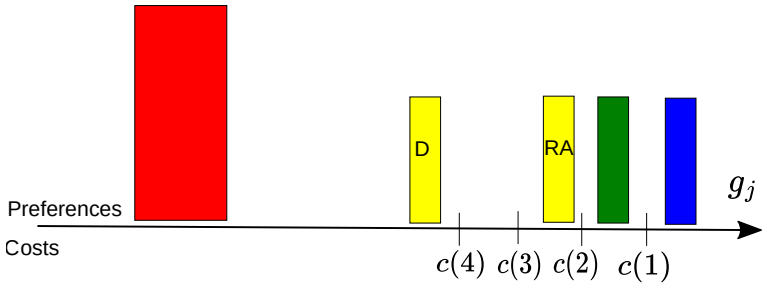
do not benefit from it. The stability of the decision based on g_{j-1} depends on the approval of j.

Proposition 2 (**Sub-Secession**). *With economies of scale, within-region heterogeneity increases the costs of secession.*

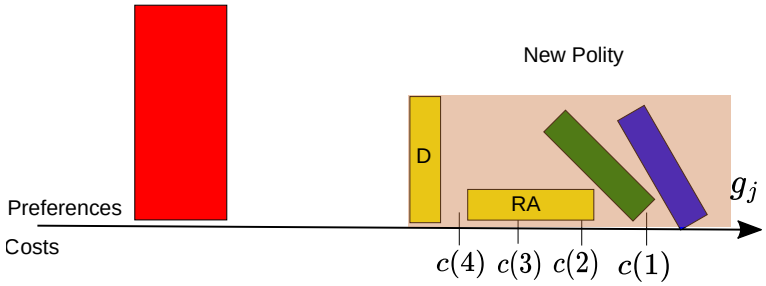
Proof. See Appendix A.2 □

Heterogeneity within a region makes the gains from secession lower as it increases the difference in preferences within the entity. In the situation illustrated in Figure 4, part of the yellow seceding region would be better off staying with the core. This situation could eventually lead to sub-secession (the secession from the seceding polity and a return to the core), resulting in a higher $c(s)$ since part of the region leaves the new polity and returns to the core. Sub-secession would reduce the economies of scale in the new polity.

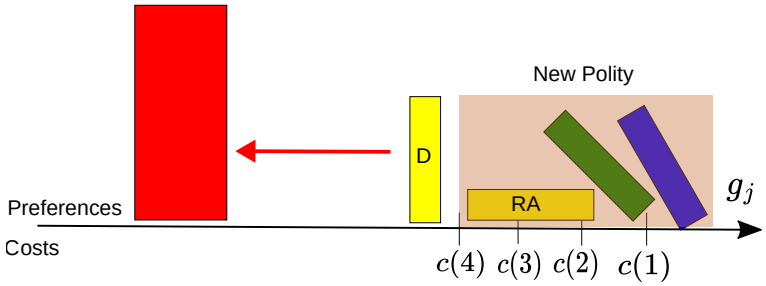
Figure 4: Secession and Within-Region Heterogeneity.



(a) Baseline: The yellow region is heterogeneous. It is composed of two regions: dissenters (D) and representative agent (RA). The decision taken by the RA is applied to the two sub-regions.



(b) First Wave of Secessions: All regions secede



(c) Sub-secession: The dissenting group within the yellow region may want to splinter off from yellow, thereby increasing the costs of seceding for other seceders.

Note: Red represents the core. The green and the blue regions have homogeneous preferences and secede. The yellow region has heterogeneous preferences and is composed of two sub-regions: dissenters (D) and a representative agent (RA).

Proposition 1 and 2 both investigate how the cost structure of secession shapes secession movements. Proposition 1 focuses on the interdependence between seceders while Proposition 2 describes how the stability of the new polity impacts the costs of secession. In both cases, information on others' secession and on the distribution of preferences within seceders directly impacts the decision of representative agents to secede.

2.1.2 Financial Markets – Secession Risk

Financial markets provide a real-time assessment of risk. We relate their ability to price risk to the evolution of secession markets. After each sequence, financial markets reassess the likelihood that each region will secede and the costs of secession. Financial markets then

price these two components into assets, such as state bonds or any other region-specific asset. Financial markets lack perfect information on the distribution of g_j but form expectations to determine the probability that a region secedes $Prob(c(s) < E(g_j))$. They also observe the realization of $c(s)$. Financial markets then price the risk of secession as the probability of seceding (as defined in Equation 2) multiplied by the costs of secession:

$$SecessionRisk = Prob(c(s) < E(g_j)) \times c(s). \tag{3}$$

Once the probability of secession is positive, the expected costs of secession will appear in the decisions of regions as well as in the markets' response to them. Information on the preferences of regions impact the probability of secession and is translated into $Prob(c(s) < E(g_j))$. Equation 3 assumes that market prices and yields incorporate all relevant publicly available information such that, at any point in time, they reflect the expected distribution of regional preferences and the costs of secession. The private information held by representative agents is not available to financial market participants. Proposition 3 assesses how financial markets behave when the probability of secession is positive.

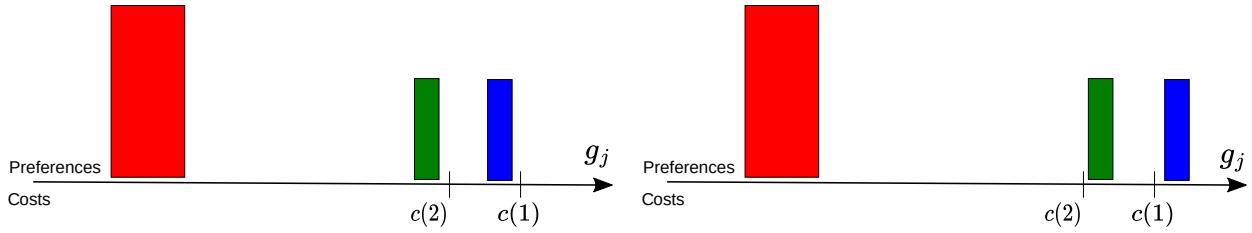
Proposition 3 (**Financial Markets: Secession Risk**). *When financial markets perceive a higher probability of secession for the n regions ($Prob(c(s) < E(g_j))$ increases for all j), then secession risk increases iff economies of scale are low compared to the increased probability of seceding.*

Proof. See Appendix A.3 □

Financial markets reassess secession risk if they observe that the distance between the core and seceders changes. This may arise from policies perceived as more harmful to potential seceders or to new information regarding potential seceders' opposition to these or other policies issued by the core. This information on the distance between potential seceders and the core influences financial markets' assessment of secession risk in two ways. Information increases the probability assigned to the secession of each region and, as a result, also decreases the expected costs of secession. Figure 5 represents this situation. In Figure 5, as expectations regarding the divergence in preferences between the blue region and the core increases, the probability of a secession of the blue region increases – thereby increasing secession risk. However, the green region is also more likely to secede, increasing the probability that the new entity would be larger and thereby reducing $c(s)$ and thus secession risk for the blue region. Which effect prevails depends on the structure of costs and the distribution of preferences between regions.

Once the probability of secession becomes positive, market participants start to price in secession risk. Mirroring regions' decisions, market participants will price in secession if

Figure 5: The Pricing of Secession Risk



(a) Secession risk not priced in (b) Secession risk priced in

Note: Red represents the core. Blue and green represent potentially seceding regions 1 and 2, respectively. As the distance between region 1's preferences and the core's (existing polity) increases, the benefits from secession rise: the cost from the difference in preferences (repulsion force) outweighs the benefits from economies of scale (attraction force).

the distance between potential seceders and the core increases. As a result, the probability that some regions belong to the group of *always seceders* increases. The probability of a secession consequently increases for all potential seceders. Then, the risk premium associated with secession varies with the perceived probability of secession and the expected costs of secession.

During domino secessions, financial markets observe new information and re-assess secession risk. The probability of secession increases as more regions join the breakaway polity or because information on diverging preferences materializes ($Prob(c(s) < E(g_j))$ increases). If economies of scale are not too large and secession becomes more likely, secession risk increases. The secession ordinance of a state creates a discrete jump in the measure of secession risk : $Prob(c(s) < E(g_j))$ will equal 1 even if it was non-null before. Later, the costs of secession decrease as more regions join the breakaway polity. In other words, the costs of secession, $c(s)$, decrease as s increases and $Prob(c(s) < E(g_j))$ stays equal to one.

Financial markets are also forward-looking and assess the expected costs of secession for seceders. After secession, secession risk only varies as a result of changes in the expected size of the new polity.[9] It decreases as more regions join the polity, but increases if markets expect regions to splinter, i.e., sub-secession. As a consequence, the risk of sub-secession is also priced into region-specific assets.

Propositions 1-3 illustrate the importance of information. When there is uncertainty about the preferences of potential co-seceders, Bayesian updating can generate domino secessions. Secessions can beget further secessions. These propositions also show how the consequence of this updating hinges on the structure of costs associated with secession.

[9] After a secession occurs, by definition, the probability of secession is equal to one.

2.2 From Theory to Empirics

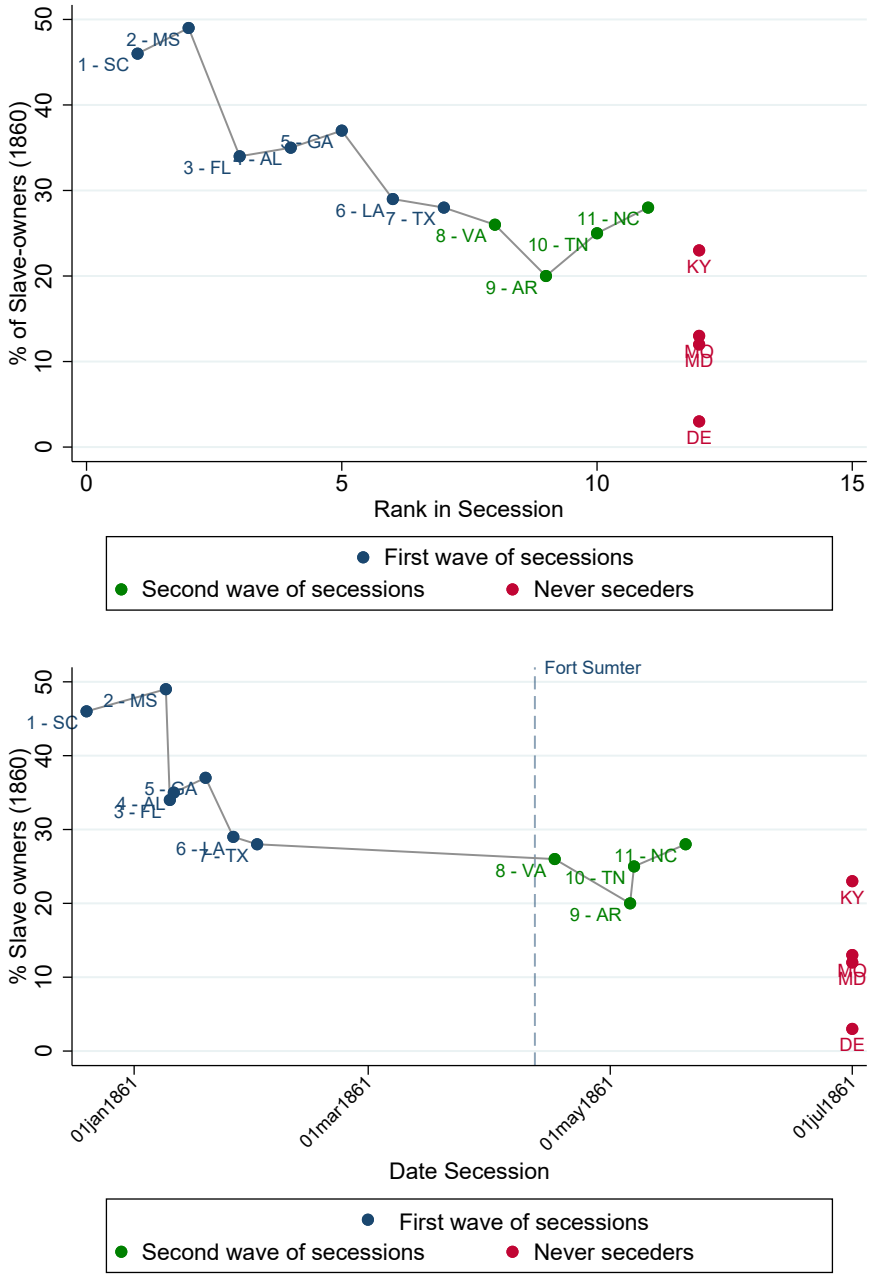
Our framework implies that secession movements start with the most extreme regions (defined as having the largest ω) and then have the potential to diffuse to other regions. To examine this in an empirical setting, we explore whether known differences in preferences predict when and which American states would eventually secede in the 1860s. We focus on states whose populations in 1860 included slaves as potential seceders. Historians have discussed how the maintenance of an economic system based on slavery was a clear and known difference , so according to the model, slaveholding states would have the highest likelihood to secede. Figure 6 displays the proportion of slave owners in a state's population on the y-axis. The x-axis ranks the order of secession based on ordinance dates. The dates for the 11 seceding states are shown in Appendix Table B.1. Each dot is labeled with the slaveholding state's two letter abbreviation as well as its ordinal rank in the secession process, i.e., South Carolina (1-SC) is the first state to secede and North Carolina (11-NC) is the last to do so. The figure's line and the dotes also distinguish between three groups: those seceding between January and February 1861 (blue), those seceding after Fort Sumter (green), and those that never seceded (red).

Figure 6 echoes our framework in two ways. First, early seceders are positioned further away from the core than late movers. All states belonging to the first wave of secessions are part of the "Deep South," and had a higher proportion of slave owners than those in the second wave. States like North Carolina and Virginia had not benefited from the expansion of cotton production and the plantation system in the 19^{th} to the same degree as South Carolina and Mississippi, states that seceded early (Meadwell and Anderson, 2008). Second, Figure 6 nicely illustrates how dispersed preferences (slaveholding ranges from roughly 5% to 50%) influence the types of secessions that occur. Consistent with the model's predictions, the case of the American South includes *always seceders* (SC), *conditional seceders*, and *never seceders*. To further illustrate the utility of this framework in our historical setting, Appendix C.2 briefly discusses Louisiana's decision to secede from the Union.

Our framework also implies that the number of regions seceding is not fixed ex ante. For some regions, the decision to secede depends on the actions of others, something that may only be revealed over time. Because it affects the costs of secession, information on the secession decisions of individual regions (or states) is a key signal that can potentially trigger a sequence of secessions. Financial markets also observe these decisions and can price them into region-specific assets.

In the case of the U.S. in the early 1860s, state-issued debt is well suited to assess the relevance of our framework for three reasons. First, financial markets price sub-sovereign or "state" risk. We argue that as markets update priors on g_j and s, they produce varia-

Figure 6: Preference Heterogeneity and domino secessions in the U.S.



Note: Each dot depicts the position of a state along two dimensions: % slave owners among the non-slave population (1860) (y-axis) and the ordinal ranking of secession (x-xis left panel) or the date of a state's secession ordinance (x-axis right panel). States that do not secede but have slave populations that are ranked last or placed as having seceded on July 1st 1861. Early seceders are shown in blue – those that occurred before Fort Sumter, between January and February 1861. Later seceders are shown in green – these occurred after Fort Sumter, between April-June, 1861. "Never seceders" are indicated in red; they are states with slave populations that ultimately chose not to secede. The line retraces the sequence of secessions linking the first secession to the second, the second to the third and so on until the last secession.

tion in state risk. Our model highlights changes in state risk associated with these costs – "secession risk." Second, our state bond data offer enough granularity to identify different components of state risk emphasized in the model. Actions by regions or states produce information, which markets use to update the result of secession, s, and the distribution of g_j. We hypothesize that some events are signals that reveal information to financial markets about these two parameters. Ideally, one could observe how different regions update these parameters. However, because these are unobservable, state bonds offer an alternative way to observe how beliefs are updated by seeing how financial market traders price "news" into asset prices. That is, as secession affects a state's risk profile, the release of information regarding its secession decision (such as an ordinance declaring secession) may change the markets' assessment of the riskiness of that states' bonds. Moreover, since *conditional seceders* create domino secessions, changes in these assets prices (i.e., empirical data that captures beliefs being updated) is particularly useful for analyzing domino secessions.

We use state bond data to document the model's propositions. To investigate Proposition 3, we identify events (described in the next section) that led to a breakdown in the co-movement of state bonds in the north and south; these events represents markets pricing in the risk of secession. Two events, in particular, led to a divergence in the movements of northern and southern/border states: the election of President Lincoln in November 1860 and South Carolina's occupation of Fort Sumter in April 1861 (Section 4). To test proposition 1, Section 5.1 investigates the evolution of yields for states having seceded.[10] We observe how the secession of other states impacts their yields. Section 5.2 then turns to the existing polity, which by definition has a 0% probability of seceding, but which becomes a smaller polity as states leave the union. We analyze how reduced economies of scale affected yields on U.S. federal bonds. To assess Proposition 2, Section 6.1 examines within-state divergence in preferences to document how bond markets price potential sub-secessions. Section 6.2 considers the specific case of Virginia.

