

# Monitoring and Discipline provided by Bank Examiners and the Panic of 1893

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We analyze the bank examination process during the National Banking Era and test whether bank examiners contributed to the health of the banking sector during this period. The information collected by the examiners consisted of quantitative information that would eventually be made public, quantitative information that remained private, and subjective information dependent on the expertise of the examiner. We find that all three types of information provided an indication about the condition of the bank. Moreover, we find that an examination that documented serious troubles at the bank prompted a response by management. We find that after such an examination, banks tended to write-down bad assets more aggressively, which would have promoted the health of the banking system. Finally, we find that the combination of a poor examination and the bank response resulted in a publicly observable signal, and that market participants reacted to this signal in ways that promoted market discipline.

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The supervision and examination of commercial banks by trained examiners is a key component of efforts by regulatory authorities to promote the health and stability of the financial sector. Nonetheless, the impact that examiners have is not well understood, in part because of the confidentiality of the process and of the outcomes. This is apparent in previous work on the topic which has been supportive of the idea that examinations matter, but which have provided only modest insights into the mechanisms at work. Some studies have found that bank examiners do appear to collect valuable private information during the examination as regulatory ratings of bank health that result from the exam forecast either asset prices or changes in the condition of the bank (Berger and Davis 1994; DeYoung, Flannery, Lang, and Sorescu 1998, Goldsmith-Pinkham, Hirtle, and Lucca 2016); however these studies do not provide any evidence about whether this information is used to affect bank behavior. Other studies have found that banks subject to more intensive examinations tend to have lower loan delinquency rates (Rezende and Wu 2014; Hirtle, Kovner, and Plosser 2016), though again the mechanism by which this happens is unclear.

In this paper, we are able to use detailed records of bank examinations to provide insights into the types information possessed by the examiner and illuminate how that information was used to influence the actions taken by the bank. The bank examination records we use are from the examinations of National banks by examiners in the United States Office of the Comptroller of the Currency (OCC) during the National Banking Era (1863-1913) which are publicly available in the National Archives. Looking at these reports allows us to see the sorts of information that the examiners were collecting and how the examiners were putting different pieces of information together to provide an overall assessment of the condition of the bank and make their recommendations. Moreover, by observing sequential examination reports, we are also able to observe the response by banks to the recommendations of the examiners.

The National Banking Era was the first time that widespread and systematic use of bank examiners was employed in the U.S. Indeed the examination process was an important part of the regulatory regime at this time. Despite the reputation of this period for being one of instability, with periodic panics that would temporarily close large parts of the system, the actual failure rate of National banks was fairly low and comparable to the modern era. The analysis here sheds light on whether the examiners had a role in keeping the bank failure rate low.

Whether examiners were effective is unclear. In his Annual Reports, the Comptroller of the Currency, the head of the OCC, praised the examiners, but also call for improvements in the examination process (1887, 1889, 1891). Crays (1941) argues that the bank examiners during this period paid close attention to the health of banks in order to protect the payment system. White (1983) notes that the National banks had a much better reputation than state banks, in part because of the examination process; but also notes that the policy of the time of paying examiners based on the number of banks that they examined may have reduced the incentive to conduct thorough and high quality examinations. Moreover, in 1892, there were nearly 3,800 National banks to be examined and 41 examiners. As each examiner had to examine over 90 banks, on average, they would have needed to conduct their investigations at a fairly rapid pace and it is not certain how thorough they would have been able to be.

From an analytical standpoint, the examination process during this time period has valuable features. First, banks were examined once each year, which mitigates some of the endogeneity concerns in modern studies that troubled banks may be examined more frequently than other banks. Second, one of the typical recommendations by the examiners was that the bank suspend the payment of dividends. Such an action was publically observable. Thus, we are able to provide some insight into the impact of having some information about the results on the examination be revealed to the market (though imperfectly as there were other reasons that banks may have opted to skip paying dividends).

We start our analysis by considering the sorts of information generated by the examination process. We categorize this information as being one, either quantitative information that the examiner was required to collect, or subjective information based on the judgment and expertise of the examiners themselves. These two types of information reflect different aspects of the examination process. The quantitative information might provide useful insights into the condition of the bank, but its collection would not necessarily require an expert to obtain it. For instance, examiners were asked to state whether the president of the bank had to post a performance bond and to provide the value of loans that met a statutory definition of being delinquent. These quantitative measures could have been fed into simple rules for whether there should be any concerns regarding the banks' performance. The subjective information in the report required expertise on the part of the examiner. For instance, the examiners were asked to

comment on whether the management was capable, whether the board of directors was exercising oversight, and whether loans were adequately secured. This information would also have been valuable in evaluating the health of the bank, but required a trained examiner.

As we consider the value of the information on the examination report, it is also important to remember that there were other sources of information on the health of the banks. Five times a year, the Comptroller required banks to file a report of condition covering basic balance sheet information (the Call Report); this report was also required to be published in a local newspaper and the Comptroller included one of these reports for each bank in his annual report. The information contained in these public balance sheets also presumably shed light on the condition of the banks. A subset of the quantitative information on the examination report is the same as the information disclosed to the public, these we further categorize the quantitative information into publically observable information and private information.

A summary statistic of the examiner's evaluation of the condition of the bank was the estimated losses the bank was likely to incur on its assets. This loss estimate was used by the examiner in his determination of whether to recommend that the bank be disciplined, such as by requiring it to suspend the payment of dividends or write down the value of capital. Using the examination reports from 1892 for a sample of banks in larger cities in the South and West of the United States, we decompose the estimated losses into parts associated the quantitative balance sheet was made available to the public, the quantitative information only available on the examination report, and the residual, which we attribute to the judgment of the examiner. We then test whether these three components have predictive power for three bank outcomes. This methodology is similar to the one used by DeYoung, Flannery, Lang, and Sorescu (1998). Our first outcome measure is whether the bank survived the panic of 1893, one of the most severe stress events of the National Banking Era. The second measure is an indicator of bank profitability between 1892 and 1894; the growth rate of surplus and undivided profits. The third measure, the change between 1892 and 1894 in the ratio of other real estate owned (typically collateral seized when a loan went bad) to assets, is an indicator of loan performance.

We find that all three component parts of estimated losses are useful for predicting our outcome measures. That the part of estimated losses attributable to public information is informative is consistent with contemporary statements that the holders of bank liabilities (both

depositors and other banks) found the information in the Call Report useful for evaluating the health of the banks. Finding that the quantitative data from the examination report has predictive power indicates that examiners were asked to provide data on useful items; we note that such information was not limited to information about the assets, but included indicators of the quality of corporate governance as well. Finally, that the residual after accounting for quantitative information is informative indicates that the examiner's judgment was valuable and supports the idea that these were professionals that employed some expertise.

As a curiosity, we are able to investigate whether individual examiners were particularly tough or easy. We find that, in general, the examiners appear to have been fairly uniform in their translation of balance sheet metrics into loss estimates. The loss estimates from the few examiners that were either particularly easy or tough do not seem to have any differential predictive power for bank outcomes.

Finally we look at whether the examiners were able to use their assessments about the condition of the bank to take actions that would support the health of the system. The examiners did not have many remedial recommendations available to them. One recommendation that they did often make if the loss estimates were particularly large was for the bank to skip its dividend payment and use those funds to charge off bad loans. Even controlling for other factors, we find that such a recommendation increased the likelihood that the bank did skip its dividend by 23 percent. Rather than paying out dividends, we find that banks for whom the examiner recommended that dividends be skipped tended to charge-off losses to a greater degree than other banks.<sup>1</sup>

In addition, it appears that the examination report may have provided some signal to the public that could have been used to support market discipline. We find that banks that had not paid a dividend recently tended to pay higher rates for interbank funds than other banks. If an unfavorable examination report raised the likelihood that banks skipped paying a dividend and potentially increased borrowing costs for the bank, then the examination process and market

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<sup>1</sup> Hirtle, Kovner, and Plosser (2016) find that modern banks that receive more regulatory scrutiny tend to have more conservative loan loss provisioning practices. Thus, both their results and our results suggest that one channel through which examiners played a role is through the managing of losses.

discipline would have reinforced each other.<sup>2</sup> This signal, and the interaction with market discipline, is similar to the findings of Flannery, Hirtle, and Kovner (2017) that bank equity prices respond to the news contained in the modern Federal Reserve stress tests.

Overall, our results indicate that the examiners in the National Banking Era were a valuable part of the process and complemented other regulatory policies of the time.

The paper is organized as follows. Section 2 describes the data that we use in our analysis. Section 3 discusses the examination process and provides some basic information about the conduct of the examinations in our sample. Section 4 discusses the methodology that we use to evaluate the usefulness of different types of information available to and provided by the examiners. Section 5 reports the actual implementation and results. In Section 6, we test whether different examiners were particularly tough or easy. Section 7 describes how the monitoring of the examiners was related to the discipline of poorly performing banks and whether the recommendations by the examiner were valuable in improving the health of the banking system. Section 8 concludes.