3 Data

3.1 Data on State Bonds

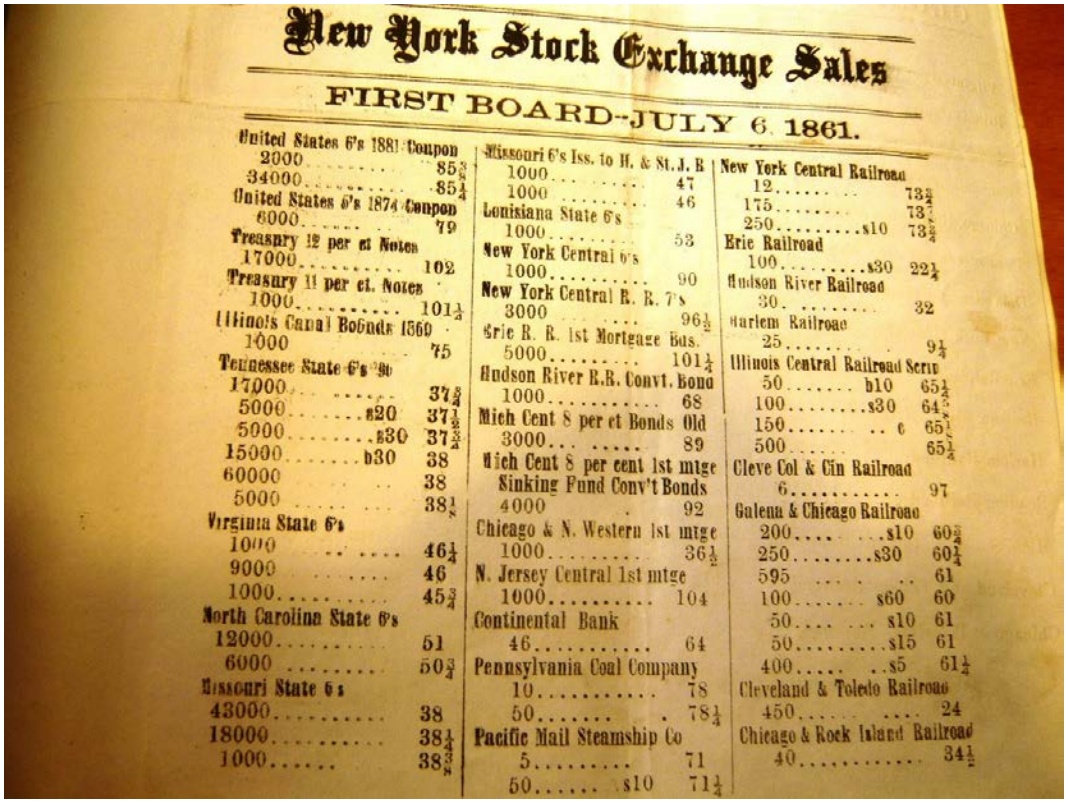
Using original records from the the New York Stock Exchange (NYSE) archives, we hand collected prices of all U.S. state bonds for the period 1857-61, allowing us to observe the universe of state debt that traded during the period of southern secession.

In the mid-19$^{\text{th}}$ century, each stock or bond's name listed on the NYSE was called out

[10] According to equation 3 we then have $SecessionRisk = c(s)$.

twice per day (what were called the first and second "boards"), at which point transactions for that issue took place. We collected all sales transactions for state bonds reported in both the first and second boards for each day between January 1, 1857 and December 31, 1861. Figure 7 provides an image of the archival data for July 6, 1861. In most instances, the data provide successive trades for state bonds, including the sales volume and price. In some cases, such as the second, third and fourth entries of the Tennessee States 6's 90', prices are preceded by one or more letters. Despite our efforts to uncover the meaning of these letters, we have not been able to discern what they mean. Therefore, and in order not to bias our results, we have excluded such sales from our analysis.

Figure 7: Picture- NYSE Archives



New York Stock Exchange Sales

FIRST BOARD--JULY 6, 1861.

United States 6's 1881 Coupon
2000 ..... 85⅝
34000 ..... 85¼
United States 6's 1874 Coupon
6000 79
Treasury 12 per ct Notes
17000 102
Treasury 11 per ct. Notes
1000 ..... 101¼
Illinois Canal Bonds 1860
1000 75
Tennessee State 6's '90
17000 ..... 37⅝
5000 ..... s20 37½
5000 ..... s30 37⅝
15000 ..... b30 38
60000 38
5000 ..... 38⅛
Virginia State 6's
1000 ..... 46¼
9000 46
1000 ..... 45¾
North Carolina State 6's
12000 51
6000 ..... 50¾
Missouri State 6's
43000 38
18000 ..... 38¼
1000 ..... 38⅜

Missouri 6's Iss. to H. & St. J. R
1000 47
1000 46
Louisiana State 6's
1000 53
New York Central 6's
1000 90
New York Central R. R. 7's
3000 ..... 96½
Erie R. R. 1st Mortgage Bds.
5000 ..... 101¼
Hudson River R.R. Convt. Bond
1000 68
Mich Cent 8 per ct Bonds Old
3000 89
Mich Cent 8 per cent 1st mtge Sinking Fund Conv't Bonds
4000 92
Chicago & N. Western 1st mtge
1000 ..... 36½
N. Jersey Central 1st mtge
1000 104
Continental Bank
46 64
Pennsylvania Coal Company
10 78
50 ..... 78¼
Pacific Mail Steamship Co
5 71
50 ..... s10 71¼

New York Central Railroad
12 ..... 73⅜
175 ..... 73⅞
250 ..... s10 73¾
Erie Railroad
100 ..... s30 22¼
Hudson River Railroad
30 32
Harlem Railroad
25 ..... 9¼
Illinois Central Railroad Scrip
50 ..... b10 65½
100 ..... s30 64⅝
150 ..... 65⅛
500 ..... 65¼
Cleve Col & Cin Railroad
6 97
Galena & Chicago Railroad
200 ..... s10 60⅜
250 ..... s30 60¼
595 61
100 ..... s60 60
50 ..... s10 61
50 ..... s15 61
400 ..... s5 61½
Cleveland & Toledo Railroad
450 24
Chicago & Rock Island Railroad
40 ..... 34½

The NYSE archives show transactions for 85 bonds, representing 20 states, indicating some states had issued multiple bonds during our sample period. However, many of these bonds traded infrequently. For example, fourteen of them are encountered only once in our sample between 1857 and 1861, including the Virginia sterling 5%, the Illinois coupon bond, and the Arkansas State bond. In order to have meaningful data for statistical purposes, we only consider bonds for which at least 20 daily observations are present between 1857-61. We also exclude three bonds for which no interest rate is mentioned as well as five of California's

state bonds, which still traded at extremely high yields following the panic of 1857.[11] Table 1 provides the breakdown.

Table 1: State bonds: Composition of the sample

NYSE - All state bonds	85
Infrequently traded	53
No interest rate data	3
California bonds	4
Final sample	25

Many American states also had little debt outstanding (e.g., Delaware and New Jersey) and no recent issuance (*Samuel Hallett and Company's American Circular*, September 18, 1861 and Porter (1880, p.537)) so the 11 states' that actively traded bonds on the NYSE represent a subset of the 33 American states that existed in the 1850s and 1860s. The 11 states include five that eventually seceded (Georgia, Louisiana, Virginia, Tennessee, North-Carolina), four northern states (Indiana, Michigan, New York State and Ohio), and two border states that ultimately chose not to secede (Missouri and Kentucky).

Appendix B.2 lists the individual state bonds regularly traded on the NYSE and that we use in our analysis, their coupon dates, and their maturities. Since volumes are reported for each date, we compute the volume-weighted price for a given bond. When multiple state bonds for the same state are sold on the same day, we use this procedure across all bonds to construct a synthetic measure. Since in most instances maturities are quite distant, this should not generate significant bias.

3.2 Yields to Maturity

Yields to maturity (YTM) are a standard way to gauge the rates of return of fixed-income securities as well as a measure of the risk faced by investors engaging in a buy-and-hold strategy (Bodie et al., 2013). YTM are thus commonly used in finance to assess risk. In the context of wars, for example, the impact of military news (see Waldenström and Frey (2008) for WWII), of perceived legitimacy (Oosterlinck, 2003) and of civil-war related repudiation (Oosterlinck, 2016) has been tested using yields to maturity.

YTM have several interesting features relevant to our analysis. First, they represent the market assessment of the probability to be reimbursed. Since we focus on a relatively short time-span, and in view of the limited debt levels prevailing for states during our sample

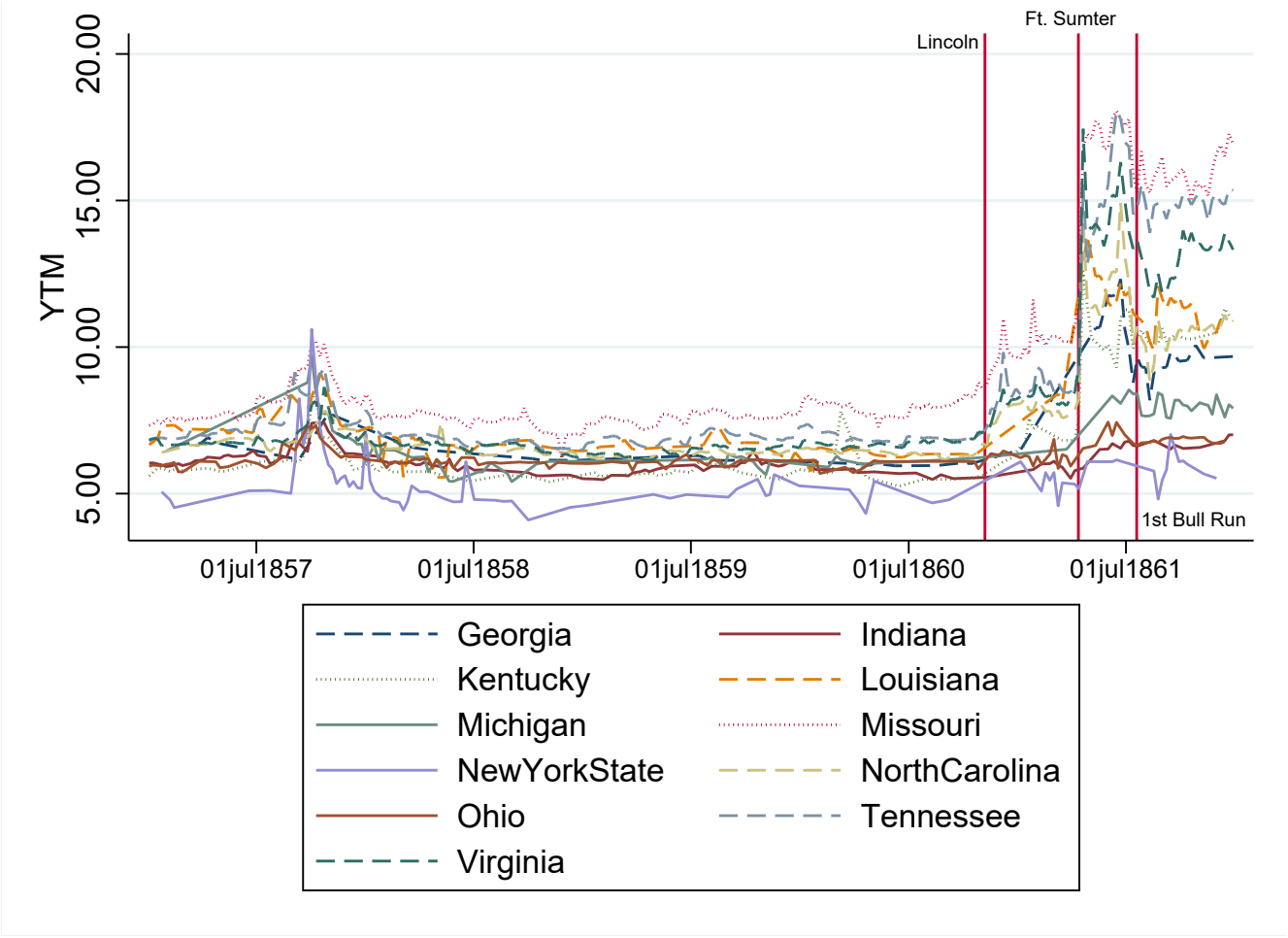
[11] In September 1860, the *Bankers Magazine*, September 1860, vol.15, pp.237-8, commented: "This state is gradually recovering from the effects of bad credit and bad management. It is a singular commentary, however, that her seven per cents sell to day no higher than the five per cents of Indiana."

period, it is reasonable to assume that most movements in yields will reflect secession, or secession-related events. Many states had indeed passed legislation creating debt ceilings (Porter, 1880, pp.649-72). In other words, major movements in yields are most likely to be driven by secession risk, broadly defined, and not by changes in economic fundamentals. Second, since they have "skin in the game," investors are more likely to base their trades on rational expectations and less likely to engage in "cheap talk," i.e., their actions represent their underlying beliefs about future states of the world as money is at stake. Third, since the state bonds in our sample are traded on a regular basis, the updating of financial markets' beliefs can be observed. A nice feature of yields to maturity, and of our data is that we can examine the question of secession at different levels of granularity.

Figure 8 displays the yields to maturity for states whose bonds regularly traded on the NYSE. The outstanding debts of the states of New England remained more or less constant between 1840 and 1860 (Porter, 1880, p.530). On the other hand, some states in both the North (e.g., New York) and the South (e.g., Tennessee and Virginia) increased their stock of outstanding debt. Others reduced their debt obligations (Louisiana, Alabama, Mississippi – See Porter (1880, pp.537-554)). Contemporary business publications suggest that most southern states' public finances were in good order prior to the Civil War (Hallett, 1864). For example, Porter (1880, p.568) mentions the good state of affairs for South Carolina. Missouri increased its borrowing, but "the credit of the state has not been in the least impaired among those who have examined the subject." In the same issue Tennessee was praised for its productive investment in railroads. Many border and southern state bonds (Missouri, Tennessee, North Carolina and Virginia) were also in high demand for banking purposes, i.e., they were used as collateral to back commercial bank note issuance).[12]

[12] *The Bankers' Magazine*, 1861, vol.15, p.516

Figure 8: Yields to Maturity for State Bonds

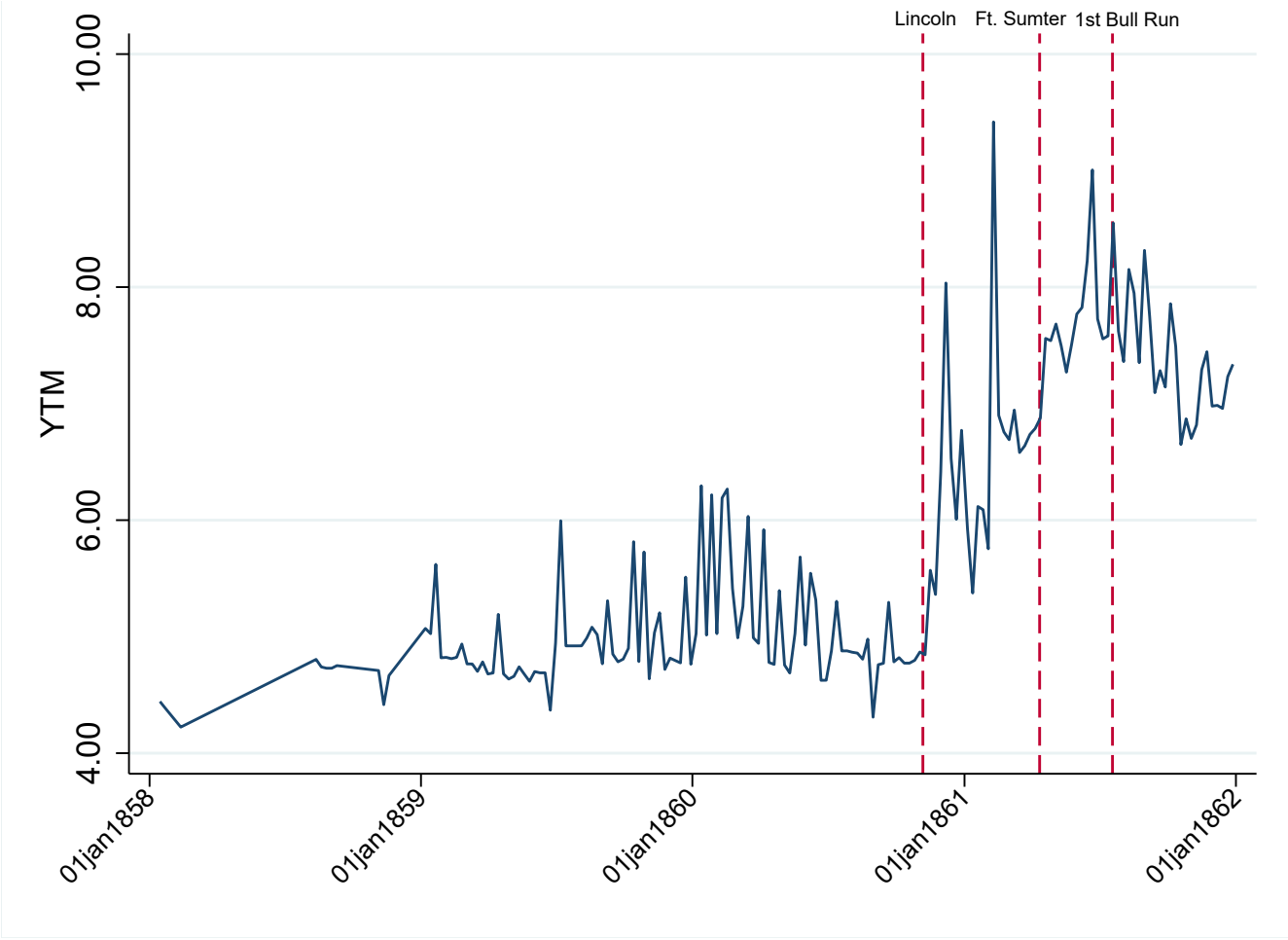


Dotted lines: Border states / Dashed lines: Southern States / Full line: Northern states

We follow similar procedures to determine which bonds to include to compute the yields on the federal debt. These are computed on the basis of the prices and volumes of the following bonds: US6s 1862, US6s 1865, US6s 1867, US6s 1868, US5s 1871, US5s 1874 and US6s 1881.