## **Section 2. Data**

The data that we use comes primarily from the examination reports prepared in the early 1890s by the OCC examiners. The examination reports were quite detailed and, in this section, we describe the parts of these reports that are salient for our analysis. We also use data from the Reports of Condition or “Call Reports” from the same period and describe that information briefly as well.

We focus on a particular, and important, set of banks in our analysis as gathering information from the examination reports for all national banks in is prohibitively time consuming. In this section, we also describe the particular set of banks we use.

### *2.1. Primary data sources*

The most important data source for us is the examination reports conducted by the examiners of the OCC. The information in these reports reflects the private information of the

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<sup>2</sup> There were other reasons why banks might not pay a dividend. For instance, newer banks tended to omit them in favor of building up their surplus and undivided profits.

examiner after looking over the books of the bank—typically over a two day period. The examination reports are a rich source of information that cover many aspects of the operations of the national banks including the structure and quality of corporate ownership and governance, the distribution and quality of the loan book, amounts of assets related to real estate, and the composition of liabilities.<sup>3</sup> Some material the examiner collected was quantifiable, such as the value of loans for which real estate served as collateral or whether there was a loan and discount review committee with at least one board member who was not a manager. Other information was much more subjective, such as requests for the examiner to comment on the “general character of loans” or whether the bank officers were “capable, prudent, and of good reputation.”

At the end of the report, the examiners were asked to provide an assessment of the likely losses that the bank faced. The loss estimates could be related to loans that were considered “bad” or were likely to have to be written down or to problems with other assets such as an over-valued banking house or real estate that had been acquired when borrower had previously defaulted and would have to be liquidated at less than the value at which it was carried on the books. Based on these loss estimates, the examiner might recommend that the bank should take action to set aside resources to write-off bad assets, or if losses were severe, write down the value of its capital.

The second source of data is the Reports of Condition, or “Call Reports” which was a report of the balance sheet of the bank provided to the OCC about five times a year. A copy of each report was retained on site and the examiner could check this report against the books of the bank as well as use the information to compare against the current condition of the bank.<sup>4</sup> The information in the call report was public. In fact, banks were required to publish some basic line items from the call report in a local newspaper about the time it was sent to the Comptroller. In his Annual Report, the Comptroller also included the call reports for all the national banks for one of the five filing dates. This information was reportedly used by the public and other banks to monitor the condition of individual banks and was considered to provide useful information

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<sup>3</sup> Calomiris and Carlson (2014) in particular provide a detailed summary of the contents of the Examination Reports during this period. See also Robertson (1968) for more information on the examination process.

<sup>4</sup> It is noteworthy that examiners were also asked to verify the information provided on the call report. Doing so ensured that the information being reported there was accurate and thus useful. We are not able to measure this benefit, but it would be in addition to the other benefits noted elsewhere in the paper.

about the health of the bank. Indeed, the information about the balance sheets of all individual banks in the annual report was considered valuable enough that the Comptroller considered publishing this volume twice a year (Comptroller of the Currency 1890).

We are interested in how the information in these two sources is related to how the banks fared in and after the Panic of 1893. Therefore, we (mainly) use the examination and call reports that mostly closely precede the Panic. The Call Report is only available once per year and we use the September 1892 Call report. For the examination report, we use the examination report that started closest to, but not after, May 1, 1893.

## *2.2. The sample*

The sample consists of 205 national banks drawn from 37 cities. The cities include all the reserve cities and a number of the larger cities in the Southern and Western part of the country.<sup>5</sup> We focus on this region because it was the most seriously affected during the Panic of 1893; this event will provide a test of the value of the information collected by the examiners. Indeed, nearly all the cities in our sample had at least one bank close during the panic. The banks in the sample comprise all the National banks that were located in these cities that both filed a September 1892 Call Report and had an examination report prior to May 1, 1893.

The banks in the sample are generally comparable in size. They range from \$200,000 in assets to \$8,000,000. Thus, the sample excludes the tails of the banking system, the largest money center banks and the small banks in small communities. Additionally, as the banks in the sample are in either reserve cities or larger cities, they also likely had access to broadly comparable ranges of business opportunities (though of course whether or not individual banks chose to pursue those opportunities may differ). Thus, the banks in the sample are generally comparable to each other. It is important to note that our sample reflects a particular slice of the banking system at the time, an important slice consisting of the institutions connecting the periphery to the center, but a slice nonetheless.

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<sup>5</sup> Reserve cities were officially designated as such. Interbank deposits placed in the National banks located in Reserve cities could be counted as part of the legal reserve of other national banks.



### **Section 3. The examination process**

Examiners were generally assigned to a region and in charge of reviewing the banks in that region. We find that, when visiting a town, the examiners would typically look at several banks. White (1983) points out that examiners were paid by the number of banks that they examined and that the examiners had to pay their own expenses, which creates an incentive for the examiners to minimize the number of days spent traveling. If the town had only a few banks, then the examiner would look at them all. However, we also observe that, if the town had a more substantial number of banks, perhaps six or more, then the examiners would generally break up the examinations. He would typically examine several banks, then leave to look at banks elsewhere, and return a few months later to examine the rest of the banks. The examinations typically took two days, although they could be done in a single day or take as long as five days.

As noted by White (2009), one concern about the process of looking at multiple banks in a town at the same time is that once the banks learned that an examiner was in town, they might have “window dressed” their balance sheets to make the condition of the bank appear more favorable. The incentive to window dress might be reduced to the extent that the examiner did not review all banks in the larger cities in the same visit. Nevertheless, to check for evidence of window dressing, we look at whether the first bank in the town to be examined had systematically different balance sheet characteristics than the banks that were examined soon thereafter. As the examiner might not examine all the banks in a town in a single visit, we consider a bank to be the first to be examined if no bank in the town had been examined in previous six months and to be a subsequent bank if another bank had been examined within the past six months, although for nearly all banks considered to be subsequent another bank had been examined in the town within the past two days. (Definitions of the variables used here and elsewhere are in Table 1 and summary statistics are in Table 2.)

Our comparison of the findings of the examiners for the first banks examined in a town and the other banks is reported two groups of banks is in Table 3. We generally find little difference between the first bank examined and the banks examined subsequently. The share of banks that are deficient in their cash reserve is almost identical, as was the share of banks with loans in excess of the legal limit. About the same share of banks reporting that they used borrowed money, a practice that was frowned upon by the examiners (if anything, a higher share

of banks that were examined after the examiner had been in town for a while were found to be using borrowed money). The one place where we do see some evidence of window dressing is in the share of loans that were “legally bad.”<sup>6</sup> Legally bad loans were those on which interest was past due for a period of six months, unless they were well secured and in the process of collection (Coffin 1890, Alcorn 1908).” generally meaning that they were past due by some period of time or inadequately secured. Thus it appears that banks did make an effort to renew loans or gather more collateral once the examiner appeared in town, but otherwise efforts to window dress appear to have been minimal.<sup>7</sup>

## **Section 4. Methodology**

In this section, we describe two methodological approaches to evaluate the usefulness of the information collected by the examiners. We also describe in more detail the variables used in the analysis.

### *4.1 Methodological approaches*

We are interested in whether the private information on the examination reports was useful in assessing the condition of and prospects for the banks above and beyond the public Call Report information available from the banks and the Comptroller’s office. In addition, we are interested in whether both the quantifiable information in the examination report and the subjective information the examiner collected during his assessment of the bank were useful.

#### *4.1.1 Decomposition approach*

The foundation of both approaches is the loss estimates provided by the examiner. These estimates provided a numerical summary of the overall condition of the bank. The estimates were used to support any recommendation the examiner might make about whether or not to discipline the bank and the particular type of discipline to impose (suspension of dividends,

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<sup>6</sup> Section 5204 of the Revised Statutes

<sup>7</sup> We also looked to see whether more troubled banks were examined first. We did not find any evidence of differences in estimated losses between banks examined first and banks examined subsequently, which suggests that troubled banks were not examined first. We did find that examinations of troubled banks typically took longer, usually an extra day or so.

capital write-down). Thus, the examiners presumably took considerable care when making these estimates.<sup>8</sup>

We start our analysis by decomposing the loss estimates into the portions that can be attributed to each of our three sets of information: the quantifiable information observable to the public from the Call Report and bank location, the quantifiable information observed only by the examiner that was contained in the examination report, and subjective information the examiner. The decomposition is done in several steps. In the first step, we first regress the loss estimates on publicly available information both balance sheet variables and location attributes:

$$Loss\ estimate = \alpha_1 + \beta_1 Call\ report\ vars + \beta_2 Location + \varepsilon \quad (1)$$

The predicted values from this regression are the part of losses that are attributed to public information while the residual ( $\varepsilon$ ) is the part of the loss estimate related to the private information of the examiner that is orthogonal to the public information.