Figure 9 shows the movement in the average yield to maturity of U.S. federal debt. The yield on the federal debt jumped when Lincoln was elected, with markets pricing the risk of secession. Yields show a rising trend thereafter. The highest point in the series occurs after Lincoln was elected but before any shot was fired at Fort Sumter. It suggests that markets priced possible secessions before any war broke out. In times of tension, markets may have priced in the challenge of raising government revenues among the remaining states to pay for federal debt. The potential exit of several states may have been perceived as creating a new form of risk for the federal debt.

Figure 9: Average Yields to Maturity of the Federal bonds



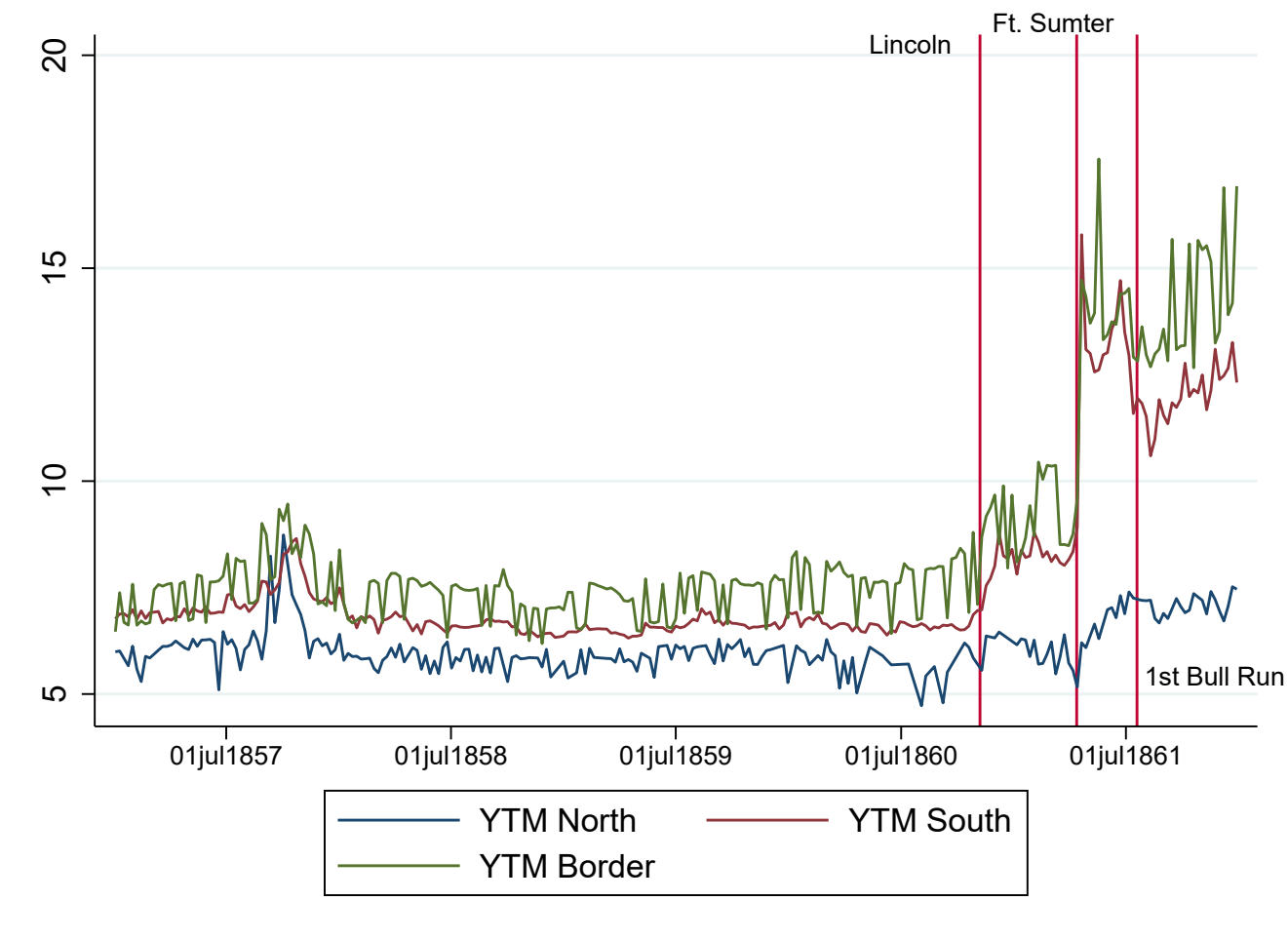
4 When Did the NYSE Price in Secession Risk? Information and Regional Divergence

We begin our empirical analysis by examining panel data evidence on whether financial markets priced in secession and, if so, when. We test whether the movements of northern and southern bonds decoupled, and what factors led to their divergence in yields.

Figure 10 plots average yields to maturity (ytm) from January 1, 1857 through December 31, 1861 for three groups of states: northern states, southern states, and border states. Unsurprisingly, the levels in ytm are not the same across the three groups, reflecting differences in default risk. In the years prior to 1860, southern states' bonds trade at slightly lower prices and higher yields than northern bonds – about 1 percentage point higher. Although bonds show weekly fluctuations, they generally moved together in the years prior to 1860. When the U.S. experienced a financial panic in 1857, the three groups all experienced rising

YTMs, reflecting higher credit risk during this period. The bonds revert to their pre-crisis yields after the crisis subsides.

Figure 10: Average Yields to Maturity in the North, South, and Border States



South= Future or Seceders. Border= States having announced neutrality and North= States of the Union

A priori, it is not clear if and when a decoupling of northern and southern state bond yields might have occurred. On the one hand, financial markets might only price credit risk associated with war, and not discriminate between northern and southern bonds beforehand. On the other, financial markets could price in the risk of secession by selling off the bonds of southern or border states that might choose to participate in a secession movement. Even though a number of important political events related to states' rights and the issue of slavery took place between 1857-1860, Figure 10 suggests that none of these moved bond yields differentially.[13] Divergence in YTM did not occur until the election of Abraham Lincoln

[13]These events include the US Supreme Court decision regarding the Dredd Scott case in 1857, John Brown's raid on Harper Ferry in October 1859 and his execution in December of that year, and the various events known under the name of "Bleeding Kansas" that occurred between 1854 and 1861.

for U.S. president in November 1860, suggesting that the outcome of the election remained uncertain until it occurred. Southern and border state bond yields jump by 1 to 2 percentage points on average in the weeks following the announcement that an "anti-slavery" Republican had won the Presidential election.

The financial press also discussed the correlated movements of Southern state bonds following Lincoln's election. With South Carolina's General Assembly calling a Convention of "the People" on November 10th to put the question of secession to a vote, the *New York Times* reported that news from South Carolina was affecting the prices of Georgia bonds, suggesting that financial markets considered many Southern states as linked.[14] By contrast, the fact that bond markets did not price Lincoln's election into northern states' bond yields is notable since it indicates that markets did not view secession as synonymous with war.

In the months leading up to the election, it was widely reported that Southerners were staunchly opposed to Lincoln and might secede if he were elected. As early as October 1860, William Gist, South Carolina's governor, sent top-secret letters, hand delivered by his cousin Nathaniel "States Rights" Gist, to the governors of Georgia, Alabama, Florida, North Carolina, Louisiana, and Mississippi, encouraging other states to consider secession if Lincoln were elected (Nicolay and Hay, 1917). However, the question of secession remained largely unsettled in the months preceding the election, with newspapers such as the *New York Times* speculating on October 22nd 1860, that only six Southern states (South Carolina, Georgia, Alabama, Mississippi, Florida and Texas) would secede if Lincoln were elected, the other Southern states having too much to lose to do so unless there was "an overt act of breaking Southern rights" by a Republican president.[15]

Historians of the Civil War suggest uncertainty prevailed in the wake of Lincoln's election. What, if any actions southern states would take was unclear. And Lincoln took no official position on the question of secession in the weeks immediately following his election. Most of his influential policy positions on this issue were written in the first half of 1861 (Lindsay and Wellman, 2003). Financial press from November 1860 corroborates historians' impression that the path that the South would take and how the union might respond was unknown immediately following the election.[16] In the months following Lincoln's election the divergence between the yields of southern and border state bonds increased while the yields on Northern states bonds remained more or less constant (Figure 10). The fact that the yields on both border and Southern state bonds rose suggests that market participants did not know (1) which states would secede, (2) when states would secede, and (3) what

[14] *New York Times*, "Monetary Affairs," November 9, 1860.

[15] *New York Times*, "Disunion: How it will work," October 22, 1860.

[16] "The stock exchange goes more feverish with the angry political discussions from the South," The *New York Times*, "Monetary Affairs," November 10, 1860.

response the union would have to secession – allowing states to secede without intervention or blocking it with force.[17]

A second jump in southern states' yields occurred when Fort Sumter was first bombed for 34 hours, beginning on April 12th, 1861, and later occupied by Confederate troops. The attack on the Federal fort marked the first large-scale attempt by southern states to enforce their secessionist claims using military force. On April 15th, Lincoln responded to the shelling of Fort Sumter by ordering state militias to provide 75,000 troops to suppress the rebellion. A day before the attack, the stock exchange was already experiencing "political anxiety"[18] and the "Southern Border State bonds" were "as active and as subject to ups and downs as the railway fancies."[19] The intensity of bond sales increased once the bombing commenced and Lincoln responded, and as described by the *New York Times*: "The first effect of the President's Proclamation of rebellion and call for military support, in the morning papers, was to increase, of course, for the moment, the feverish anxiety of the Stock Exchange, and prices were seriously depressed on the Stocks [bonds] of the Border States of the South."[20] As shown in Figure 10, on average, bond yields rose for southern and border states by 6 to 7 percentage points, suggesting that markets viewed the risks of secession much greater after these events. Interestingly, Figure 10 shows little upward movement for northern bonds at this time: markets, like many in the press, still believed that a prolonged war was not a forgone conclusion and did not price in war risk to northern state bonds.

Another way to assess when financial markets started to price in the risk of secession is to examine the weekly correlations in YTMs between the regions. Figure 11 plots the beta coefficients for two regressions, displayed with 10-week rolling windows. In the left-hand panel, the regression examines how southern bond yields respond to the movement in northern bond yields by regressing: $MeanYTM_{South} = \alpha + \beta MeanYTM_{North} + \varepsilon_t$. Similarly, the right-hand panel regresses the response of both southern and border states bond yields on northern bond yields: $MeanYTM_{South/Border} = \alpha + \beta MeanYTM_{North} + \varepsilon_t$.

Both panels of Figure 11 show little evidence of dramatic departures away from northern bond yields prior to the election of President Lincoln – even during economic shocks, such as the Panic of 1857 or during events related to the status of slavery (such as the Dred Scott versus Sandford decision of March 1857). The coefficients are always between 0 and 1. However, after Lincoln's election (shown by the red vertical line), that relationship changes,

[17] "We have to report the lowest and most feverish market for stocks for the season. The panic feeling at one time in the morning appeared to run as wild as in some of the blackest days of 1857," *New York Times*, "Monetary Affairs," November 14, 1860.

[18] *New York Times*, "Monetary Affairs," April 11, 1861.

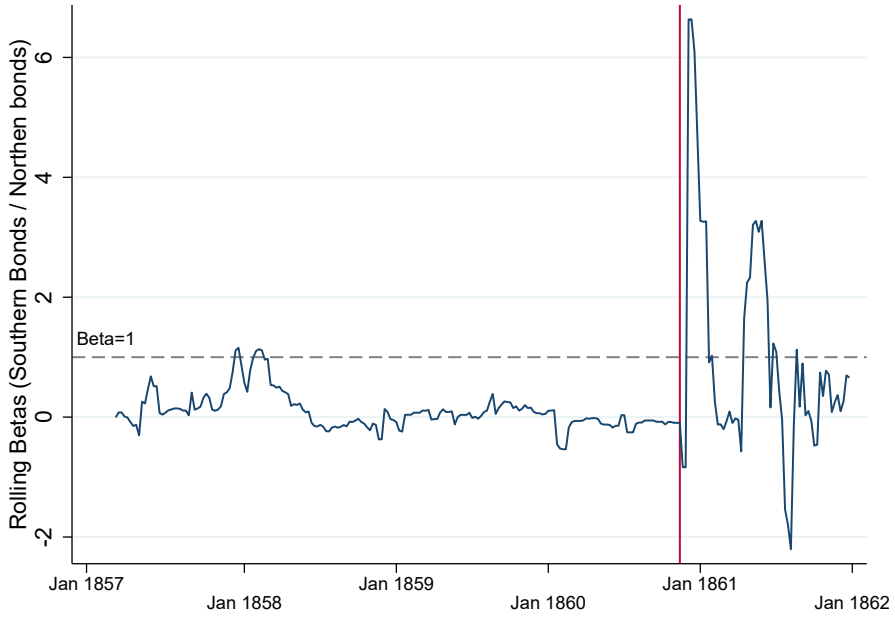
[19] *New York Times*, "Monetary Affairs," April 11, 1861.

[20] *New York Times*, "Monetary Affairs," April 16, 1861. Note that the financial press referred to government bonds as "stocks" during this era.

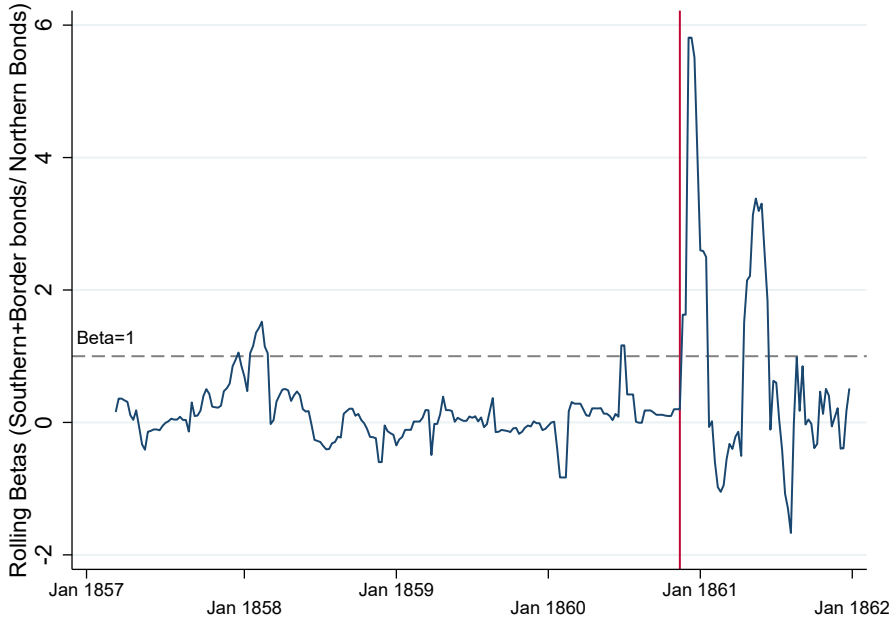
with 10-week rolling betas jumping to over 5 at the time of Lincoln's election and to more than 3 after Fort Sumter's bombing.

To provide more precise quantitative estimates, Table 2 regresses the yield to maturity of each state in our sample on three interaction terms. We first generate a variable that takes on a value of 1 if the traded bond was issued by a southern state or border state. We then interact this with three different indicator variables, each representing a key political or military event in the pivotal event window of 1860-61: (1) Lincoln's election; (2) the bombing of Fort Sumter; and (3) the Battle of Bull Run (also known as the Battle of Manassas). The first Battle of Bull Run was fought in Virginia on July 21, 1861. It was the first, full-scale battle of the Civil War, with the Union pressing for a quick victory so that it could respond to public pressure to end the war in 90 days. The battle was particularly bloody, ended in Confederate victory, and served to convince both sides that any war would be long (McPherson, 1988). The regression also includes a dummy variable indicating the date when each state seceded as well as state fixed effects and time (week) fixed effects.