In the second step, we regress  $\varepsilon$  on the private quantitative information.

$$\varepsilon = \alpha_2 + \beta_3 Exam\ report\ vars + \tau \quad (2)$$

The predicted values from this regression are the part of losses that are attributed to private quantitative information while the residual ( $\tau$ ) represents the portion of losses that we attribute to the examiner's subjective information. To be precise, our decomposition approach gives us:

$$L_1 = losses\ attributed\ to\ public\ data = \widehat{\alpha}_1 + \widehat{\beta}_1 Call\ report\ vars + \widehat{\beta}_2 Location$$

$$L_2 = losses\ attributed\ to\ "quantifiable"\ private\ data = \widehat{\alpha}_2 + \widehat{\beta}_3 Exam\ report\ vars$$

$$L_3 = losses\ attributed\ to\ "soft"\ private\ data = \tau$$

A similar procedure has been used elsewhere in the literature to extract the portion of quantitative ratings due to private information (DeYoung et al. 1998).

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<sup>8</sup> Examiners were expected to have some knowledge of the quality of the local businesses to help them make these evaluations and loss estimates. One examiner indicated that he was new to the city in which he was examining banks and reported that he had sought out the local agent from Bradstreet's, a private credit rating agency, to help him evaluate the quality of the loan book. (Examiner report of the North Texas National Bank of Dallas, TX, charter 3834, 3/2/1893).

Having decomposed expected losses in this way, we then see whether each or any of the component parts are related to the subsequent performance of the bank either during the panic or over the next two years.

$$Outcome = f(\alpha_3 + \beta_4 L_1 + \beta_5 L_2 + \beta_6 L_3) \quad (3)$$

If the loss estimates contain any information useful for forecasting the evolution of the condition of the bank, then at least one of the three components should be associated with the subsequent outcomes.

#### 4.1.2 Direct prediction approach

The above methodological approach takes the information available to the examiners and uses it to explore whether the examiner's *ex ante* expectations of performance are related to subsequent bank performance. An alternative approach would be to estimate the relationship between the observable information and performance measures with the benefit of hindsight available to us as researchers and see whether the component of the loss estimate attributed to the soft private information of the examiner ( $\tau$ ) is still useful in predict outcomes as well as to determine the value of the data collected by the examiners. Here we would estimate:

$$Outcome = f(\gamma_1 \tau + \gamma_2 \text{Exam report vars} + \gamma_3 \text{Call report vars} + \gamma_4 \text{Location}) \quad (4)$$

Thus we have two different approaches for assessing the value the soft information provided by the examiners.

#### 4.2 What variables should be informative?

It is useful to consider the kinds of variables that we should expect to matter in our analysis and the context in which they will matter. To do so, it is helpful to think of risk at three levels: loan level risk, asset level risk (of which a subset is loan level risk), and institution level risk (of which a subset is asset level risk).

The examiner was asked to estimate expected losses on the assets of the bank. To do so, we expect that they considered the riskiness of the loan book, which they observed directly, and considered loan delinquencies and adequacy of any collateral when estimating losses. They might also take into account corporate governance practices that would impact the riskiness of

the loan book, such as the checks and balances embedded in the loan approval process. The examiners would also have evaluated potential losses from other assets of the bank, such as the amount of cash being held by the bank or the amount of assets that the bank had acquired through foreclosing on loans.

There are a variety of other variables that would be expected to matter for the outcomes that we observe and may be useful for outsiders to consider when evaluating the riskiness of the bank, but may not have been useful for the examiners. An excellent example is the leverage of the bank. Leverage affects the institutional level risk of the bank; more leveraged banks may be more likely to fail in the event of a shock. In addition, leverage could be a sign of willingness to take risk and outsiders might use this as a signal about the riskiness of the bank's loan portfolio. However since the examiners observe the loan portfolio directly, we expect that leverage would not be especially helpful for them in predicting the losses of the bank. We include leverage and other non-asset institutional level risk measures, such as deposit composition, in our regressions of loss estimates just in case the examiner took some signal from them, but we do not expect them to matter in these regression.

Our two procedures approach the value of subjective versus quantitative information and the relationships between the types of risk and outcomes in different but complementary ways. Our decomposition approach uses only examiner knowledge. This approach focuses on how outcomes are related to risks that appear on the asset side of the balance sheet (loan level and asset level risk). The alternative approach allows us to assess the value of pieces of information ex post. It compares the value of subjective information against a holistic picture of the bank that considers institution level risks and how those institution level risks relate to the different outcomes.

#### *4.3 Variables*

We have three sets of information: public quantifiable information, which consists of both call report data and location variables; private quantifiable information based on quantifiable information in the examination reports; and private soft information where we do not use any observable information. Here we describe the variables we construct for each set.

#### *4.3.1 Public quantifiable items from the call report*

We construct several variables derived from the Call Report; we consider these to be both publicly observable and “hard” quantifiable information. The variables we use are straightforward and many have previously been found in the economics literature to be associated with failure.

The first variable is bank size, which we measure using the log of total assets. Larger banks presumably have more opportunities to pick higher quality assets and managers and thus may have lower expected losses.

A direct indicator of the quality of the assets of the banks available from the call report was “other real estate owned” which was typically real estate acquired by a bank when a loan went bad. Presumably these are linked to higher expected losses. Another asset side variable that we use is the ratio of cash to assets. Cash holdings demonstrate both the ability of the bank to meet obligations as they come due. Cash is also a safe assets and holdings of safe assets might provide a signal about risk preferences; Calomiris, Heider, and Hoerova (2014) suggest that banks with higher preferences for cash may be signaling their safety and have lower expected losses.

We also include some variables related to the funding profile of the bank. Bills payable and/or rediscounts are higher cost forms of funding and borrowing through these instruments was considered imprudent in many cases.<sup>9</sup> As the use of high cost funding may have led the examiner to expect higher losses even if this variable was not on the asset side of the balance sheet, we add an indicator for whether the bank borrowed money in this way. This variable has been found by scholars to predict bank failure during the National Banking Era as well as during subsequent periods (Calomiris and Mason 1997, 2003, Carlson 2005). We also include the ratio of individual deposits to total liabilities. While it is not obvious whether this variable would necessarily be linked to failure, the examiner might have considered the role of individual depositors in funding base of the bank when estimating losses.

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<sup>9</sup> However, it was not uncommon for banks to resort to using these sources of funds during the harvest season. Use of such borrowing for these purposes was generally understood to be less problematic.

Our final call report variable is the bank's capital ratio defined as the ratio of net worth—capital, surplus, and undivided profits—to assets. As discussed above, while this variable does not directly affect the asset risk of the bank, lower leverage may signify less risk taking and lower expected losses.

#### *4.3.2 Public quantifiable items linked to bank demographics and location*

Various other bank attributes and location factors would have been apparent to both the examiners and the general public and we classify several control variables based on these items as publicly available information. Older banks might have more experienced personal and be better run. We thus include the log of the age of the bank as an observable attribute.

As the interbank deposits placed in banks in reserve cities were allowed to count toward the reserve requirements of other banks, examiners may have subjected the banks in the reserve cities to greater scrutiny. We control for this possibility by including an indicator for whether the bank was located in a reserve city among the observable factors. There is some indication that banks farther west tended to behave differently (Calomiris and Carlson 2016), so we also control for the distance the city is away from New York City, the center of the financial system.

County population may also have mattered; larger populations might imply more lending opportunities which might in turn have meant that the banks could choose from a better pool of potential loans. We therefore add a variable to account for the (log of the) county population. Similarly, the types of nearby lending opportunities might also have shaped loss expectations. In particular, the large seasonal swings associated with agriculture or the potentially volatile nature of mining may have been viewed differently by the examiners. Thus we include variables indicating the importance of agriculture in the state economy and an indicator for whether the state had notable mining activities (at least \$1 million in gold or silver was mined in the state in 1891).

#### *4.3.3 Private quantifiable items linked to the examination report*

The reports that the examiners filed with the Comptroller contained considerably more information about the condition of the bank than was available through the Call Report. This information, in combination with the examiner's recommendations, could be used by the

Comptroller to determine whether to take disciplinary action against the bank or in decisions regarding renewal of charters (during the National Banking Era, bank charters had to be renewed every 20 years). There are a number of quantifiable items in the examination report that the examiners might have used to inform their estimates of losses.