Figure 11: Beta coefficients and Secession Risk



(a) Beta correlation South/North



(b) Beta correlation non-Northern/North

Note: Left-panel: Beta coefficient showing how Southern bonds react to movements in Northern bonds (Result of the estimation $MeanYTM_{South} = \alpha + \beta MeanYTM_{North} + \varepsilon_t$ on 10 weeks rolling windows) / Right-panel: Beta coefficient showing how Southern and border-state bonds react to movements in Northern bonds (Result of the estimation $MeanYTM_{South/Border} = \alpha + \beta MeanYTM_{North} + \varepsilon_t$ on 10 weeks rolling windows). The red line here represents the election of President Abraham Lincoln.

Table 2: When did the Risk of Secession Appear?

	(2.1) $YTM_{i,t}$	(2.2) $YTM_{i,t}$	(2.3) $YTM_{i,t}$	(2.4) $YTM_{i,t}$	(2.5) $YTM_{i,t}$
Lincoln × South/Border	4.010***				1.369***
	(0.574)				(0.293)
Ft Sumter × South/Border		5.021***			4.940***
		(0.800)			(1.110)
1st Bull Run × South/Border			4.297***		-0.777**
			(0.776)		(0.305)
Secession				2.228	-0.807
				(1.716)	(1.519)
Constant	8.179***	8.177***	8.229***	8.253***	8.176***
	(0.236)	(0.249)	(0.249)	(0.285)	(0.249)
Controls					
State FE	YES	YES	YES	YES	YES
Week FE	YES	YES	YES	YES	YES
Observations	1,765	1,765	1,765	1,765	1,765
R-squared	0.858	0.890	0.818	0.774	0.901
Number of States	11	11	11	11	11

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Each model includes state fixed effects and time fixed effects. The dependent variable is the yield to maturity of for the bond in state i at time t. Since our estimations include time and state fixed effects, coefficients are to be interpreted as the time variation of the difference in yields between southern/border bonds and northern bonds before and after these key events. Column 4 consider all events at once and hence control for the confounding effects of different events. Lincoln is a dummy variable equal to one after the election of President Lincoln. Fort Sumter is a dummy variable equal to one after the battle of Fort Sumter. 1st Bull Run is a dummy variable equal to one after the 1st battle of Bull Run. Secession is a dummy variable equal to one after a particular state secedes. South/Border is a dummy variable equal to one for Southern and Border States

Each of the three event dummies (interacted with south/border) is statistically significant on its own (columns 1-3) as well as when they are all included in the same regression specification (column 5). The results in the last column indicate that Lincoln's election raised Southern/border states' bond yields by 1.4 percentage points relative to northern states' bond yields. Fort Sumter's bombing further increased southern/border state bond yields relative to northern state bond yields by 4.9 percentage points. The Battle of Bull Run led to a decrease in YTMs of southern/border states. The victory for the Confederacy thus led financial markets to believe that the likelihood that the South would succeed had increased or that the Union might have to sue for an early peace. As an alternative specification and robustness check, Table E.1 includes the lagged spread as an independent variable. In this model, only the election of Lincoln is statistically significant at conventional levels; it increases the spread between southern and northern yields by around 32 basis points.

Table 2 assesses the average difference in yields before and after three secession-related events for state bonds as well as the act of secession. This average effect encompasses market reactions when the information about the events was released on markets as well as future market adjustments. In the case of the date of secession, the average effect of secession encompasses both the effect of secession and all market adjustments coming from other information affecting their assessment of the Confederacy – as emphasized in the model.

Alternatively, Table 3 estimates narrower time windows around these three events as well as around the dates that southern states seceded. By reducing the time window around a state's secession date as well as the other secession events, we can more precisely isolate the market's perception about news specifically relevant to secession. In columns 1-4, we limit the observations to the four weeks around the event. In columns 5-8, we examine a broader window of 8 weeks. For the most part, the results are not sensitive to the choice of the window, particularly for Lincoln's election and the attack on Fort Sumter. Given that coefficients are quite similar to those reported earlier, most of the effect on YTMs seems to be captured in the shorter horizons shown in this table. For Bull Run, we find statistically significant effects using the 8-week window, though the sign is still negative and of similar magnitude in the 4-week window. The narrower windows allow us to identify a statistically significant effect on secession. The yields to maturity of seceding states' bonds average between 370-440 basis points higher in the weeks after a state announces its secession than in the weeks before. Thus, in contrast to results shown in Table 2, the tighter event windows allow us to identify large and statistically significant effects when states seceded from the union.

Based on the narrative evidence from the financial press and timing (pre-Bull Run), we attribute movements in yields arising from Lincoln's election and Fort Sumter as indicating increased secession risk. Even though the historical record is quite clear on this point, we nevertheless provide additional evidence on border states to support this claim. We analyze the case of two slave-holding border states, Kentucky and Missouri, for which we have constructed yields to maturity (see Appendix D).

Table 3: Secession Risk - Triggering events: Discontinuities

	(3.1) $YTM_{i,t}$	(3.2) $YTM_{i,t}$	(3.3) $YTM_{i,t}$	(3.4) $YTM_{i,t}$	(3.5) $YTM_{i,t}$	(3.6) $YTM_{i,t}$	(3.7) $YTM_{i,t}$	(3.8) $YTM_{i,t}$
Lincoln × South/Border	1.083***				0.819**			
	(0.377)				(0.343)			
Ft Sumter × South/Border		4.227***				3.867***		
		(0.654)				(0.466)		
1st Bull Run × South/Border			-1.047				-1.157**	
			(0.714)				(0.518)	
Secession				3.743***				4.400***
				(0.779)				(0.643)
Constant	6.049***	5.782***	7.233***	10.52***	5.691***	5.850***	7.128***	9.534***
	(0.0876)	(0.149)	(0.216)	(0.653)	(0.232)	(0.106)	(0.167)	(0.430)
Controls								
Post-treatment FE	YES	YES	YES	YES	YES	YES	YES	YES
Non-Northern FE	YES	YES	YES	NO	YES	YES	YES	NO
Window	4 weeks	4 weeks	4 weeks	4 weeks	8 weeks	8 weeks	8 weeks	8 weeks
Observations	53	71	96	31	93	131	171	57
R-squared	0.374	0.694	0.549	0.436	0.433	0.721	0.575	0.459

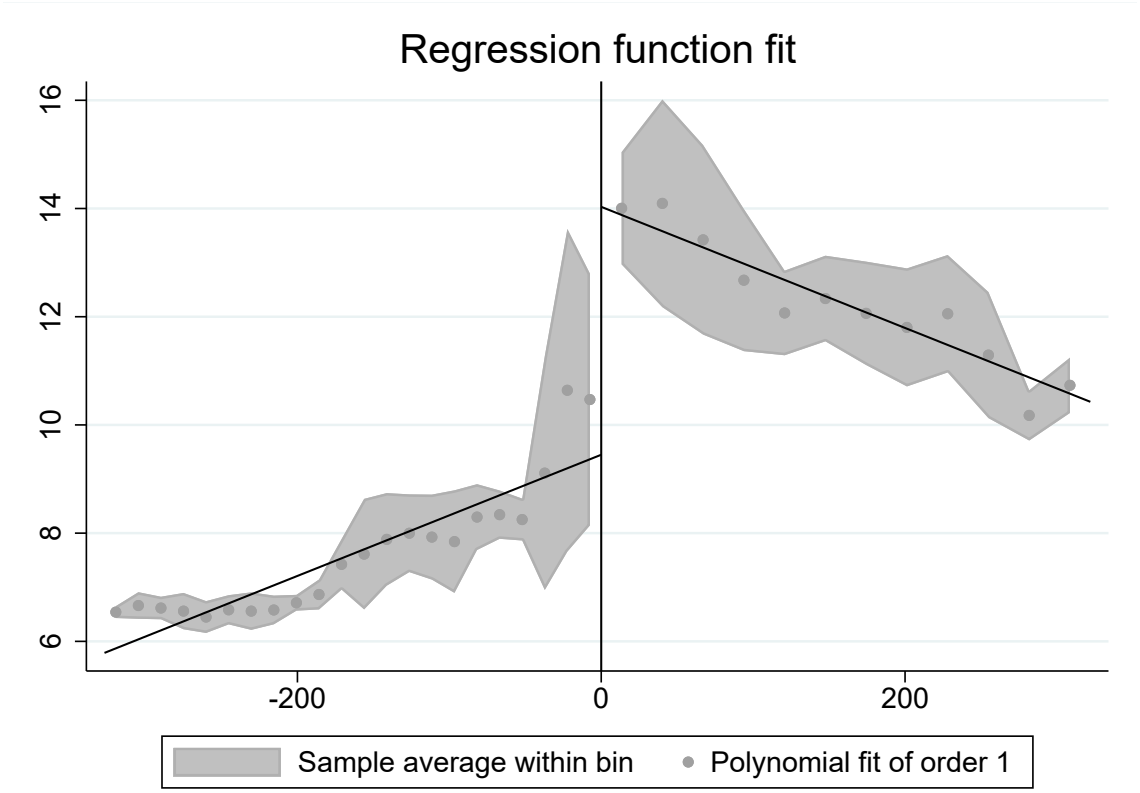
Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Data at the state/week-level. Each model includes both after events dummy variable as well as a dummy variable for southern and border states (excepts models in Column 4 and 8 whose sample is selected as states experiencing secession). Coefficients are to be interpreted as the difference in average yields immediately before and immediately after an event. Models in Columns 1,2,3,5,6,7 use northern bonds as control group. The four first columns reduce the sample to 4 weeks around the event studied whereas the four last columns reduce the sample to 8 weeks around the event studied. Estimates in Columns 4 and 8 solely rely on time variations. Lincoln is a dummy variable equal to one after the election of President Lincoln. Fort Sumter is a dummy variable equal to one after the battle of Fort Sumter. 1st Bull Run is a dummy variable equal to one after the 1st battle of Bull Run. Secession is a dummy variable equal to one after a state has seceded. South/Border is a dummy variable equal to one for southern and border states.

5 Investigating the Pattern of Secessions

5.1 Domino Secessions

During domino secessions, financial market participants update secession risk upward as the probability of secession increases to one. However, our framework also implies that secession risk would decrease over time if additional regions join the breakaway state. These two features of the model are observed in our data on southern U.S. secession. Figure 12 presents a RDD plot centered around the day on which a state enacted a secession ordinance.[21]

Figure 12: The secession discontinuity on Yields



Y-axis: Yield to Maturity. X-axis: day around secession, before secession if negative, after secession if positive. Each point represents the average yield to maturity for a bin defined using optimal bandwidth (Calonico et al., 2014).

The ytm jumps up at the time of secession, but then falls as elapsed time from the date of a state's secession ordinance increases.[22] Consistent with the results of Section 4, Figure 12 shows that financial market participants began pricing in secession risk even before secession happened. However, the jump in the ytm at the date of the secession ordinance indicates

[21] Appendix Table E.4 presents estimations of the discontinuity generated by secession.

[22] Dates of secession are available in Appendix B.1

that financial markets did not have perfect foresight. The figure shows that markets react significantly to the enactment of secession ordinances. These overt political acts sent a clear signal about the region's commitment to joining the outside option. The model also predicts that there are economies to scale to secession movements: average costs fall as more regions join. This feature of the model is also seen in the RDD plot: ytm declines as time elapses and additional states secede.

Table 4 provides a second approach for exploring how financial market perceptions of secession changed as time elapsed. It uses the baseline model shown in Table 2, but includes an additional covariate that indicates the number of days since a state seceded. As the coefficient on *days since secession* shown in column 2 indicates, markets appear to lower the yields on the average seceders' debt the longer it has been since announcing secession. For example, 100 days after secession, the average yield to maturity is roughly 125 basis points lower. It became clearer to bond traders that, at least by early in the winter of 1861, the Confederacy was not reversing course and was committed to its political objective of breaking away from the union. As more states joined the movement, markets viewed the creation of a new polity as more viable.

To provide some interpretation as to why risk in seceding states declined, we next estimate the sequential role of secession. In the model of Section 2, as more regions secede, the viability of a newly-created nation state increases. We can test this idea by examining changes in market perceptions for bonds of seceders. Using the baseline specification from Table 5, we include an additional regressor, *other secessions*, a variable indicating how many states had seceded by time t. We then interact this variable with *secession*. A negative coefficient on the interaction would indicate that, as more states seceded, markets lowered secession risk – consistent with the model where the start-up costs of forming a new polity fall as more states abandon the existing one.

Table 4: Yields and Time after Secession : Does Uncertainty Disappear?

	(4.1) $YTM_{i,t}$	(4.2) $YTM_{i,t}$	(4.3) $YTM_{i,t}$	(4.4) $YTM_{i,t}$
$YTM_{i,t-1}$		0.942***		0.869***
		(0.0171)		(0.0362)
Secession	3.402	0.198	1.494	0.315**
	(1.947)	(0.138)	(1.254)	(0.122)
Day since secession	-0.00833	-0.000994**	-0.0125*	-0.00216**
	(0.00474)	(0.000392)	(0.00593)	(0.000936)
Ft. Sumter × South/Border			4.254***	0.266
			(0.797)	(0.309)
Lincoln × South/Border			1.329***	0.970**
			(0.352)	(0.317)
1st Bull Run × South/Border			0.0642	0.202
			(0.640)	(0.119)
Constant	8.252***	-0.215	7.758***	0.341
	(0.274)	(0.278)	(0.481)	(0.327)
Controls				
State FE	YES	YES	YES	YES
Week FE	YES	YES	YES	YES
State group × Year FE	NO	NO	YES	YES
Observations	1,765	1,427	1,765	1,427
R-squared	0.779	0.982	0.914	0.983
Number of States	11	11	11	11

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Data at the state/week-level. Each model includes state fixed effects and time fixed effects. Coefficients are to be interpreted as the time variation of the difference in yields between northern/border bonds and northern bonds before and after some key events. Lincoln is a dummy variable equal to one after the election of President Lincoln. Fort Sumter is a dummy variable equal to one after the battle of Fort Sumter. 1st Bull Run is a dummy variable equal to one after the 1st battle of Bull Run. Secession is a dummy variable equal to one after a country has seceded. South/Border is a dummy variable equal to one for Southern and Border States. Date since secession is the number of days after a state has seceded.

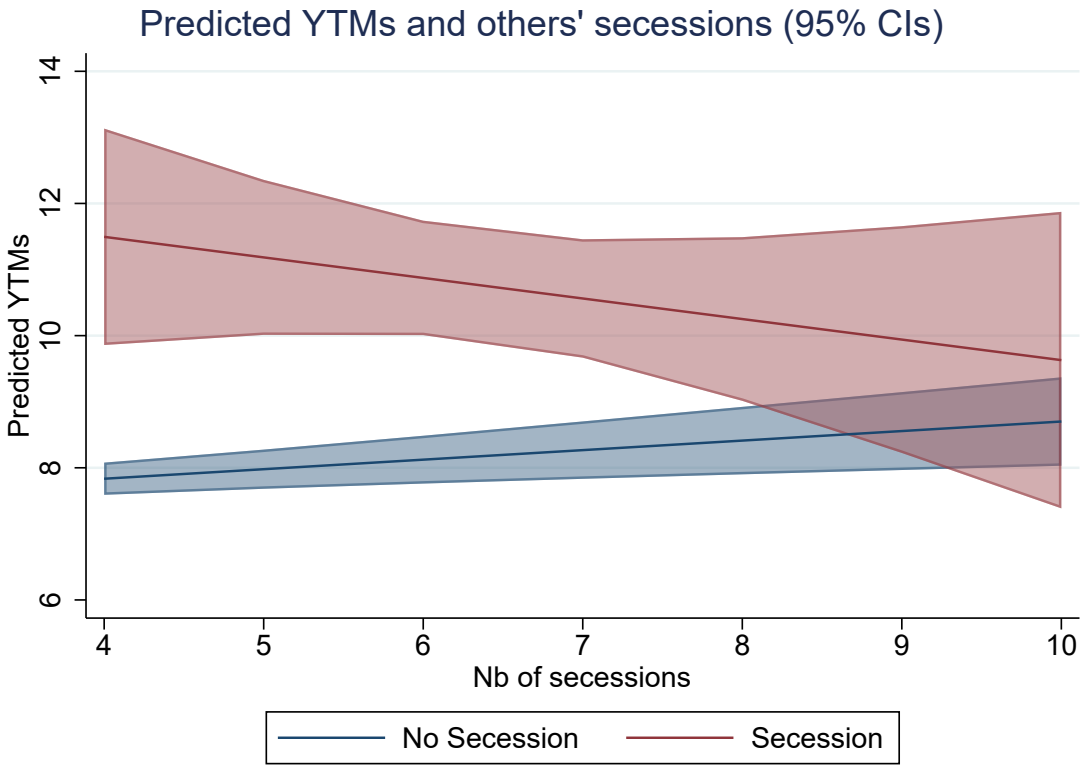
Table 5: YTM and Coordination: the Effect of other States' Secessions

	(5.1) $YTM_{i,t}$	(5.2) $YTM_{i,t}$	(5.3) $YTM_{i,t}$	(5.4) $YTM_{i,t}$
Secession	0.233	4.346**	1.685*	5.581**
	(0.933)	(1.899)	(0.844)	(1.854)
Other Secessions	0.142***	0.136**	0.157***	0.144***
	(0.0417)	(0.0444)	(0.0399)	(0.0434)
Secession×Other Secessions		-0.442		-0.455
		(0.260)		(0.286)
Constant	7.620***	7.702***	7.689***	7.741***
	(0.451)	(0.423)	(0.449)	(0.423)
Controls				
State FE	YES	YES	YES	YES
Week FE	YES	YES	YES	YES
State group × Year FE	YES	YES	YES	YES
Nationwide events	YES	YES	YES	YES
State Specific events	NO	NO	YES	YES
Observations	1,765	1,765	1,765	1,765
R-squared	0.905	0.906	0.922	0.923
Number of states	11	11	11	11

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Data at the state/week-level. Each model includes state fixed effects and time fixed effects. Secession is a dummy variable equal to one after a country has seceded. Nationwide events include Lincoln, Fort Sumter and 1st Bull-Run and their interaction with the South/Border dummy variable. State-specific events include: Date since secession: the number of days after a state has seceded.