As noted above, certain loans were specified as meeting a statutory definition of being “bad.” As these loans were bad based on technical specifications, it did not take an expert to determine whether these loans were problematic. We use the share of total loans that consisted of these technically bad loans as one private quantitative measure the examiner could have considered when forming loss estimates. However, as we found above, banks tended to take actions to reduce this item following the arrival of the examiner in town; thus it is not clear that this ratio will be informative.

We also use ratios related to particular loan categories observed by the examiner. Real estate loans were considered riskier loans and National banks were forbidden from originating loans secured by real estate collateral. National banks were however, allowed to take real estate to secure previously existing debts. We therefore include the portion of loans backed by real estate as another quantitative indicator the examiner may have considered when estimating losses. Another type of loan listed on the examination report was demand loans, loans that could be called at the discretion of the bank. Comments by the examiner suggest that these were viewed as offering more liquidity to the bank than time loans. It is possible that the examiner considered these loans of a different credit quality as well offering additional liquidity.

We also use variables related to the governance and operation of the bank as the governance of the bank might matter for risk taking. One governance variable is the share of the bank’s equity owned by managers in the top three officer positions (president, vice-president, and cashier). Calomiris and Carlson (2016) find that banks where officers owned more of the bank tended to be more conservatively run institutions. The number of shares owned by these individuals was listed in the examination report and the total number of shares was simply the paid-in-capital of the bank divided by one-hundred.<sup>10</sup> We also include governance measures that indicate whether non-management shareholders were monitoring the management. These

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<sup>10</sup> In a few instances, the book value of the shares was not equal to one hundred, but these were noted in the call report.



include whether the president needed to post a performance bond (as a device for managing fraud), the log of the number of meetings the board held each year (based on whether the examiner whether the board met weekly, monthly, semi-annually, etc.), and whether there was an independent discount committee that monitored the loans. All three of these items were specifically required to be stated in the examination report.<sup>11</sup>

Finally, we include two measures related to the liabilities of the banks. One item described in the examination report was whether the bank issued certificates of deposit “for the purpose of borrowing money.” These were CDs that were issued to other banks and secured; they also paid higher rates of interest. Comments from the examiners make it clear that these were a close substitute for bills payable or rediscounts, but structured in such a way as to avoid being required to be reported as one of those more suspect items. Coffin (1890) also provides a dim view on the use of these certificates. Thus, having information on the use of such liabilities by the bank might be indicative of riskier behavior. The examination reports also provide more detailed information regarding the composition of individual deposits than the call report. Recent research, such as Ramirez and Zandbergen (2013), have found that checking deposits were more stable during crisis episodes. It is unclear that contemporaries would have made this inference, nevertheless, we include the ratio of checking deposits to total individual deposits as another indicator available from the examination report that is related to the riskiness of the bank.

#### *4.3.4 Outcome variables*

We focus on three outcome variables to infer the value of the subjective information provided by the examiners. The first is whether or not the bank closes—fails, suspends temporarily, or otherwise ceases operation—between time of the September 1892 call report or most recent examiner report and the end of 1893, after the panic. We use this broad measure of closure as the failure of the bank is not necessarily a straightforward idea, especially during a stress event such as a panic. A bank could fail if the regulators decide to take possession of the bank and appoint an outside receiver to liquidate the institution; this typically occurred if losses

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<sup>11</sup> Calomiris and Carlson (2016) use the sum of five indicators based on these pieces of information as well as whether the cashier had to post a performance bond and the share of the board of directors that consisted of non-managers. We use individual governance characteristics here as the examiner may have put different weights on different attributes than the equal weighting used by Calomiris and Carlson.

were expected to exceed the net worth of the bank. A voluntary liquidation would occur if the owners of the bank decided to unwind the bank without the regulators appointing a receiver; this could occur if the bank had incurred notable losses, but not so severe as to completely wipe out equity. Potentially, a bank could also be voluntarily liquidated if the owners simply decided that the bank was no longer expected to be profitable, though there is not much sign of this in our sample. Finally, a bank could suspend operations temporarily; if there was a “run” on the bank where liability holders sought to withdraw more cash than the bank had available the bank could shut its doors. If the owners desired to reopen, the examiners were sent to evaluate the bank to verify that its condition was generally sound and then give permission. Rather than try to determine which of these cases constituted failure, we focus simply on whether any of these events occurred. In our sample, 16 banks were placed in receivership, 7 were voluntarily liquidated, and 35 suspended temporarily but reopened. In general, higher loss estimates of any sort should be associated with an increased likelihood of closure.

The other two outcome variables are based on how the bank performed following the panic. These measures are thus conditional on the bank surviving the panic. The first is the change in the other real estate owned relative to assets between the September 1892 call report and October 1894 call report. As other real estate owned is associated with the seizing of collateral once a loan has gone bad, a change in this ratio is indicative of an improvement or deterioration in the health of the bank. We expect that the change in other real estate owned will be relatively greater for banks with higher expected losses.

The last outcome variable is the percent change in the bank’s surplus and undivided profits between the 1892 and 1894 call reports. These balance sheet items reflected the retained earnings of the bank. An increase in these items would be a sign of a profitable bank. Alternatively, banks would typically write off bad assets against current profits, but if those profits were insufficient to cover losses, then the bank would write-down its surplus and undivided profits to cover write-offs of bad assets. Higher expected losses would be linked to both higher write-offs and lower income so we expect a negative association between the growth of surplus and undivided profits and different measures of expected losses.

As noted above, definitions of all variables appear in Table 1. Summary statistics are reported in Table 2.

## Section 5. Analysis of the value of examiner private information

Here we present our baseline results as well as a variety of robustness exercises.

### *5.1 Analysis using the decomposition approach*

We start with the decomposition approach and estimate equation 1 to analyze how publicly available information contributed to the examiner estimates of total losses. These results are reported in Table 4. Overall, the adjusted  $R^2$  of the regression indicates that more than one-third of the variation in loan loss estimates could be explained by publicly observable information. Only one of the balance sheet variables from the call report is significant; the ratio of other real estate owned is strongly and positively related to estimated losses. Given that these assets were the result of loans that went bad, this result is not particularly surprising. Locational attributes seem to have played a notable role in determining the examiner loss estimates. As expected, we find that banks in reserve cities tended to have lower estimated losses than other institutions. Examiners appear to have had a more positive view of mining activities as banks in areas where mining was more prevalent tended to have lower expected losses. Agricultural activity appears to have been more suspect as examiners tended to expect greater losses at banks in areas where agriculture was more important. Curiously, we find that estimated losses tended to be higher in more populous areas.

The role of quantifiable factors from the examination report in explaining the part of losses not explained by public information, as estimated in equation 2, is shown in Table 5. The adjusted  $R^2$  is .13 which indicates that the variables reflecting private information explain an appreciable share of the residual from the first stage. Banks that had more loans secured by real estate were expected to have higher losses. Similarly, banks that funded themselves with certificates of deposit issued to other banks were also expected to have higher losses. While it might not be obvious why a liability item would predict expected losses on the asset side of the balance sheet, as noted above, this was a form of borrowed money that was employed, at least in part, to hide the extent of borrowing. Observing the use of such liabilities may have led the examiner to be more skeptical of the quality of the assets the bank was reporting. Banks that made use of formal corporate governance tools, such as having an independent loan review committee or requiring the president of the bank to post a performance bond were expected by

the examiner to have lower losses. Banks where the board met more frequently were expected to have higher losses; this finding suggests that involvement of the directors was not necessarily viewed as being beneficial.

The residual from the second stage is our measure of the loss estimate that is related to the expertise of the examiner and his subjective assessment of the condition of the bank. To assure ourselves that we are in fact capturing something associated the expertise and perceptiveness of the examiner, we look at how our residual is related to some of the characterizations made in the examination report that might illustrate “soft” information. One useful characterization is whether the management was viewed by the examiner as capable and efficient, both subjective ideas. For the 25 banks for which the examiner had concerns about the capability and efficiency of the management, the average residual is .013. At the other banks, the residual has an average value of -.002. The higher residual at banks were the examiner had concerns about the quality of the management is consistent with the idea that the residual is capturing some of the “soft” information from the examiner.

Overall these results suggest that the both the public and private quantitative information were incorporated into the loss estimates provided by the examiner, but that there was still substantial room for subjective information to play a role.

We next turn to testing whether the three decomposed parts of the loss estimate are useful in predicting the outcome measures. The results of regressing the three outcome measures on the loss estimate components are shown in Table 6. As a whole, the results are consistent with our expectations. The coefficients on all three components have the expected signs in all cases, higher losses raise the likelihood of failure, reduce the growth rate of surplus and undivided profits, and are associated with having an increase in other real estate owned on the bank’s books.

We find that that the loss estimate that we attribute to “soft” private information has notable predictive power. A one standard deviation increase in the expected losses attributable to soft private information (.027) increased the likelihood that the bank closed by about 10 percentage points; thus the effect seems economically notable. We also find that the loss estimate based on soft information helps predict the future performance of the bank. A one

standard deviation increase in this type of estimated loss is associated with a reduction in the growth of surplus and undivided profits by 28 percentage points (a bit less than one standard deviation) and boosts the change in other real estate owned by about 1 percentage point (about half a standard deviation).

The part of total expected losses attributed to private quantifiable information has predictive power for the two outcome measures that are available for banks that survive the panic, but has less predictive power for closure around the time of the panic. A one standard deviation increase in this component (.012) is associated with a reduction in the growth of surplus and undivided profits by 18 percentage points and with a boost in the change in other real estate owned by .6 percentage points (about one-fourth of a standard deviation). Thus, the size of the effects are slightly less than for the part of losses due to soft information.

The part of total expected losses that are attributable to public information and location effects are particularly valuable for predicting closure. Here a one standard deviation increase in this measure (.024) is associated with an increase in the probability of failure by 16 percentage points. The connection to the subsequent change in retained earnings is also quite strong the coefficient implies that a one-standard deviation increase in this component of losses reduces growth in surplus and undivided profits by 28 percentage points. Interestingly, we find no relationship between this part of estimated losses and the change in other real estate owned.

These results in general suggest that the soft information provided by the examiners was quite useful in assessing the health of the bank. The soft information appears to be statistically related to our three outcome measures and has comparably sized effects as the other components of the loss estimate.

### *5.2 Analysis using the direct prediction approach*

We now turn to our alternative framework and test whether the component of losses attributable to subjective information still has predictive power for various outcomes after accounting for the public and private quantifiable information directly. The results of regressing our outcome measures on the component of losses associated with subjective information, the quantitative indicators of bank condition, and location attributes are shown in Table 7. The first column of the Table shows results when the outcome variable is closure during the Panic of

1893, the second column has results for when the outcome is the growth of surplus and undivided profits, and the third column reports results when the outcome is the change in other real estate owned.

The results in these tables continue to support the idea that the subjective information provides information about the condition of the bank. The component of losses we attribute to the examiner expertise continues to forecast the outcome variables despite the fact that the quantitative variables are now able to be directly associated with the outcome variables rather than just acting through their impact on expected losses. Indeed, the size of the coefficients are not greatly changed indicating that the economic size of the relationships remain the same in this approach as in the previous approach.

The other variables in the regressions affect outcomes in ways consistent with our expectations. Using money borrowed from other banks was a bad signal. Banks that did so, either via certificates of deposit or bills payable and rediscounts, were both more likely to close and had lower growth in surplus and undivided profits. Notably, the coefficients on these variables are roughly the same in both regressions where they mattered. This result is consistent with the statements in the examination reports that these two forms of borrowing were close substitutes.

The impact of involvement in real estate proved to be mixed. Banks with more other real estate owned (loans gone bad and collateral seized) on their balance sheets in 1892 were more likely to close while banks with more active loans secured by real estate were less likely to close. Both measures of real estate involvement are associated with lower growth in surplus and undivided profits. Having more active loans secured by real estate resulted in increases in other real estate owned between 1892 and 1894, a finding that suggests that a good number of these loans eventually went bad and the collateral was seized. Having more other real estate owned in 1892 was associated, marginally, with a decreases of these loans on the balance sheet, possibly as these loans were charged-off.

The deposit base also mattered for the outcomes we consider. Banks that were funded more by individual deposits, and especially by checking deposits rather than savings deposits, appear done better following the panic. Banks with more checking deposits tended to have

stronger growth in retained earnings and lower growth in their other real estate owned. Banks funded more by individual deposits also appear to have been more likely to survive the panic than other banks.

With respect to corporate governance, we find that banks that required that the president be bonded also tended to be more likely to close in the Panic. However, if they survived, they tended to experience slower growth in other real estate owned in subsequent years. Our other corporate governance variables are not significant.

Location mattered. Banks in reserve cities were less likely to close and tended to fare better after the Panic as they had greater increases in their surplus and undivided profits. Banks in states with large mining activity were more likely to close, but after the panic did relatively well with notably higher growth in their surplus and undivided profits.

### *Section 5.3 Comparison to modern results*

Our finding that examiners in the National Banking Era had valuable private knowledge is in line with research regarding the information of modern examiners. Berger and Davis (1994) find that downgrades of regulatory ratings (which are not observed by the public) tend to occur in advance of declines in equity prices. Their result suggests that examiners have private information, especially with regard to potential deteriorations in condition. DeYoung, Flannery, Lang, and Sorescu (1998) regress the regulatory CAMEL rating on publicly observable information and see if the residuals have information for future movements of the prices of subordinated debt. They find that the residuals have predictive power which provides further evidence that the examiners possess useful private information.

Goldsmith-Pinkham, Hirtle, and Lucca (2016), look at the types of information possessed by examiners; they find that examiners pay attention to the information on internal processes, internal controls, and regulatory compliance, but that the assessments of information on capital and liquidity seem more closely associated with deteriorations in bank health. We also find that measures of capital and liquidity, as reflected in the examiner assessments, mattered for bank outcomes. However, our results might put more weight on the value of internal controls as we find that measures of governance and internal controls are strongly associated with the

examiner's estimates to total losses and that even our measures of subjective information appears to be correlated with indicators of concerns about the quality of the management.

#### *Section 5.4 A note of caution*

This is not to say that examiners were perfect. Bank managers appear to have been able to hide problems in their institutions if they were particularly determined to do so. One illustrative example is the Indianapolis National Bank. Two successive examiners reported that the bank appeared in good shape. The examiner in June 1892 reported that the bank was in good condition and was prosperous. On July 17, 1893, the examiner reported that the bank was “in excellent condition.” Seven *days* later the bank failed. There was a run which closed the bank on July 24.<sup>12</sup> A receiver was appointed on August 3. By the end of 1900, the receiver had returned to depositors only 60 cents on the dollar. The bank president had apparently been engaging in numerous deceptive practices to support the failing business of his sons. These practices included issuing small loans to all the employees of these businesses to make it look like the loans were better distributed and inflating the value of collateral. Detecting fraud can always be a challenge and clearly the examiners missed this particular episode. We provide this example to highlight that some minimum level of cooperation of management with the examiners was necessary for the examination process to be a success.

#### **Section 6. Did which examiner conducted the examination matter?**

We know the names of the examiners that conducted each examination.<sup>13</sup> One might wonder whether certain examiners tended to provide higher or lower estimates of losses than others. Indeed, if there is significant dispersion in how examiners translated the observables into estimated losses, then we might need to include examiner controls in the first stages. To test for differences in examiner strictness, we create indicator variables for each examiner that

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<sup>12</sup> Other banks also appear to have thought the bank was not in terrible shape. The Indianapolis Journal of July 26, p.1, reported that the clearinghouse of the city had extended the bank a \$50,000 loan when the run first started a few days previous.

<sup>13</sup> We do not know very much else about these individuals, such as their experience when conducting the examinations. The Comptroller did include a list of examiners in his 1892 Annual Report and again in the 1902 Report. (We have not been able to locate similar lists in other years.) Of the 41 examiners listed in 1892, only 6 of them were still examiners in 1902. This turnover suggests that the tenure of the examiners was fairly moderate.



performed at least five examinations. There were 18 examinations that were made by six individuals that conducted less than five examinations apiece; these form the control group against which we compare the other examiners. We then regress estimated total losses on these examiner indicator variables and controls for the quantitative variables used above, both public and private, and location controls.

The results appear in Table 8. In most cases, we find that the coefficients on the examiner indicator variables are small and insignificant. This finding suggests that, broadly speaking, banks were held to a fairly uniform standard.

There are a few exceptions. Mr. Stone and Mr. Gannon appear to have been relatively tough while Mr. Brush and Mr. Chamber were comparatively easy. We looked at whether the banks that these individuals examined fared worse or better in any of our measures. To do so, we regress the three outcome measures on the quantitative variables, the part of estimated total losses attributable to soft information, and either indicators for having a tough/easy examiner or the indicators for having a tough/easy examiner interacted with the soft information residual (results not shown). We do not find any systematic evidence that having a tougher or easier examiner made a difference one way or another in the three outcomes.

### **Section 7. Discipline provided by examiners on poorly performing banks**

In the previous sections, we have found that that both the factual and opinion based information in the examination reports were useful in formulating loss estimates which are indicative of the condition of the bank. It is at least as important to know whether the examiners were able to use this information in such a way as to push for corrective behavior to promote the health of the banking sector. In this section, we investigate whether the examiners affected the behavior of the banks that they examined.