To visualize the effects of changing participation in the secession movement, Figure 13 plots the marginal effect of an additional state joining the movement on the ytm of seceding states' bonds. As more states joined the secession movement, yields fell by around 200 basis points. We observe the opposite for non-seceders.

Figure 13: Predicted Yields for Seceding and Non-Seceding states as a Function of the Number of States that have already Seceded



(Note: From Estimation 4 in the Table 5)

5.2 Evidence from Federal Debt Yields

If decreasing costs exist, then the riskiness of Federal debt may have risen in response to states departing the union. As states exited the union, per state costs rise. Even though seceding states might have been expected to pay their dues of the debts issued prior to Secession, markets priced in the lower ability of a smaller union to raise funds in the future, and thus required an additional risk premium to hold the Federal bonds.

To test whether states exiting the union influenced the ytm on federal debt, Table 6 uses the baseline regression that includes controls for Lincoln's election, the bombing of Fort Sumter, and the first battle of Bull Run as well as the previously described variable that counts the number of states that have seceded at time t. As states exited the union, the average yield to maturity on U.S. government bonds rose: the coefficient on the number of states seceding is positive and statistically significant. These results remain stable when adding lagged YTM as an additional control variable (see Appendix Table E.2) or when using Newey-West standard errors (see Appendix Table E.3).

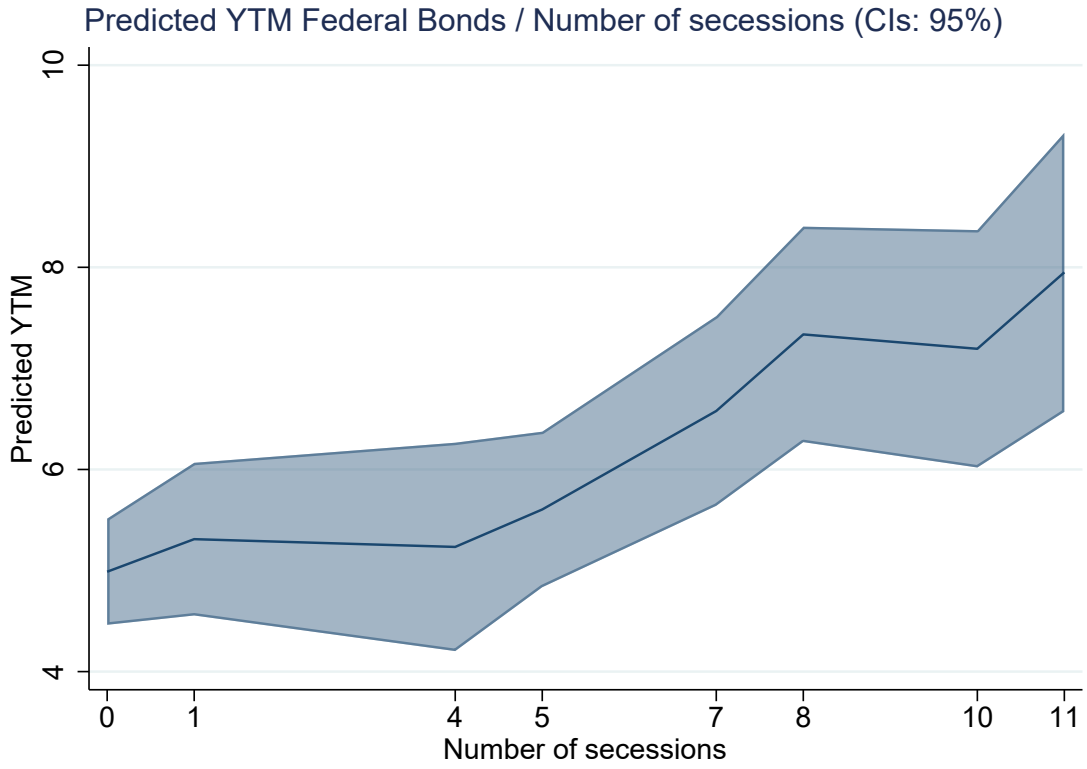
Table 6: Yields to Maturity of the Federal Debt and Number of Secessions

	(6.1) $YTM_{i,t}$	(6.2) $YTM_{i,t}$	(6.3) $YTM_{i,t}$	(6.4) $YTM_{i,t}$	(6.5) $YTM_{i,t}$	(6.6) $YTM_{i,t}$	(6.7) $YTM_{i,t}$	(6.8) $YTM_{i,t}$
Nb of Secessions	0.233	0.190	0.184	0.358	0.343	0.309	0.347	0.281
	(0.00958)***	(0.0163)***	(0.0342)***	(0.0600)***	(0.0571)***	(0.0812)***	(0.0625)***	(0.0792)***
	[0.0141]***	[0.0253]***	[0.0360]***	[0.0397]***	[0.0381]***	[0.0430]***	[0.0456]***	[0.0420]***
Lincoln					1.53			1.54
					(0.370)***			(0.374)***
					[0.482]***			[0.497]***
Ft. Sumter						0.396		0.437
						(0.373)		(0.348)
						[0.168]**		[0.165]**
1st Bull Run							-0.170	-0.118
							(0.308)	(0.282)
							[0.231]	[0.227]
Observations	174	174	174	174	174	174	174	174
R-squared	0.771	0.791	0.799	0.819	0.858	0.820	0.819	0.860
Controls								
Time trend	NO	YES	NO	YES	YES	YES	YES	YES
Year FE	NO	NO	YES	YES	YES	YES	YES	YES
Time trend × Year FE	NO	NO	NO	YES	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Frequency: Weekly. Estimates from an autocorrelated model with White standard errors in parentheses and standards errors clustered at the month-level are shown in box brackets.

Figure 14 plots the impact of an additional state seceding on federal debt yields. It illustrates non-linearities in economies of scale. Most of the increase in the ytm of the federal debt materialized between the fifth secession and the eighth secession.[23] When Louisiana and Texas exited from the Union (sixth and seventh states to join the Confederacy), the ytm on federal debt increased. Indeed, their secessions provided important momentum for the creation of a new polity as they preceded the official proclamation of the Confederate States of America. Virginia's exit (the eighth state) also had a large impact on federal debt yields as it was an economically important state in the South. In summary, bond traders priced in the fact that the union's fiscal picture was directly impacted by growth in the Confederacy and the decline in the size of the union.

Figure 14: The Impact of Secession on Federal Debt Yields to Maturity



6 Sub-Secession and Heterogeneity

We now turn to examining whether financial markets priced sub-secession risk. We first leverage *ex ante* measures of within-state heterogeneity that markets might have used to price

[23] In Appendix E.5, we allow for non-linearities and estimate a specific premium for different numbers of seceders.

in sub-secession risk: voting results (Section 6.1). We then directly observe the evolution of yields to maturity in states observing internal turmoil around the secession process (Section 6.2).

6.1 Within-state Heterogeneity

Southern states were not homogeneous in their preferences. For example, as discussed earlier, there were significant differences in slaveholding across the South. Differences also existed within states, often where slaveholding among whites varied across counties. Self-interested voters thus likely differed in their preferences to join a new polity. As in our model, heterogeneity is specified as a function of the share of a state's population opposed to the decision to secede. To proxy for the importance of this opposition, we use electoral data and focus on two candidates who ran for president of the U.S. in the 1860 election: John Bell (of the Constitutional Unionist party) whose supporters openly opposed secession and John Breckinridge (a pro-slavery southern Democrat).[24] The percentage of the electorate supporting Bell provides a measure of the size of the group potentially opposing secession. Conversely, a strong turnout for Breckinridge suggests that voters would likely be aligned with any future decision to secede. If a state seceded subsequent to the 1860 election, then the larger the group opposed to secession (i.e., more Bell voters), the greater the likelihood of a future sub-secession.

In regressions where we estimate yields to maturity on state bonds, we thus include a right-hand side variable where we interact the secession dummy with the percentage of counties in a state for which the vote share for Bell exceeded the vote share for Breckinridge.[25] Given the stated positions of Bell and Breckinridge, this interaction term is meant to capture how aligned a state's counties were with secession. Our regressions include state and time fixed effects and also control for the shift in regional trends, the election of Lincoln, the attack on Fort Sumter, and the battle of Bull-Run.

From the regression estimates, we can generate a plot of the marginal effects of the secession dummy variable against the percentage of counties in which Bell received more votes than Breckinridge in the 1860 election. Figure 15a shows that, as predicted by the model, the higher the proportion of counties opposing secession, the greater the secession risk. When more than a simple majority of counties favored Bell over Breckinridge (as in Tennessee and Virginia), the premium is sizable – more than two percentage points and

[24]The two other candidates who ran for president in 1860 were Abraham Lincoln (Republican Party), who opposed the expansion of slavery in territories, and Stephan Douglas (Democratic Party) who favored popular sovereignty in the territories. Lincoln was not even listed on ballots in the South and therefore his share of the electorate can not be used.

[25]We use county-level data to construct state-level indices of opposition to secession.

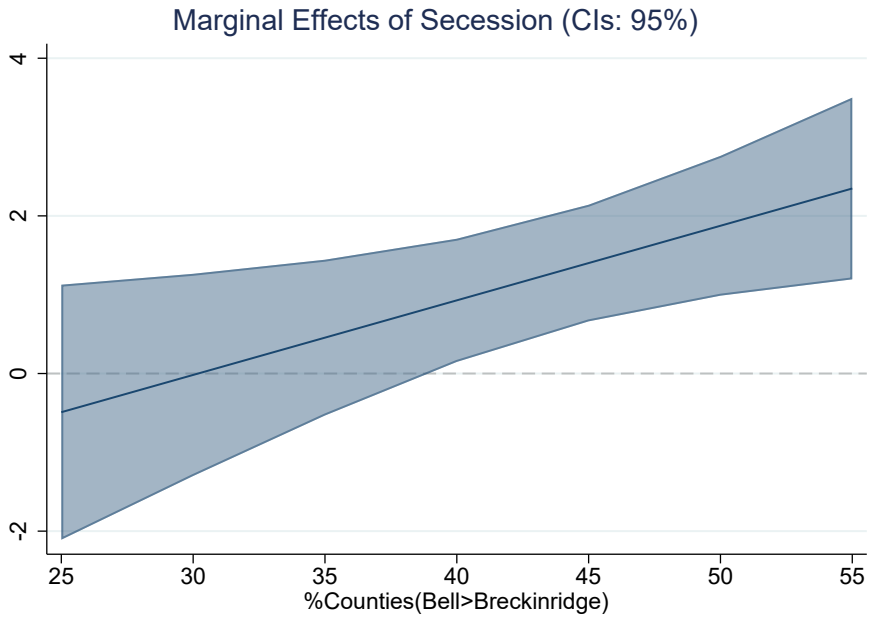
reflecting the market's perception that the heterogeneity within the state regarding secession might lead to sub-secession. As Bell support relative to Breckinridge declines, the premium decreases. It is no longer statistically different from zero when less than 40% of counties voted more for Bell than for Breckinridge. Results are consistent when using the share of counties displaying either a strong majority for Bell or a strong majority for Breckinridge (Appendix E.6 provides regression estimates and F.1 displays the corresponding figures).[26]

Another way to look at this issue is to focus on seceding states before and after secession, and to examine whether their yields differed based on voter heterogeneity. Figure 15b displays the distribution of yields to maturity before and after secession in seceding states. Seceding states are ordered according to the percentage of counties in which Bell performed better than Breckinridge in November 1860. Before secession, the yields on southern bonds are similar. However, after secession, the two states with a clear majority in favor of secession (less than 40 % of counties voting more for Bell) experience a smaller increase in yields than the states with a larger opposition (Tennessee, North Carolina, and Virginia). Even though Virginia was the only state that eventually experienced a sub-secession, our analysis suggests that markets did not rule out this possibility for other states. The high yields observed for Tennessee linked to the high proportion of counties preferring Bell over Breckinridge may have led markets to believe that East-Tennessee, the pro-Union part of the state, would secede.[27]

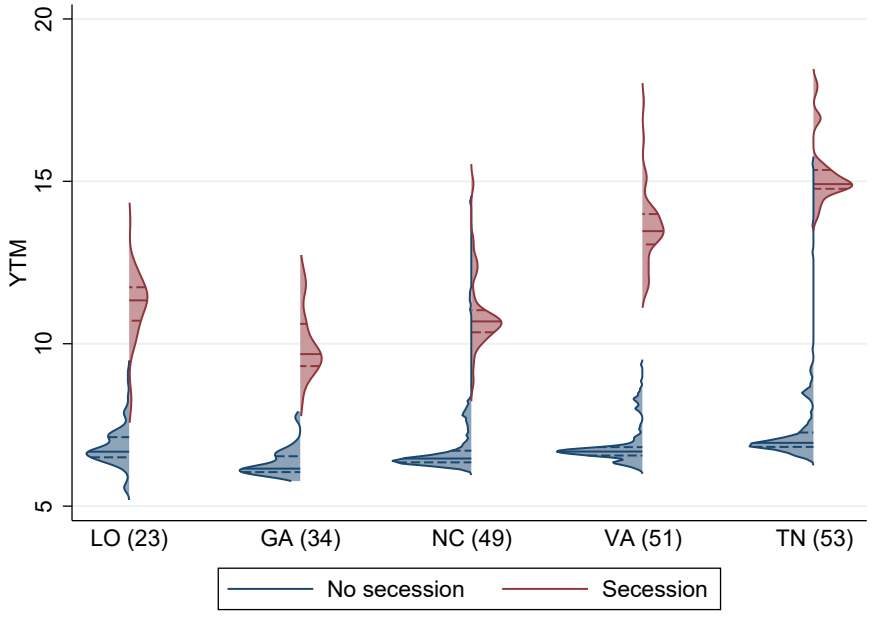
[26] Appendix Table E.7 summarizes the different measures used to assess the heterogeneity.

[27] The possibility of sub-secession in that state was certainly believed to be within the realm of possibility by contemporaries. In its August 21, 1861 edition (p.3), *The New York Times* noted in a piece entitled, "The Eastern Tennessee Unionists," that "the people of that region [East-Tennessee] although two to one for the Union, do not wish to resist the state authorities." The need to mention this fact reflects the previous belief that a sub-secession might occur.

Figure 15: Electoral Results and Within-State Heterogeneity



(a) Marginal Effects: Percent of counties in which the vote share for Bell exceeded the vote share for Breckinridge. The marginal effects result from the following specification: $YTM_{i,t} = \alpha + \beta_1 Secession_{i,t} + \beta_2 Secession_{i,t} \times \%Counties_i + \Gamma X_{i,t} + \epsilon_{i,t}$. Results of the estimation can be found in Appendix E.6



(b) Violin graph of the distribution of yields to maturity before and after the secession in seceding states. Each column represents the distribution of yields for one southern state, in parentheses is the percentage of counties in that state for which the vote share for Bell exceeded the vote share for Breckinridge. Blue shows the distribution of ytm before secession. Red displays the distribution of ytm after secession.

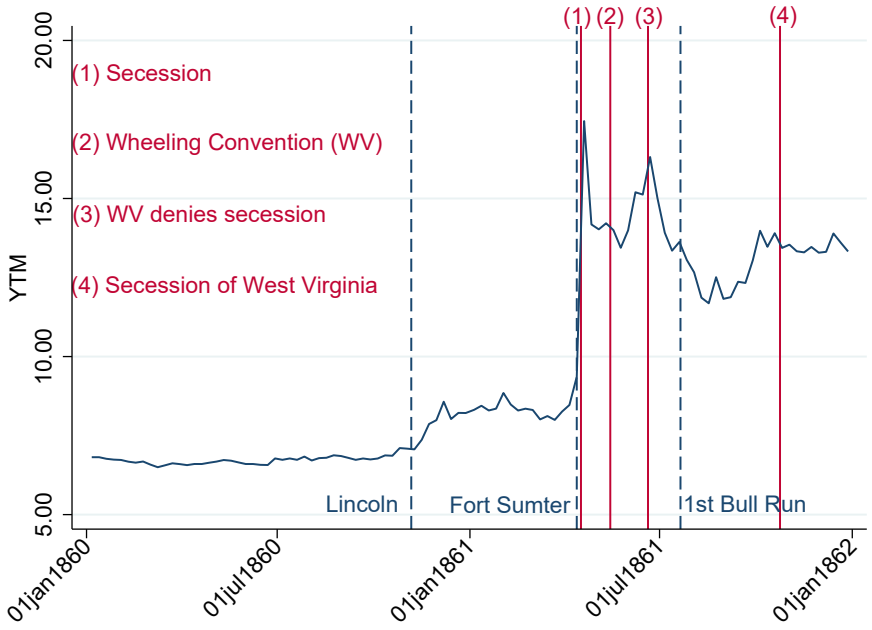
6.2 Further Secession?