When an examiner had concerns about the banks and expected that losses were likely to be particularly large, there were a limited number of statutory recommendations that he could make. If the bank was found to have violated certain rules, such as its reserve requirement, the bank was not supposed to make new loans or pay dividends; the examiner may have been able to point out such a circumstance. If the bank was found to have a capital impairment—estimated losses exceeded the surplus and undivided profits—the Comptroller could require an assessment

against shareholders to pay the deficiency or to appoint a receiver if the deficiency was not remedied (or if the bank was deemed insolvent).<sup>14</sup>

We find that in practice, the examiners would make other recommendations even if these did not have statutory backing. Some recommendations were mild, such as suggesting that the bank use a more modern bookkeeping system. On the other end of the spectrum, the examiner might recommend that the bank charge off bad assets by writing-down the value of its capital stock. The most common recommendation was that the bank skip paying a dividend, even if the reserve requirement was met, and instead use its earnings to charge off bad assets or to rebuild the surplus and undivided profits of the institution. Out of our sample of 205 institutions, this course of action was recommended 33 times or for about 15 percent of the sample. More severe recommendations, such as writing-down capital or making assessments against shareholders, were recommended for 8 of these institutions.

To understand whether the loss estimates and the recommendations for corrective action were effective in improving the health of the banking system, we consider several aspects of the disciplinary process. We first consider whether the assessment the examiner provided affected whether that same examiner visited the bank subsequently; finding that the examiners were more likely to be replaced if they provided high loss estimates might indicate that they were less able to discipline the bank. Next, we consider how the recommendation might have affected the behavior of the bank. When the examiners recommended not paying a dividend, the intent was that the bank would instead charge off some of its bad assets. We look at whether a recommendation resulted in such behavior. Finally we look at whether there might be a connection between the recommendation of the examiner and market discipline. In particular, we look whether the interest rates the bank paid to borrow funds was impacted by a decision to not pay dividends.

When investigating the disciplinary aspects of examination process, we look at how reports on the examination filing we have focused on so far, which we refer to as the baseline exam, are related to information reported on the subsequent exam. When considering this subsequent exam, we exclude cases where the next examinations is of a closed bank as these

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<sup>14</sup> The Comptroller could also allow the bank to voluntarily liquidate or write-down the value of its capital. See Comptroller of the Currency (1887, p.91).

may well differ from a normal bank examination. Excluding these banks reduces our sample somewhat. As an alternative, we also looked at how the results of the examination preceding the baseline exam affected the responses in the baseline exam; while changes in the variables reported on the examination form in earlier years were less detailed than in the baseline examination, so we cannot control for the condition of the bank quite so well using the preceding examination. Nevertheless, results using the data that is available from the earlier reports are quite similar to the ones reported here.

### *7.1 Loss estimates and examiner turnover*

We start by looking at whether examiners that noted larger expected losses were more or less likely to revisit the bank. In particular, we test whether the ratio of estimated losses to assets reported by the examiner for the baseline examination affected the likelihood that the same examiner was also the examiner for the subsequent examination. If examiners pointing to problems were less likely to return, then the bank may have been willing to take the chance that the next examiner might provide a more favorable report. However, as shown in Table 9, we find no evidence that this was the case. There appears to have been little association between expected losses and whether the examiner returned.<sup>15</sup> Thus, we find no evidence that examiner turnover would have reduced discipline.

### *7.2 Examiner recommendations and subsequent action*

Our next step is to look more closely at how the bank responded to the recommendation that it not pay dividends and to instead charge off bad assets. We first focus on whether or not the subsequent exam reported that the bank had not paid dividends in the past six months. We regress an indicator for whether the bank paid such a dividend on an indicator for whether the examiner had recommended that the bank skip paying the dividend. We are interested in whether the recommendation of the examiner might have influenced the decision of the bank to skip the dividend above and beyond what the bank might have done itself based on its own

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<sup>15</sup> If we consider the losses reported on the previous exam and whether that examiner saw the bank in the baseline exam, we find that a bank was less likely to have a change in the examiner between the two reports if the examiner in the prior examination had made a higher estimate of losses. This, if anything, would have increased the discipline provided by the examiners.

assessment of its condition.<sup>16</sup> In order to do so, we also include in our regressions the quantitative indicators of bank health that we used previously.

Our results, Table 10, show that banks where the examiner recommended a suspension of dividends were less likely to have paid a dividend in the past six months. This is true even after controlling for other variables reflecting the condition of the bank.

The examiner intended that the funds not being used to pay dividends would instead be used to charge-off bad loans. We test whether the charge-off rate was indeed higher for banks where the examiner recommended that the dividend not be paid. A positive result here requires two things. First, it requires that the banks had sufficient earnings to be able to charge off bad assets; if the banks had no earnings, then clearly they could not charge off any bad assets. Second, if they did have earnings then a positive result requires that the banks made a choice to dedicate those earnings to charging off the bad assets. While we know from the previous result that the bank did not pay any funds (if available) as dividends, the bank could instead have opted place those funds into its surplus and undivided profits. Remember, the estimated losses are to some extent the opinion of the examiner, if the bank disagreed, then they could complied with the recommendation of not paying dividends while still positioning themselves to be able to pay out dividends more easily in the future if the losses expected by the examiner did not materialize.

Our measure of the charge-off rate is based examiner reports' indications of the amount of losses that the bank had charged off, any premiums charged off, and any decreases in value of assets charged off since the last examination. The charge-off rate is the sum of these charge-off amounts divided by the assets at the time of the last report. We then regress this charge-off rate on whether the examiner recommended that the bank not pay dividends.

The recommendations of a suspension of dividends were based on the examiner's estimates of the expected losses the bank would incur. One might expect that if a bank had more observably bad assets, such as elevated levels of other real estate owned, then the bank itself would prefer to charge-off more bad assets. Thus, in order to see whether the recommendation by the examiner might have resulted in charge-offs above and beyond what the bank might have

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<sup>16</sup> Moreover, the examiner could only recommend the suspension of dividends. For a recommendation to have had stronger legal force, the Comptroller would need to issue a letter to the bank.

opted to do itself, we again include in our regressions the quantitative measures of condition, public and private, as well as location factors that we used previously. As a further check for whether it was the examiner's recommendation that mattered, we test an alternative specification in which we use the measure of examiner's subjective estimate of losses from the decomposition analysis instead of the indicator for recommending the suspension of dividends.

The results support the idea that the examiner was able to push the bank to charge-off more bad assets. In Specification 1 of Table 11, we see that banks where the examiner had recommended that dividends not be paid, tended to have higher write-down rates. In fact, the coefficient indicates that at such banks the write-down rate was almost twice as high as the average rate of .8 percent. Further, we find that the judgmental part of the examiner's loss estimate is also associated with a higher charge-off rate even controlling for other factors related to condition. In Specification 2, we find the measure of losses based on subjective information also tended to result in higher charge-offs. These results provide further support for the idea that the examiner's recommendation provided a push for the bank to change its behavior. Interestingly, we don't find that many of our control variables are significant. We do however find that banks that had an active discount committee to review loans tended to have lower write-down rates.

These findings are supportive of the idea that the examiners had a positive influence on the health and stability of the banking system through encouraging banks to reduce bad assets through write-downs. Our findings are also consistent with the narratives provided by the examiners about their impact of the behavior of banks:

This is one of the largest and best reputed banks in the city. I frankly told the president and cashier that were it not that I know from general results that the bank was perfectly solvent the appearance of the paper, if judged by comparison with other banks, would give me a strong suspicion otherwise. I told them that their paper looked on its surface about the worst of any in my district. These open expressions spurred them on to a betterment of the appearance of the loans as a body...At the urgent request of the president and cashier, I remained in the bank for two days during which time notices were sent out and considerable technically bad and overdue paper was collected or put in better shape...(Examination report of First National Bank, Los Angeles, charter 2491, 12/31/1891)

Our results about the change in behavior at the banks must be compared to our results regarding the forecasting power of the decomposed parts of the loss estimates. With respect to

bank closure, given that the examinations typically happened only shortly before the panic, it is likely that the banks did not have much time to substantially change their behavior. Thus, we can be fairly confident that the decomposed loss estimates are predictive of closure rather than causal. For the change in other real estate owned, it is striking that even though we find that examiner recommendations of skipping a dividend resulted in a higher charge-off rate, that amount of these bad assets still increased. Presumably they would simply have increased more in the absence of the examiners encouraging banks to charge them off. Thus, again, it appears that the estimated loss estimates are in the case of the changes in other real estate owned are again important for their forecasting ability. In the case of the change in surplus and undivided profits, the interpretation could be a little different. Here, our earlier result seem to reflect, at least in part, the change in behavior engendered by the examiners. To the extent that examiners encouraged banks to use earnings to charge off troubled assets it would result in banks not being able to add to their surplus or undivided profits.

### *7.3 Market discipline*

Not paying dividends was potentially a signal to the stockholders of the bank that there were issues with the bank's profitability. (It was not a perfect signal however. While low profitability was the most common reason for not paying a dividend, there were other reasons. For example, newly chartered banks tended not to pay dividends as they sought to grow their surplus.) As this was not a common event, it seems likely that the suspension of dividends was noted by other banks.<sup>17</sup> Indeed, the examiners reported some discussions with the managers of troubled banks in which those managers expressed concerns about potential reputational consequences of omitting the dividend. We test whether banks that did not pay dividends suffered serious enough reputational consequences that they resulted in the banks paying higher rates in the interbank market. Finding evidence that skipping dividends raised borrowing rates would suggest that the examination process might have provided a fairly public signal about the quality of the bank in a way that was reinforced by market discipline.

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<sup>17</sup> Other researchers have found that the suspension of dividends was an important signal of condition in this era. For instance, Riddiough and Thompson (2016) find that that equity market participants used the suspension of dividends as a signal about the quality of firms around the time of the collapse of Ohio Life in 1857.

We compute the weighted average rate that banks paid in the interbank market as of the baseline examination report. We then regress this rate on whether the bank had omitted its recent dividend payment, as well as call report variables that would have been observable to other banks (using the 1891 call report as the 1892 information would generally not have been available yet) and locational controls. As reported in Table 12, banks that had omitted their most recent dividend payment tended to pay higher rates to borrow from other banks, even controlling for other public indicators of their condition. Thus, there is some evidence that the suspension of dividend payments triggered by a poor examination report contributed to disciplining of the bank in the interbank market.

## **Section 8. Conclusion**

In this paper, we find that the subjective information gathered by the bank examiners of the national banking era while conducting their examinations was important in shaping their overall assessments of the bank and were informative about the condition of the bank. We find that the part of overall expected losses that we attribute to this subjective information were useful in predicting whether a bank would fail in the panic, how profitable it would be in the next couple years, and how the banks' loans would perform. We also find that the private quantifiable information was informative about the health of the bank. The information that was valuable was not limited just to additional measures regarding the assets of the bank, but included information about the quality of the corporate governance of the bank.

We find that the examiners were able to use the results of the examination process to improve the health of the banks. The recommendations by the examiners that the bank was in poor condition appear to have prompted the banks to shift the use of their earnings from dividend payouts to funds that could be used to charge off bad assets. We also find evidence that the consequence of a bad examination report, the suspension of dividends, may have supported the use of market discipline. These results support the idea that the supervisory process of the national banking era was important for the general functioning and safety of the system and of the role of examiners whose expertise helped make that process effective.

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Table 1  
List of variables

<b>Variable</b>	<b>Source</b>	<b>Description</b>
<i>Loss related variables</i>		
Total losses to assets	Exam report	Ratio of total losses on all balance sheet items as estimated by the examiner relative to assets
Total losses attributed to public information	Derived	Predicted value from Equation (1)
Total losses attributed to private quantitative information	Derived	Predicted value from Equation (2)
Total losses attributed to subjective assessment	Derived	Residual from Equation (2)
<i>Public information</i>		
Log assets	Call Report	Log of assets.
Net worth to assets	Call Report	Ratio of capital, surplus, and undivided profits to assets
Cash to assets	Call Report	Cash and legal tender to assets
Other real estate owned to assets	Call Report	Ratio of other real estate owned to assets
Individual deposits to total liabilities	Call Report	Share of liabilities consisting of deposits by individuals
Used bills or rediscounts to borrow money	Call Report	Indicator that the bank borrowed using rediscounts or bills payable
Log age	Comptroller & Rand McNally	Log of the difference between 1892 and the time the bank was established.
Reserve city	Comptroller	Indicator that the city is a reserve city
Log county population	1890 Census	Log of county population
Log distance to New York		Log distance in miles to NY
Mining in state	Statistical Abstract of the US for 1892	The state mined more than \$1 million in gold and/or silver in 1891.
Fraction state income from agriculture	1890 Census	Value of agricultural products in the state divided by sum of the value of agricultural products and of manufacturing value added
<i>Private quantitative</i>		
Used CDs to borrow money	Exam report	Indicator that the bank borrowed using interbank certificates of deposit
Checking deposits to individual deposits	Exam report	Share of individual deposits consisting of checking deposits
Real estate loans to total loans	Exam report	Ratio of loans secured by real estate to total loans
Demand loans to total loans	Exam report	Ratio of loans callable at any time by the bank to total loans
“bad” loans to total loans	Exam report	Ratio of “Bad debts, as defined in Section 5204 Revised Statutes” to total loans
Management ownership	Exam report	The share of stock owned by the top 3 bank managers – the president, vice president, and cashier
Frequency of board meetings	Exam report	Log of the number of meetings held by the board each year
Active discount committee	Exam report	Indicator variable for having an active independent discount committee
President bonded	Exam report	President posted a surety bond
<i>Outcome variables</i>		

Closed	Comptroller	Indicator that the bank suspended, failed, voluntarily liquidated after filing the Sept. 1892 call report but before Jan 1, 1894.
Percent change in surplus and undivided profits	Call reports	The percent change in surplus and undivided profits from September 1892 to October 1894
Change in other real estate owned to assets	Call reports	The ratio of other real estate owned to assets in 1894 minus the ratio of other real estate owned to assets in 1892
<i>Other variables</i>		
Share of banks with deficient cash reserves	Exam report	Examiner indicated that the bank was deficient in its cash reserve
Share of banks that made loans in excess of legal limit	Exam report	Examiner indicated that the bank made loans in excess of the legal limit
Share of banks that used borrowed money	Exam report	Bank borrowed using bills payable, rediscounts, or CDs issued to other banks
Change in the examiner	Exam report	Is the examiner the same on the subsequent examination as on the baseline examination
Recent dividend subsequent exam	Exam report	Indicator for whether the bank reported on the subsequent examination that it had paid dividends in the past six months
Recent dividend current exam	Exam report	Indicator that the bank reported on the baseline examination that it did not pay a dividend recently
Charge-off rate	Exam report	Amount reported as being charged off since last examination on the subsequent examination divided by assets on the baseline examination
Rate bank pays to borrow in the interbank market	Exam report	Median rate at which the bank borrows in the interbank market on CDs, bills payable, and rediscounts
Examiner recommends no dividend be paid	Exam report	On the baseline exam report, the examiner recommended that the bank not pay dividends

Table 2  
Summary statistics

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<i>Loss related variables</i>					
Total losses to assets	205	1.2	3.8	0	32.1
Total losses attributed to public information	205	1.2	2.4	-2.2	14.8
Total losses attributed to private quant. information	205	0	2.9	-10.7	26.0
Total losses attributed to subjective assessment	205	0	2.7	-10.9	21.0
<i>Public information</i>					
Log assets	205	14.1	.84	12.0	15.9
Net worth to assets	205	33.0	12.8	8.5	76.1
Cash to assets	205	7.9	3.6	.29	20.3
Other real estate owned to assets	205	.81	1.6	0	11.2
Individual deposits to total liabilities	205	47.2	14.7	5.8	78.0
Used bills or rediscounts to borrow money	205	.19	.39	0	1
Log age	205	2.4	.75	.69	3.4
Reserve city	205	.37	.48	0	1
Log county population	205	4.4	.83	2.7	5.9
Log distance to New York	205	7.1	.45	6.3	7.8
Mining in state	205	.21	.41	0	1
Fraction state income from agriculture	205	.56	.15	.09	.92
<i>Private quantitative</i>					
Used CDs to borrow money	205	.15	.35	0	1
Checking deposits to individual deposits	205	74.1	19.9	17.5	100
Real estate loans to total loans	205	3.6	6.1	0	54.7
Demand loans to total loans	205	12.6	14.2	0	80.0
“bad” loans to total loans	205	1.9	4.2	0	31.4
Management ownership	205	24.2	22.5	.5	96.7
Frequency of board meetings	205	2.1	1.0	.7	3.9
Active discount committee	205	.60	.49	0	1
President bonded	205	.33	.47	0	1
<i>Outcome variables</i>					
Closed	205	.28	.44	0	1
Percent change in surplus and undivided profits	171	-11.9	40.6	-97.9	150
Change in other real estate owned to assets	171	.90	2.2	-8.3	10.6
<i>Other variables</i>					
Share of banks with deficient cash reserves	205	.18	.38	0	1
Share of banks that made loans in excess of legal limit	205	.55	.50	0	1
Share of banks that used borrowed money	205	.30	.46	0	1
Change in the examiner	205	.44	.49	0	1
Recent dividend subsequent exam	195	.40	.49	0	1
Recent dividend current exam	205	.28	.45	0	1
Charge-off rate	142	.84	1.1	0	6.1
Rate bank pays to borrow in the interbank market	67	5.9	1.2	2.9	9
Examiner recommends no dividend be paid	205	.16	.37	0	1

Table 3  
Comparison of the first banks examined with subsequent banks examined

	First banks to be examined (78 observations)	Subsequent banks to be examined (127 observations)
Share of banks with deficient cash reserves	.17 (.38)	.19 (.39)
Average ratio of legally bad loans to total loans	2.7 (5.6)	1.4 (2.9)
Share of banks that made loans in excess of legal limit	.55 (.50)	.55 (.50)
Share of banks that used borrowed money	.33 (.47)	.27 (.45)

Note. Standard deviations in parentheses.