Of course, when a cohesive group within a region differs markedly in its support for secession, our model suggests an alternative course of action – further secession. To understand this possibility and better understand Figure 15b, we explore Virginia's experience in the 1860s, and the decision by a subset of voters in the northwestern part of the state to side with the union and dissolve their relationship with the state.

Virginia made the decision to leave the union based on a vote by convention delegates that took place just after the bombing of Ft. Sumter, on April 17$^{\text{th}}$, 1861, becoming the eighth state to join the Confederacy.[28] As Figure 16 shows, this action led to a dramatic increase in yields. Before a public referendum could be called to ratify the convention delegates' decision, secessionist Virginians began to call for the seizure of Harper Ferry's federal armory and the Gosport Navy Yard at Norfolk, VA, leading unionists in the state to call their own convention in Wheeling on May 13, 1861. They met to repeal Virginia's Ordinance of Secession, with the majority voting to do so, and to consider forming a new state, but held off on that latter decision until after Virginia's statewide referendum on the question of secession. Virginia bond yields briefly rose in response to the first Wheeling Convention. Though the statewide popular vote on secession easily passed on May 23, 1861, voters in the western counties largely opposed to it – voting 34,677 against and 19,121 for secession. Leaders from the western counties then reconvened in Wheeling on June 11, 1861, and responded to the referendum by declaring the secession of Virginia illegal and the secession government in Richmond void since it had not been initiated by the people, but instead non-representative delegates at the Virginia convention. On June 19$^{\text{th}}$, they passed an act to reorganize government, declaring the "restored government" as legitimate government of the state of Virginia. Virginia's yields continued to rise in response to these events. By October 24$^{\text{th}}$, the western counties had organized a popular referendum on the issue of forming a new state: it passed, with 18,408 voting in favor of breaking away versus 781 against.

[28] Two votes on the question of secession in Virginia occurred at a convention that occurred prior to conflict at Fort Sumter. Both failed to receive a majority by convention delegates.

Figure 16: Weekly Yields to Maturity for Virginia State Bonds in 1861



Dashed grey: National events / Red: State-Specific

From the perspective of the model the departure of the northwestern counties from the state of Virginia would be treated by financial markets equivalently to a state leaving the union – it reduces the capacity of the existing polity to finance its debt, raising the risk of default. Table 7 thus tests whether there is evidence of elevated risk when Virginia splintered in two. When breakaway counties in the western part of the state voted to remain part of the union by forming the new state of West Virginia, the ytm on Virginia state bonds rose by 65 basis points (using the specification shown in the last column and that includes all relevant secession-related events).[29]

[29] Appendix Table E.8 shows that the results are similar when using Newey West standard errors.

Table 7: Yields to Maturity of Virginian debt - Within State secession

	(7.1) $YTM_{i,t}$	(7.2) $YTM_{i,t}$	(7.3) $YTM_{i,t}$	(7.4) $YTM_{i,t}$	(7.5) $YTM_{i,t}$	(7.6) $YTM_{i,t}$
Secession	5.261				6.648	5.624
	(0.203)***				(0.733)***	(0.732)***
	[0.312]***				[0.558]***	[0.611]***
Convention W-Virginia		3.670			-0.583	-0.593
		(0.677)***			(0.794)	(0.800)
		[1.006]***			[0.529]	[0.534]
W-Virginia opp secession			2.530		-1.173	0.118
			(0.670)***		(0.421)***	(0.593)
			[1.081]**		[0.428]***	[0.612]
W-Virginia Secedes				1.825	0.0911	0.650
				(0.468)***	(0.277)	(0.222)***
				[0.886]**	[0.439]	[0.361]*
Lincoln						1.097
						(0.174)***
						[0.277]***
Ft. Sumter						1.073
						(0.0566)***
						[0.0835]***
1st Bull Run						-1.797
						(0.533)***
						[0.792]**
Observations	261	261	261	261	261	261
R-squared	0.954	0.871	0.821	0.785	0.963	0.976
Controls						
Time trend	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates from an autocorrelated model and presents White standard errors in parentheses and standards errors clustered at the month-level in box brackets.

7 Conclusion

By nature, secessions are uncertain events, the success of which is unknown at their outset. They often take months, if not years to unfold. As a result, participation can change as groups or regions update their beliefs about the relative benefits of staying in a union.

We build a simple model that accounts for the initial uncertainty as to whether a region participates in a secession movement and that allows for regions to update their decisions as new information about others' participation is revealed over time. This setting generates interdependence and allows for the emergence of several types of secession movements: solo secessions (where only one region leaves an existing polity), synchronous secessions (where several regions leave simultaneously), and domino secessions (where multiple regions depart,

but do so in different periods). The model also speaks to instances of sub-secession, when regions themselves further splinter over the decision to secede.

We illustrate how state bond data is particularly well suited for exploring the implications of models that allow for interdependence and Bayesian updating in secession movements. In particular, we build a new hand-collected data set of daily U.S. state bond yields for the 1850s and early 1860s to test three propositions arising from the model: (1) does heterogeneity in preferences lead to secession risk; (2) do bond markets price in secession risk; and (3) does interdependence matter?

Event studies and regression estimates show that financial markets began to price in secession risk at the time of Lincoln's election – well prior to the start of the U.S. Civil War – and did so in a way that accounted for the sequential nature of the breakaway regions. At the movement's outset, it was unknown which states would secede, but as more joined the movement, bond markets responded by reducing the yields on seceding states' bonds. This result is consistent with our model, which shows that the net benefits of secession can change over time, and that the costs of secession decline as more regions breakaway. Conversely, bond yields on existing U.S. federal debt rose as more states seceded.

Our framework also predicts that the alignment of within-region preferences in favor of secession impact a state's decision to secede. We find empirical support for this claim in the state bond data. For example, yields to maturity were greater in states that received more votes for unionists, suggesting that some counties in those states had a higher likelihood of rejoining the Union and/or opposing the state-level decision to secede.

We contribute to the existing literature on secession by examining how uncertainty can affect the willingness to secede. This uncertainty is crucial since it affects the size, the shape, and the perceived viability of a seceding polity. We document how secession ordinances contained "new information" in the sense that bond traders priced them into state bond yields. We show that these formal commitments to join a breakaway polity in turn influenced the willingness of others to secede. These results call for a better understanding of coalition-building and coordination among seceders during secession movements.

References

Alesina, A. and E. Spolaore (1997). On the Number and Size of Nations. *The Quarterly Journal of Economics 112*(4), 1027–1056.

Alesina, A. and E. Spolaore (2005). War, Peace, and the Size of Countries. *Journal of Public Economics 89*(7), 1333–1354.

Anesi, V. (2012). Secessionism and Minority Protection in an Uncertain World. *Journal of Public Economics 96*, 53–61.

Anesi, V. and P. De Donder (2013). Voting under the Threat of Secession: Accommodation versus Repression. *Social Choice and Welfare 41*, 241–61.

Bodie, Z., A. Kane, and A. J. Marcus (2013). *Investments and Portfolio Management*. McGraw Hill Education.

Bolton, P. and G. Roland (1997). The Breakup of Nations: A Political Economy Analysis. *The Quarterly Journal of Economics 112*(4), 1057–90.

Brown, W. O. and R. C. Burdekin (2000). Turning Points in the U.S. Civil War: a British Perspective. *The Journal of Economic History 60*(1), 216–231.

Burdekin, R. C. and M. D. Weidenmier (2001). Inflation is Always and Everywhere a Monetary Phenomenon: Richmond vs. Houston in 1864. *American Economic Review 91*(5), 1621–1630.

Calomiris, C. W. and J. Pritchett (2016). Betting on Secession: Quantifying Political Events Surrounding Slavery and the Civil War. *American Economic Review 106*(1), 1–23.

Calonico, S., M. D. Cattaneo, and R. Titiunik (2014). Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica 82*(6), 2295–2326.

Davis, G. K. and G. M. Pecquet (1990). Interest Rates in the Civil War South. *The Journal of Economic History 50*(1), 133–148.

Desmet, K., M. Le Breton, I. Ortuño-Ortín, and S. Weber (2011). The Stability and Breakup of Nations: A Quantitative Analysis. *Journal of Economic Growth 16*(3), 183–213.

Desmet, K., I. Ortuño-Ortín, and O. Özak (2022). Is Secessionism Mostly About Income or Identity? A Global Analysis of 3,003 Subnational regions.

Dew, C. B. (1970). Who Won the Secession Election in Louisiana? *The Journal of Southern History 36*(1), 18–32.

Esteban, J., S. Flamand, M. Morelli, and D. Rohner (2022). Stay, Split or Strike: Theory and Evidence on Secessionist vs. Centrist Conflict.

Friedman, D. (1977). A Theory of the Size and Shape of Nations. *Journal of Political Economy 85*(1), 59–77.

Gehring, K. and S. A. Schneider (2020). Regional Resources and Democratic Secessionism. *Journal of Public Economics 181*, 104073.

Hallett, S. (1864). *The Industrial and Financial Resources of the United States of America*. New York, NY: Samuel Hallett, Banker and Negotiator.

Hallwood, P. (2017). Comment: Betting on secession: Quantifying Political Events Surrounding Slavery and the Civil War. Technical report.

Hierro, M. J. and D. Queralt (2021). The Divide over Independence: Explaining Preferences for Secession in an Advanced Open Economy. *American Journal of Political Science 65*(2), 422–442.

Lindsay, P. and C. H. Wellman (2003). Lincoln on Secession. *Social Theory and Practice 29*(1), 113–135.

McCandless, G. T. (1996). Money, Expectations, and the U.S. Civil War. *The American Economic Review 86*(3), 661–671.

McPherson, J. M. (1988). *Battle Cry of Freedom*. New York, NY: Oxford University Press.

Meadwell, H. and L. M. Anderson (2008). Sequence and Strategy in the Secession of the American South. *Theory and Society 37*(3), 199–227.

Nicolay, J. G. and J. Hay (1917). *Abraham Lincoln: A History*, Volume 2. New York: The New Century.

Oosterlinck, K. (2003). The Bond Market and the Legitimacy of Vichy France. *Explorations in Economic History 40*(3), 326–344.

Oosterlinck, K. (2016). *Hope Springs Eternal: French Bondholders and the Repudiation of Russian Sovereign Debt*. Yale University Press.

Porter, R. P. (1880). *Report on Valuation, Taxation and Public Indebtedness in the United States as Returned at the Tenth Census*. Washington, D.C.: Government Printing Office.

Powell, R. A. (1976). *Kentucky Governors*. Frankfort, KY: Kentucky Images.

Suesse, M. (2018). Breaking the Unbreakable Union: Nationalism, Disintegration and the Soviet Economic Collapse. *The Economic Journal 128*(615), 2933–2967.

Suesse, M. (2019). Adjusting the Size of Nations: Empirical Determinants of Separatism and the Soviet Breakup. *Journal of Comparative Economics 47*(1), 50–64.

Waldenström, D. and B. S. Frey (2008). Did Nordic Countries Recognize the Gathering Storm of World War ii? evidence from the Bond Markets. *Explorations in Economic History 45*(2), 107–126.

Walter, S. (2021). Brexit Domino? the Political Contagion Effects of Voter-Endorsed Withdrawals from International Institutions. *Comparative Political Studies 54*(13), 2382–2415.

Weidenmier, M. D. (2002). Turning points in the U.S Civil War: Views from the Grayback market. *Southern Economic Journal 68*(4), 875–890.

Willard, K. L., T. W. Guinnane, and H. S. Rosen (1996). Turning points in the Civil War: Views from the Greenback Market. *American Economic Review 86*(4), 1001–1018.

Appendix

A Theoretical model: Proofs

A.1 Proofs - Proposition 1

Proof. As $g_1 \geq g_2 \geq g_3 \geq ... \geq g_n$, a region j never secedes if a region $j-1$ has not considered seceding yet. Given the structure of preferences, if region $j-1$ has seceded so have regions with lower j. We also note the difference in the costs of secession is written $\Delta c = c(j-1) - c(j)$.

Synchronous secessions. If $g_j > c(j-1)$, j and $j-1$ secede in the same period. In that case, region j does not require any additional economies of scale before seceding and secedes at the same time as $j-1$.

Solo secession. If $g_{j-1} > c(j-1)$ and $g_j < c(j)$, $j-1$ secedes but this is not followed by the secession of j. Thus, $j-1$ secedes but is not joined by j.

Combining previous inequalities, neither *synchronous secessions* nor *solo secessions* will occur if:

$$g_{j-1} > c(j-1) \geq g_j > c(j-1) - \Delta c. \tag{A.1}$$

In this sequence of inequalities, the first one ($g_{j-1} > c(j-1)$) ensures that region $j-1$ secedes. The second one ($c(j-1) \geq g_j$) ensures that region j does not secede at the same time as region $j-1$. The third inequality ensures that region j secedes after having observed the secession of region $j-1$ and updated its expectations ($g_j > c(j-1) - \Delta c$).

One condition for this inequality to hold is $\Delta c > c(j-1) - g_{j-1}$. Given that for the secession of $j-1$ to occur we have $c(j-1) < g_{j-1}$, Δc has to positive and greater than $c(j-1) < g_{j-1}$. In that case $c(j-1) > c(j)$, so we have economies of scale.

□

A.2 Proofs - Proposition 2

Proof. This proof is a sub-case of the previous one. Depending on the structure of the sequence of g (and expectations on g) and the c function, sub-secessions may occur. These effects are all driven by the extension of our model for which the representative agent does not decide for a single region having homogeneous preferences but for several regions having dissimilar preferences. Regions $j-1$ and j form a super-region R. The representative agent of $j-1$ decides on the secession of $j-1$ and j. the decision rule of $j-1$ is $E(g_{j-1}) > c(j)$. The

decision rule of j is $E(g_j) > c(j)$. By definition, $E(g_j) < Eg_{j-1})$ so potentially $E(g_j) \leq c(j)$. In that case, region j secedes from the seceding super-region R. This reduces the economies of scales and increases the costs of secession from $c(j)$ to $c(j-1)$. Eventually, this could lead to a domino effect of sub-secessions if $E(g_{j-1}) < c(j-1)$. We see that these patterns are more likely as $E(g_{j-1})$ is further away from $E(g_j)$. By assuming a different structure in the decision making process, we are then able to observe a potential second layer of secessions. □

A.3 Proofs - Proposition 3

Proof. The informational shock increases the probability $Prob(c(s) < E(g_j))$ for all regions. We can rewrite the secession risk for each region by defining s as the sum of individual properties to secede:

$$Secessionrisk_j = Prob(E(g_j)) > c(s)) \times c\left(\sum_{i=1}^{n} Prob\left(c(s) < E(g_{i,O})\right)\right) \tag{A.2}$$

Intuitively, increasing $Prob(c(s) < E(g_{j,O}))$ for all regions increases the first term of equation A.2 and decreases the second term if there are economies of scale. The evolution of secession risk following an overall shift in the probability to secede for the n regions then depends if the first or the second effect prevails. The second effect prevails iff economies of scale are large enough. If economies of scale are smaller than the increase in the probability of secession, then secession risk increases when news on the difference in preferences between potential seceders and the core arrives on the market. □

B Data Appendix

B.1 State Bonds Trading on the NYSE

Using data from the New York Exchange's archives, we identified all bonds trading during our sample period. There is surprisingly little information regarding the terms of US state bonds just before and during the Civil War. For example, determining the maturity and the date of coupon payments is not straightforward. Our main sources for doing so are Porter (1880) and *Hallett and Company's American Circular* (18 September 1861). These sources proved crucial for understanding some apparent inconsistencies. For example, in one case, the Ohio 6s 1860 still traded in 1861. Porter (1880, 617) mentions that these bonds were "payable at the pleasure of the state after 1860." The *Banker's Magazine* confirms this, stating "the state did not consider itself bound to come into the market, at such an unfavorable time, for a new

loan, and consequently the interest only was paid. The date should thus be viewed as the first date after which the state could call back the bond rather than the date of maturity."[30] Hallett (1861) lists other bonds as having a variable payment date (Georgia coupon bonds, Louisiana coupon bonds). In some instances, the maturity is given as a range. For example, this is the case for Kentucky's 6 per cent bonds (maturity 1868-1872), Missouri 6s (1872-1886), and Virginia 6s (1885-1893). For some states, the maturity is not mentioned in Hallett (1861), as in the case of the Tennessee coupon bonds and Indiana's bonds (listed with a maturity given as "18."). However, for the former, our original source provides a maturity date. In practice, when the maturity was absent, and when bonds were callable after a given date, we treated the bonds as perpetuities to compute the yields to maturity. When the maturity was given as a range, we considered the mid-range as the maturity date. In view of the long-term maturities expressed, when there is a range, this should limit any bias. While Porter (1880) proved helpful in understanding the maturity of particular bonds, it provided little guidance for coupon dates. Hallett (1861) proved to be a better source as it provided dates of coupons payments for most of our bonds. In instances where it did not provide this information, we relied on prices listed as ex-dividend or ex-interest. For the remainder, we first consider the coupon dates of the closest bond from the same issuer for which we know the date. If there is no such bond, we assume that the bond pays coupons on the most frequent dates encountered (1st of January and 1st July).

The following provides a listing of all bonds that traded on the NYSE. As noted in the data section, some of these bonds traded too infrequently to be used in our analysis:

Kentucky 6s and 6s large ,Kentucky 6s 15 years, Ohio 6s 1860, Ohio 6s 1862, Ohio 6s 1865, Ohio 6s 1870, Ohio 6s 1875, Ohio 6s 1886, Ohio 6s war loan, Indiana 2.5, Indiana 5, Pennsylvania 5s (coupon), Tennessee 1890, Tennessee 1871, Tennessee 1868, Virginia 6s, Virginia 6s new, Virginia 6s transferable, Virginia 6s large bond, North Carolina 6s, South Carolina 6s, Missouri 6s, Missouri 6s sterling, California 7s 1870, California 7s 1875, California 7s 1877, California 7s large bonds, California State 7s, California State 7s New bond, Louisiana 5s, Louisiana 6s, Georgia 6s, Georgia 6s payable in Georgia, Michigan 6s 1878, Michigan 6s, Michigan 6s 1863, Michigan State 7s, Michigan State 7s 1878, Michigan 7s war loan, Michigan State 8 weeks loan, Oregon war loan, Arkansas States 6s, NY State 5s 1858, NY State 5s 1859, NY State 4-1/2s 1859, NY State 5s 1860, NY State 5-1/2s 1860, NY State 5-1/2s 1861, NY State 5s 1862, NY State 6s 1860, NY State 6s 1861, NY State 6s 1862, NY State 6s 1864 NY State 6s 1865, NY State 6s 1866, NY State 6s 1867, NY State 6s 1868, NY State 7s 1870, NY State 6s 1871, NY State 6s 1872, NY State 6s 1873, NY State 6s 1874, NY State 6s 1875, NY State 5s 1874, NY State 5s 1875, NY State 6s 1878

[30] *Banker's Magazine*, February 1861, vol.15, pp.670-1.

NY State 6s 1887, Illinois interest 1847, Illinois interest 1860, Illinois internal improvement 1847, Illinois coupon bond 1860, Illinois coupon bond 1862 Illinois coupon bond 1863, Illinois coupon bond 1869, Illinois coupon bond 1870, Illinois coupon bond 1875, Illinois coupon bond 1876, Illinois coupon bond 1877, Illinois coupon bond 1879, Illinois registered bonds, Illinois sterling bonds, Illinois unregistered bonds, Illinois freeland bonds, Minnesota State 8 per cent, Virginia sterling 5 per cent, Iowa state 7s 1868. The next section of our appendix lists only the bonds used in our data analysis.

B.2 State bonds Traded on the NYSE and used in the Analysis

Description	Maturity	Maturity Used	Coupon dates
Kentucky 6s and 6s large	Unknown	Perpetuity	1st January and 1st July
Ohio 6s 1860	callable from 1860 on	Perpetuity	1st January and 1st July
Ohio 6s 1865	callable from 1865 on	Perpetuity	1st January and 1st July
Ohio 6s 1870	callable from 1870 on	Perpetuity	1st January and 1st July
Ohio 6s 1875	callable from 1875 on	Perpetuity	1st January and 1st July
Ohio 6s 1886	callable from 1886 on	Perpetuity	15 December and 15 June
Indiana 2.5	callable from 1873 on	Perpetuity	1st January and 1st July
Indiana 5	Unknown	Perpetuity	1st January and 1st July
Tennessee 1890	1890	1890	1st January and 1st July
Virginia 6s	Unknown	Perpetuity	1st January and 1st July
North Carolina 6s	Unknown	Perpetuity	1st January and 1st July
Missouri 6s	Unknown	Perpetuity	1st January and 1st July
Louisiana 5s	Unknown	Perpetuity	1st January and 1st July
Louisiana 6s	Unknown	Perpetuity	1st January and 1st July
Georgia 6s	Unknown	Perpetuity	1st January and 1st July
Michigan 6s 1878	1878	1878	1st January and 1st July
Michigan 6s	Unknown	Perpetuity	1st January and 1st July
NY State 5s 1858	1858	1858	1st June and 1st December
NY State 5s 1860	1860	1860	1st June and 1st December
NY State 6s 1862	1862	1862	1st June and 1st December
NY State 6s 1864	1864	1864	1st June and 1st December
NY State 6s 1872	1872	1872	1st June and 1st December
NY State 6s 1873	1873	1873	15 March and 15 September
NY State 5s 1874	1874	1874	16 march and 15 September

B.3 Dates of Southern Secession

Table B.1: Dates of State Secession Ordinance from the U.S., 1860-1

State	**Secession dates**
South Carolina	December 20, 1860
Mississipi	January 9, 1861
Florida	January 10, 1861
Alabama	January 11, 1861
Georgia	January 19, 1861
Louisiana	January 26, 1861
Texas	February 1, 1861
Virginia	April 17,1861
Arkansas	May 6, 1861
Tennessee	May 6, 1861
North Carolina	May 20, 1861

Note: States in bold are included in our data analysis.

C Historical evidence

C.1 Typology and Secessions in History

Table C.1: Illustration : Typology of secessions.

Type of secession	**Motives for secession**		**Definition**	**Examples**
	Preferences heterogeneity	Information on other secessions		
Solo Secession	Yes	No	A single region leaves the pre-existing entity	South Soudan (2011) Bangladesh (1971)
Synchronous Secessions	Yes (large shocks)	No	Several regions break-up from the pre-existing entity at the same time	Austro-Hungarian Empire (1920's) Ottoman Empire(1920's)
Domino Secessions	Yes	Yes	Secessions are endogenous and occur sequentially	USSR(1991) Yugoslavia(1990's) USA(1860's)

C.2 Louisiana: Illustrating the Process of a Domino Secession

The secession of Louisiana in 1860 from the United States illustrates the particularities of *domino secessions* presented in Propositions 1 to 3. As noted by Dew (1970), Louisiana's Governor, Thomas O. Moore told South Carolina's governor in October 1860: "I shall not advise the secession of my state." However, secessionists in Louisiana gained traction after the election of Abraham Lincoln to the U.S. presidency in November 1860: Louisiana's preferences diverged from those of the Union. Dew (1970, p.21) notes that "the Secessionist sentiment in most parts of the state grew measurable after South Carolina left the Union on December 20." Indeed, secession became more attractive once other regions made the first move. Regions (states) whose preferences differed from the core's were more likely secede if the new polity they entered was larger. In Louisiana, the citizens desiring a collective approach to secession via a "Union of Southern States" organized as the "Cooperationists" at the secession convention elections of January 7$^{\text{th}}$. "Immediate Secessionists" preferred going it alone. These factions nicely illustrate that, even within a seceding region, preferences may not be uniform.

C.3 Border States

Missouri held a convention in the late winter of 1861 on the issue of secession, and on March 4$^{\text{th}}$, voted 89-1 against, resolving that "at present there is no adequate cause to impel Missouri to dissolve her connection with the Federal Union, but on the contrary she will labor for such an adjustment of existing troubles as will secure the peace, as well as the rights of quality of all the States."[31] Even if Missouri officially stayed neutral, its governor Jackson was advocating in favor of secession and preparing a coup. On July 22, 1861, new elections were held for governor and the state once again called for a convention to vote on secession. The convention reaffirmed its earlier "no" vote on the secession question, a decision which only seemed to embolden the exiled Governor Jackson (and who had fled to the southern part of the state at that time). Despite union forces controlling almost the entire state, on October 28, 1861, Jackson along with some sympathetic members of the Missouri General Assembly passed an ordinance of secession. The act was formally recognized by the Confederacy on November 28, 1861, when it declared Missouri its twelfth member state.

Kentucky also had slaveholders. Roughly 23 percent of the state's total population in 1860 was slave-owners (ranking it 10$^{\text{th}}$). Kentucky relied on both northern railways and southern ports along the Mississippi River and its tributaries to transport its grains and other tradables. Like Missouri, Kentucky had a governor, Beriah Magoffin, who had strong

[31] *New York Times*, "Missouri State Convention," March 11, 1861, p.8.

beliefs about states' rights and who also believed that states had the right to secede. Despite his desire and effort to secure more rights for southern states, he ultimately acceded to the parliamentary process and called a special session of the Kentucky General Assembly on December 27, 1860 to decide the question of secession. In contrast to Governor Magoffin's views, most members of the general assembly were sympathetic to remaining part of the union. After the bombing of Ft. Sumter and Lincoln's request for troops from Kentucky to help extinguish the rebellion, Magoffin replied, "I will send not a man nor a dollar for the wicked purpose of subduing my sister Southern states"(Powell, 1976, 52). However, unlike Missouri, he did not go rogue. Instead, on May 20, 1861, both houses of the General Assembly passed a declaration of neutrality, a position endorsed by the Governor.

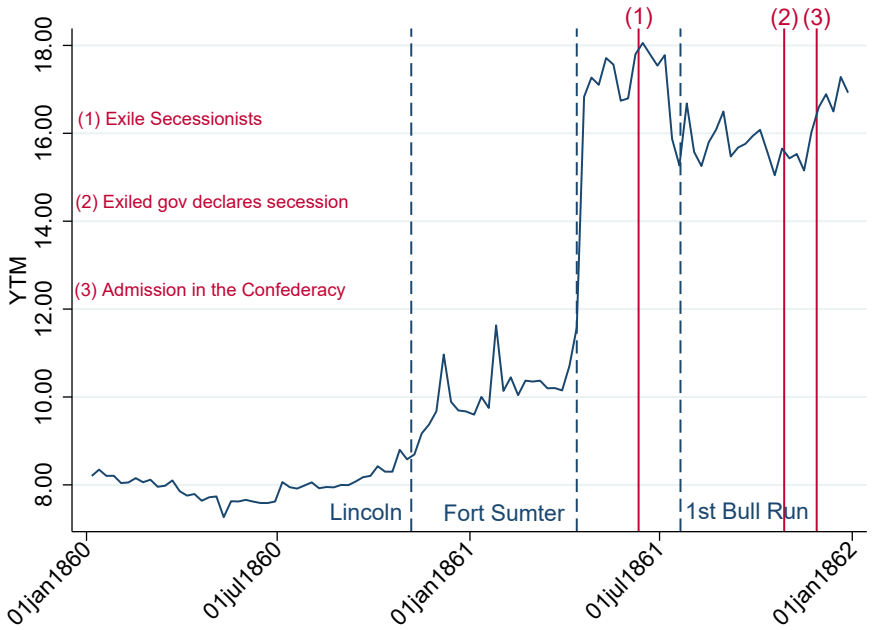
D Using Border States to Disentangle Secession risk from War Risk

Kentucky and Missouri are of particular interest because they declared their neutrality early on, leaving open the prospect that they could join the Confederacy at a later date. However, as neutral states, markets were probably not inclined to consider they would enter a war, if one were to begin. Their yields should therefore not reflect war risk. By contrast, movements in the yields could be affected when new information regarding their status as members of the union was revealed.

Both Missouri and Kentucky's bond yields increased around the bombing of Ft. Sumter and around the election of Lincoln, though Kentucky's rose by considerably less in response to both events (Figure D.2). The latter result may reflect the fact that, even though Lincoln had a very poor showing in his birth state of Kentucky, receiving less than 1 percent of the popular vote, the candidate garnering the most votes for president in the 1860 election was John C. Bell (45 percent) of the anti-secessionist Constitutional Union party. Markets in late 1860 perhaps viewed secession risk as lower in Kentucky in comparison to Missouri where the two Democrats running for president, Breckinridge and Douglas, received the most votes (around 35 percent), but who publicly differed on the right of a state to secede from the union. In addition, Missouri's bond yield remained considerably higher than Kentucky's after Fort Sumter. Bond markets also appear to have priced in the fact that Missouri's population was electorally divided at the time of Lincoln's election and because of the subsequent actions by the governor (Figure D.1). Tables D.2 and D.4 examine the weekly data for both Missouri and Kentucky's bonds. Our results imply that when Missouri was "admitted" to the Confederacy without the support of its elected legislature, its bond yields rose by around 130 to 250 basis

points. Given that unionists controlled the state at that time – markets simply priced this as additional secession risk, given the actions by the governor and the Confederacy lacked the legitimacy of even the state's legislature.[32]

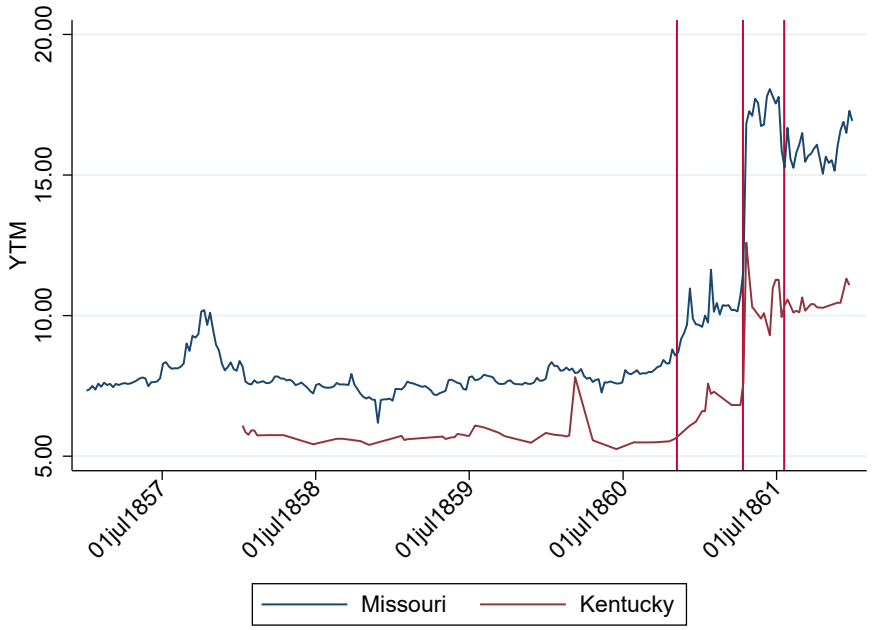
Figure D.1: Weekly Yields to Maturity in Missouri and key events



Dashed grey: National events / Red: State-Specific

[32] Appendix Table D.3 presents estimates using Newey-West standard errors.

Figure D.2: Weekly Yields to Maturity for Kentucky and Missouri



In Table D.4, we consider how two actions affected the yields of Kentucky's bonds: its decision not to send troops on April 15th 1861 in support of the union and its declaration of neutrality on May 20th 1861.[33] When the state declared that it would not send troops to the Union, its debt yields increased. Neutrality sent a dual signal: first, that the state would try to avoid war, second, that its place in the Union was not as certain as one could have expected since the state was not willing to risk the lives of its citizen for the Union. More generally, Kentucky's bonds were perceived as more risky than northern states' bonds, given it was a border state with slaveholders, but as long as its official position was to remain part of the union, bond markets perceived it as less risky to secede than a border state like Missouri. The evolution of the yields confirm the importance of secession risk as opposed to war risk. Following Lincoln's election, yields on these two border states bonds rose, a movement one could attribute to the position of both state governors who had expressed favorable views on seceding. But afterwards, the yields reflected new information regarding the position of the two states.

[33]Contrary to Missouri and the Federal debt, we do not estimate à Newey-West model for Kentucky as some weeks have missing data in 1861.

Table D.2: Testing Within-State Secession: Evidence from Missouri State Debt

	(D.2.1) $YTM_{i,t}$	(D.2.2) $YTM_{i,t}$	(D.2.3) $YTM_{i,t}$	(D.2.4) $YTM_{i,t}$	(D.2.5) $YTM_{i,t}$
Exile Seceders	3.425			3.358	0.449
	(0.714)***			(0.736)***	(0.762)
	[1.216]***			[1.214]***	[0.718]
Missouri "secedes"		2.161		-0.499	-0.245
		(0.543)***		(0.275)*	(0.210)
		[1.052]**		[0.316]	[0.167]
In Confederacy			2.557	1.283	1.302
			(0.461)***	(0.201)***	(0.205)***
			[0.894)]***	[0.0732]***	[0.0743]***
Lincoln					1.670
					(0.234)***
					[0.341]***
Ft. Sumter					6.312
					(0.637)***
					[0.620]***
1st Bull Run					-1.258
					(0.463)***
					[0.595]
Observations	261	261	261	261	261
R-squared	0.863	0.815	0.814	0.865	0.964

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates from an autocorrelated model with White standard errors in parentheses and standards errors clustered at the month-level in box brackets.

Table D.3: Testing Within-State Secession: Evidence from Missouri State Debt (Newey-West standard errors)

	(D.3.1) $YTM_{i,t}$	(D.3.2) $YTM_{i,t}$	(D.3.3) $YTM_{i,t}$	(D.3.4) $YTM_{i,t}$	(D.3.5) $YTM_{i,t}$
Missouri – Newey-West standard errors					
Exile Seceders	3.425***			3.358***	0.449
	(1.135)			(1.156)	(0.797)
Missouri "secedes"		2.161**		-0.499	-0.245
		(0.881)		(0.321)	(0.179)
In Confederacy			2.557***	1.283***	1.302***
			(0.743)	(0.160)	(0.161)
Lincoln					1.670***
					(0.295)
Ft. Sumter					6.312***
					(0.658)
1st Bull Run					-1.258**
					(0.577)
Controls					
Time trend	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates a Newey-West corrected standard errors model accounting for autocorrelation with two lags on the 1860-1861 sample for which no week has missing yields.

Table D.4: Testing Within-State Secession: Evidence from Kentucky State Debt

	(D.4.1) $YTM_{i,t}$	(D.4.2) $YTM_{i,t}$	(D.4.3) $YTM_{i,t}$	(D.4.4) $YTM_{i,t}$
No Troops	3.604		4.187	3.550
	(0.180)***		(0.515)***	(0.507)***
	[0.155]***		[0.606]***	[0.648]***
Declare Neutrality		2.235	-0.687	-0.747
		(0.567)***	(0.510)	(0.561)
		[0.734]***	[0.627]	[0.617]
Lincoln				0.308
				(0.200)
				[0.204]
Ft. Sumter				0.705
				(0.109)***
				[0.0716]***
1st Bull Run				0.0954
				(0.253)
				[0.138]
Obs	108	108	108	108
R-squared	0.933	0.828	0.936	0.938
Controls				
Time trend	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates from an autocorrelated model with White standard errors in parentheses and standards errors clustered at the month-level in box brackets.

E Supplementary Results

E.1 Robustness checks

Table E.1: When did the Risk of Secession Appear?Controlling for lagged Yields to Maturity

	(E.1.1) $YTM_{i,t}$	(E.1.2) $YTM_{i,t}$	(E.1.3) $YTM_{i,t}$	(E.1.4) $YTM_{i,t}$	(E.1.5) $YTM_{i,t}$
$YTM_{i,t-1}$	0.908***	0.905***	0.923***	0.944***	0.892***
	(0.0161)	(0.0258)	(0.0141)	(0.0167)	(0.0291)
Lincoln × South/Border	0.383***				0.315***
	(0.103)				(0.0862)
Ft Sumter × South/Border		0.380*			0.189
		(0.182)			(0.301)
1st Bull Run × South/Border			0.292***		0.0959
			(0.0704)		(0.130)
Secession				0.0615	-0.0928
				(0.120)	(0.173)
Constant	0.0787	0.105	-0.0533	-0.227	0.222
	(0.229)	(0.271)	(0.235)	(0.273)	(0.276)
Controls					
State FE	YES	YES	YES	YES	YES
Week FE	YES	YES	YES	YES	YES
Obs	1,427	1,427	1,427	1,427	1,427
R-squared	0.982	0.982	0.982	0.982	0.982
Number of States	11	11	11	11	11

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Each model includes state fixed effects and time fixed effects. The dependent variable is the yield to maturity of the difference state bonds. Since our estimations include time and state fixed effects, coefficients are to be interpreted as the time variation of the difference in yields between northern/border bonds and northern bonds before and after some key events. Column 4 consider all events at once and hence control for the confounding effects of different events. Lincoln is a dummy variable equal to one after the election of President Lincoln. Fort Sumter is a dummy variable equal to one after the battle of Fort Sumter. 1st Bull Run is a dummy variable equal to one after the 1st battle of Bull Run. Secession is a dummy variable equal to one after a country has seceded. South/Border is a dummy variable equal to one for Southern and Border States

Table E.2: Yields to Maturity of the Federal Debt and Number of Secessions

	(E.2.1) $YTM_{i,t}$	(E.2.2) $YTM_{i,t}$	(E.2.3) $YTM_{i,t}$	(E.2.4) $YTM_{i,t}$	(E.2.5) $YTM_{i,t}$	(E.2.6) $YTM_{i,t}$	(E.2.7) $YTM_{i,t}$	(E.2.8) $YTM_{i,t}$
Panel A: Autocorrelated models								
$YTM_{i,t-1}$	0.391	0.342	0.319	0.258	0.101	0.251	0.260	0.0881
	(0.106)***	(0.101)***	(0.113)***	(0.127)**	(0.118)	(0.123)**	(0.129)**	(0.113)
	[0.143]	[0.130]	[0.147]	[0.153]	[0.112]	[0.155]	[0.154]	[0.110]
Nb of Secessions	0.141	0.122	0.129	0.278	0.313	0.246	0.263	0.260
	[0.0288)***	(0.0288)***	(0.0309)***	(0.0654)***	(0.0683)***	(0.0896)***	(0.0743)***	(0.0951)***
	[0.0378]***	[0.0376]***	[0.0329]***	[0.0561]***	[0.0511]***	[0.0511]***	[0.0634]***	[0.0564]***
Lincoln					1.400			1.429
					(0.385)***			(0.389)***
					[0.469]***			[0.469]***
Ft. Sumter						0.280		0.388
						(0.361)		(0.313)
						[0.140]*		[0.136]***
1st Bull Run							-0.203	-0.136
							(0.327)	(0.295)
							[0.228]	[0.232]
Observations	174	174	174	174	174	174	174	174
R-squared	0.803	0.812	0.815	0.827	0.856	0.827	0.827	0.858
Panel B : Newey-West standard errors (Sample : 1860-1861)								
$YTM_{i,t-1}$	0.364**	0.356**	0.360**	0.299*	0.125	0.291*	0.301*	0.111
	(0.142)	(0.158)	(0.149)	(0.161)	(0.135)	(0.159)	(0.162)	(0.131)
Nb of secessions	0.132***	0.156**	0.122***	0.265***	0.306***	0.235***	0.250***	0.254***
	(0.0357)	(0.0749)	(0.0324)	(0.0657)	(0.0627)	(0.0744)	(0.0722)	(0.0751)
Lincoln					1.369***			1.400***
					(0.433)			(0.446)
Ft. Sumter						0.262		0.375*
						(0.239)		(0.222)
1st Bull Run							-0.209	-0.141
							(0.265)	(0.258)
Controls								
Time trend	NO	YES	NO	YES	YES	YES	YES	YES
Year FE	NO	NO	YES	YES	YES	YES	YES	YES
Time trend × Year FE	NO	NO	NO	YES	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Panel A presents estimates from an autocorrelated model and presents White standard errors in parentheses and standards errors clustered at the month-level in box brackets. Panel B estimates a Newey-West corrected standard errors model accounting for autocorrelation with two lags on the 1860-1861 sample for which no week has missing yields.

Table E.3: Yields to Maturity of the Federal Debt and Number of secessions (No lag)

	(E.3.1) $YTM_{i,t}$	(E.3.2) $YTM_{i,t}$	(E.3.3) $YTM_{i,t}$	(E.3.4) $YTM_{i,t}$	(E.3.5) $YTM_{i,t}$	(E.3.6) $YTM_{i,t}$	(E.3.7) $YTM_{i,t}$	(E.3.8) $YTM_{i,t}$
Nb of secessions	0.209***	0.242***	0.184***	0.358***	0.343***	0.309***	0.347***	0.281***
	(0.0164)	(0.0631)	(0.0349)	(0.0478)	(0.0496)	(0.0556)	(0.0486)	(0.0587)
Lincoln					1.53***			1.54***
					(0.426)			(0.434)
Ft. Sumter						0.396		0.437*
						(0.268)		(0.259)
1st Bull Run							-0.170	-0.118
							(0.266)	(0.253)
Controls								
Time trend	NO	YES	NO	YES	YES	YES	YES	YES
Year FE	NO	NO	YES	YES	YES	YES	YES	YES
Time trend × Year FE	NO	NO	NO	YES	YES	YES	YES	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates a Newey-West corrected standard errors model accounting for autocorrelation with two lags on the 1860-1861 sample for which no week has missing yields.

E.2 Supporting estimates

Table E.4: RDD Estimates of secession

	(E.4.1) $YTM_{i,t}$	(E.4.2) $YTM_{i,t}$	(E.4.3) $YTM_{i,t}$	(E.4.4) $YTM_{i,t}$	(E.4.5) $YTM_{i,t}$	(E.4.6) $YTM_{i,t}$
RDD Estimate Secession	3.799***	3.316***	2.471**	2.163**	3.303***	2.122**
	(0.978)	(1.133)	(1.082)	(0.934)	(1.049)	(0.919)
Bandwidth	MSERD	CERRD	MSERD	MSERD	MSERD	MSERD
Donut	No	No	No	No	Yes	No
S.e clustered	No	No	No	No	No	Yes
Control variables						
Fort Sumter	No	No	Yes	Yes	Yes	Yes
State FE	No	No	No	Yes	Yes	Yes
Obs	331	331	331	331	316	331

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. MSERD stands for MSE optimal bandwith selector. CERRD stands for CER-optimal bandwith selected. Donut regression excludes observation within 2 weeks of the secession (before and after)

Table E.5: Federal Debts, Secessions and non-linearities

	(E.5.1)
	$YTM_{i,t}$
1 Secession	0.346
	(0.548)
	[0.604]
4 Secessions	0.218
	(0.621)
	[0.604]
5 Secessions	0.614
	(0.550)
	[0.604]
7 Secessions	1.636**
	(0.668)
	[0.620]
8 Secessions	2.423***
	(0.683)
	[0.625]
10 Secessions	2.298***
	(0.703)
	[0.628]
11 Secessions	3.078***
	(0.762)
	[0.650]
Lincoln	1.525***
	(0.472)
	[0.627]
Ft. Sumter	0.147
	(0.250)
	[0.122]
1st Bull Run	-0.0847
	(0.311)
	[0.202]
Observations	174
R-squared	0.866
Controls	
Time trend	YES
Year FE	YES
Time trend × Year FE	YES

Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Frequency: Weekly. Estimates from an autocorrelated model with White standard errors in parentheses and standards errors clustered at the month-level are shown in box brackets.

Table E.6: Within-state heterogeneity and secession premium

	(E.6.1) $YTM_{i,t}$	(E.6.2) $YTM_{i,t}$	(E.6.3) $YTM_{i,t}$	(E.6.4) $YTM_{i,t}$	(E.6.5) $YTM_{i,t}$	(E.6.6) $YTM_{i,t}$	(E.6.7) $YTM_{i,t}$
$Secession_{i,t} = 1$	-6.080*	-0.527	0.277	17.71***	9.114***	9.324***	2.483***
	(2.813)	(1.109)	(1.180)	(3.892)	(2.545)	(2.157)	(0.575)
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Bell>40%)	0.121**						
	(0.0471)						
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Bell>50%)		0.0537					
		(0.0385)					
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Bell>60%)			0.0613				
			(0.0865)				
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Breckinridge>40%)				-0.241***			
				(0.0605)			
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Breckinridge>50%)					-0.162**		
					(0.0523)		
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Breckinridge>60%)						-0.312***	
						(0.0759)	
$\mathbb{1}(Secession_{i,t} = 1) \times$ %Counties(Bell>Breckinridge%)							0.0946**
							(0.0397)
Constant	7.898***	7.895***	7.893***	7.902***	7.902***	7.915***	7.897***
	(0.146)	(0.158)	(0.170)	(0.149)	(0.144)	(0.164)	(0.146)
Observations	1,765	1,765	1,765	1,765	1,765	1,765	1,765
R-squared	0.923	0.918	0.912	0.936	0.928	0.933	0.931
Number of states	11	11	11	11	11	11	11

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Each model includes state fixed effects and time fixed effects. $Secession_{i,t} = 1$ is a dummy variable equal to 1 if a state has seceded and zero otherwise. %Counties(Breckinridge>50%) is the proportion of counties within a state having a Breckinridge majority. %Counties(Bell>50%) is the proportion of counties within a state having a Bell majority. Median Margin is the difference in vote share between Breckinridge and Bell of the county at the median of the distribution within each state.

Table E.7: Secession Premium and electoral data – Summary

State	**Premium** Secession	%**Counties** (Bell>50%)	%**Counties** Breck>50%)	%**Counties** (Bell>Breck)
Georgia	0.79	17.56%	58.78%	34%
p-value	0.36			
Louisiana	1.61	6.25%	60.41%	23%
p-value	0.07*			
Virginia	4.76	35.06%	42.86%	51%
p-value	0.00***			
Tennessee	5.72	46.91%	43.21%	53%
p-value	0.00***			
North-Carolina	2.05	48.19%	45.78%	49%
p-value	0.06*			

*** p<0.01, ** p<0.05, * p<0.1. States shown according to their order of secession based on ordinance dates.

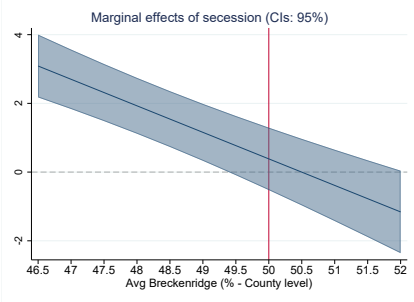
Table E.8: Yields to Maturity of Virginian debt - Within State secession (Newey-West standard errors)

	(E.8.1) $YTM_{i,t}$	(E.8.2) $YTM_{i,t}$	(E.8.3) $YTM_{i,t}$	(E.8.4) $YTM_{i,t}$	(E.8.5) $YTM_{i,t}$	(E.8.6) $YTM_{i,t}$
Secession	5.261***				6.648***	5.624***
	(0.261)				(0.604)	(0.644)
Convention W-Virginia		3.670***			-0.583	-0.593
		(1.001)			(0.699)	(0.703)
W-Virginia opp secession			2.530**		-1.173**	0.118
			(1.019)		(0.467)	(0.580)
W-Virginia Secedes				1.825**	0.0911	0.650**
				(0.745)	(0.390)	(0.308)
Lincoln						1.097***
						(0.232)
Ft. Sumter						1.073***
						(0.0683)
1st Bull Run						-1.797***
						(0.652)
Controls						
Time trend	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

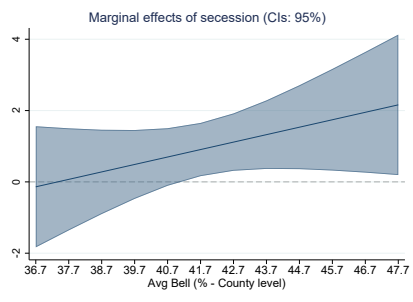
Robust standard errors in parentheses : *** p<0.01, ** p<0.05, * p<0.1. Estimates a Newey-West corrected standard errors model accounting for autocorrelation with two lags on the 1860-1861 sample for which no week has missing yields.

F Additional Figures

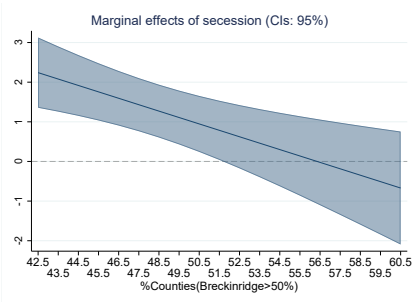
Figure F.1: Electoral Results and Within-State Heterogeneity



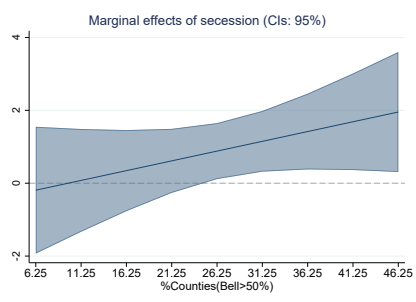
(a) Marginal effects - Vote share for Breckinridge (% average across counties)



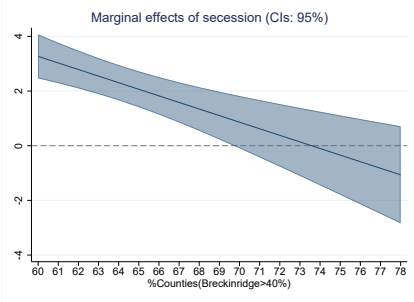
(b) Marginal effects - Vote share for Bell (% average across counties)



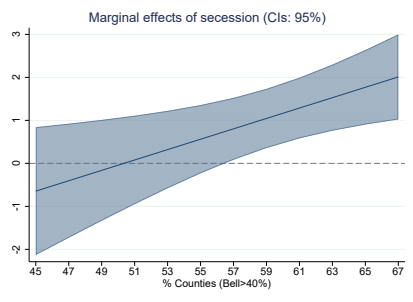
(c) Marginal effects - % of Counties with Breckinridge>50%



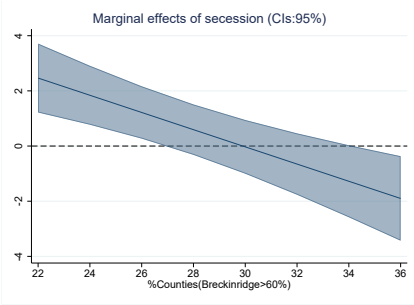
(d) Marginal effects - % of Counties with Bell>50%



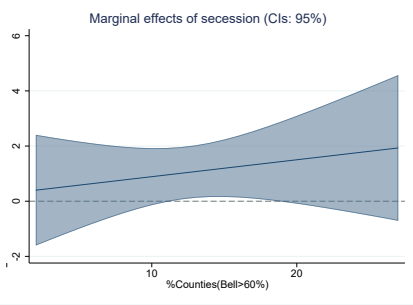
(e) Marginal effects - %Counties(Breckinridge>40%)



(f) Marginal effects - %Counties(Bell>40%)



(g) Marginal effects - %Counties (Breckinridge>60%)



(h) Marginal effects - %Counties (Bell>60%)