Table 4  
Publicly observable hard information and total estimated losses

Dependent variable: Examiner's estimated losses divided by assets

	Coefficient	Standard error
Log assets	.20	(.39)
Net worth to assets	.04	(.03)
Cash to assets	-.08	(.08)
OREO to assets	1.09***	(.15)
Indiv. dep. to assets	-.03	(.02)
Uses bills of rediscount	.09	(.62)
Log age of bank	-.01	(.38)
Bank in a reserve city	-2.06***	(.72)
Log pop. of county	1.01**	(.49)
Log distance to New York	.78	(.71)
State has mining	-1.73**	(.70)
Ratio of income from ag. to income from ag. and manufacturing	2.51*	(1.50)
Constant	-12.3	(7.74)
Observations	205	
Adjusted R <sup>2</sup>	.36	
F-statistic	10.5	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively

Table 5  
Privately observable factors and the residual estimated losses

Dependent variable: Residual from equation 1

	Coefficient	Standard error
Borrows using CDs	1.20**	(.57)
Checking to indiv. dep.	-.003	(.01)
Real estate loans to total loans	.10***	(.03)
Demand loans to loans	-.02	(.01)
Legally bad loans to loans	-.08	(.05)
Mgmt ownership	-.003	(.01)
Number board meetings	.46**	(.21)
Active discount committee	-1.15***	(.45)
President bonded	-.81*	(.43)
Constant	.11	(.96)
Observations	205	
Adjusted R <sup>2</sup>	.13	
F-statistic	4.24	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively

Table 6  
Decomposed loss estimates and outcome variables

	Likelihood bank closes in 1893 (probit)		Percent change in surplus and undivided profits 1892 to 1894 (OLS)		Percent changes in other real estate owned 1892 to 1894 (OLS)	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Portion of losses attributed to subjective information	.04*	(.02)	-10.2***	(2.64)	.34**	(.14)
Portion of losses attributable to private quantitative information	.03	(.03)	-15.5***	(3.56)	.49**	(.20)
Portion of losses attributed to public information	.07***	(.02)	-12.0***	(2.69)	.02	(.15)
Constant			-4.3	3.5	.98***	.19
Observations	205		171		171	
LR $\chi^2$ / F-statistic	18.7		8.8		5.2	
Pseudo / adjusted R <sup>2</sup>	.08		.12		.07	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively. Coefficients in Column 1 are marginal effects evaluated at the mean.



Table 7  
Value of soft information in an ex post framework

	Likelihood bank closes in 1893 (probit)		Percent change in surplus and undivided profits 1892 to 1894 (OLS)		Percent changes in other real estate owned 1892 to 1894 (OLS)	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Subjective information	.05**	(.02)	-8.2***	(2.9)	.31**	(.16)
Borrows using CDs	.19***	(.08)	-26.2**	(11.2)	.10	(.59)
Checking to indiv. dep.	-.003**	(.001)	.31*	(.19)	-.03***	(.01)
Real est. loans to total loans	-.01*	(.006)	-2.1***	(.81)	.13***	(.04)
Demand loans to loans	.005**	(.002)	.37	.24	-.02	(.01)
Legally bad loans to loans	.001	(.01)	.18	(1.4)	-.09	(.08)
Mgmt ownership	-.001	(.001)	.16	(.16)	.001	(.01)
Number board meetings	-.004	(.03)	-2.8	(3.6)	.003	(.20)
Active discount committee	-.003	(.06)	9.5	(7.2)	.34	(.38)
President bonded	.11*	(.06)	3.2	(6.9)	-.80**	(.36)
Log assets	-.11**	(.05)	.22	(5.6)	-.22	(.30)
Net worth to assets	-.007**	(.004)	.26	(.45)	.05**	(.02)
Cash to assets	-.009	(.01)	.20	(1.03)	-.04	(.05)
OREO to assets	.09***	(.03)	-8.8**	(4.4)	-.41*	(.23)
Indiv. dep. to assets	-.007**	(.003)	.85**	(.33)	.001	(.02)
Uses bills of rediscount	.17**	(.07)	-24.9***	(9.2)	-.49	(.49)
Log age of bank	.04	(.05)	-10.0*	(5.2)	-.06	(.28)
Bank in a reserve city	-.24***	(.09)	23.0**	(11.4)	.65	(.60)
Log pop. of county	.09	(.06)	-12.8*	(7.8)	.39	(.41)
Log distance to New York	.08	(.10)	-19.0*	(11.2)	1.09*	(.59)
State has mining	.13	(.08)	25.9**	(10.7)	-.38	(.56)
Ratio of income from ag. to income from ag. and manf.	-.17	(.20)	-27.5	(22.0)	.66	(1.16)
Constant			133.7	(117)	-4.8	(6.2)
Observations	205		171		171	
LR $\chi^2$ / F-statistic	80.2		2.6		2.9	
Pseudo / adjusted R <sup>2</sup>	.33		.18		.20	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively.

Table 8  
Were there difference across examiners?  
(Tobit Regression)

Dependent variable: estimated losses to assets

	Coefficient	Standard error
Mr. Brush	-2.0	(1.3)
Mr. Camp	.70	(1.2)
Mr. Elary	-1.64	(1.4)
Mr. Wilson	-.96	(1.5)
Mr. Stone	6.5***	(1.5)
Mr. Galb	1.4	(1.4)
Mr. Griff	.61	(1.5)
Mr. Gannon	4.1**	(1.8)
Mr. Knight	1.2	(1.4)
Mr. McHugh	-.03	(1.7)
Mr. Lazear	-.29	(1.6)
Mr. Betts	.13	(1.6)
Mr. Chamber	-4.3*	(2.3)
Mr. Wight	-2.3	(2.2)
Borrows using CDs	1.6**	(.72)
Checking to indiv. dep.	-.02	(.02)
RE loans to total loans	.13***	(.03)
Demand loans to loans	.01	(.02)
Legally bad loans to loans	.0002	(.07)
Mgmt ownership	.001	(.01)
Number board meetings	.33	(.27)
Active discount committee	-1.03*	(.54)
President bonded	-.75	(.52)
Log assets	.47	(.42)
Net worth to assets	.04	(.04)
Cash to assets	-.07	(.09)
OREO to assets	.91***	(.17)
Indiv. dep. to assets	-.04	(.03)
Uses bills of rediscount	.64	(.74)
Log age of bank	-.14	(.45)
Bank in a reserve city	-.11	(.83)
State has mining	.45	(1.13)
Ratio of income from ag. to income from ag. and manufacturing	-1.95	(2.87)
Constant	-3.73	(7.25)
Observations	205	
LR $\chi^2$	168.0	
Pseudo R <sup>2</sup>	.18	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively. 62 observations were left-censored.

Table 9  
Relationship of reported losses and examiner turnover  
(Probit)

Dependent variable: did the examiner change from one examination to the next

	Coefficient	Standard error
Estimated losses on baseline exam to assets	.85	(3.73)
Log assets	-.16**	(.06)
Log age of bank	.15***	(.06)
Bank in a reserve city	-.33***	(.12)
Log pop. of county	.10	(.08)
Log distance to New York	-.08	.12
State has mining	-.07	(.13)
Ratio of income from ag. to income from ag. and manufacturing	.53**	(.24)
Observations	147	
LR $\chi^2$	31.5	
Pseudo R <sup>2</sup>	.16	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively. We report marginal effects.

Table 10  
Impact of examiner recommendation on the likelihood that the bank pays a dividend  
(Probit)

Dependent variable: Did the bank pay a dividend in the past six months?

	Coefficient	Standard error
Examiner recommended no dividend	-.23**	(.12)
Borrows using CDs	-.01	(.13)
Checking to indiv. dep.	.003	(.002)
RE loans to total loans	.002	(.01)
Demand loans to loans	.003	(.004)
Legally bad loans to loans	.01	(.01)
Mgmt ownership	-.0002	(.002)
Number board meetings	-.01	(.05)
Active discount committee	.16**	(.08)
President bonded	-.21***	(.07)
Log assets	.10	(.07)
Net worth to assets	-.004	(.005)
Cash to assets	.02	(.01)
OREO to assets	-.05	(.05)
Indiv. dep. to assets	-.004	(.004)
Uses bills of rediscount	-.08	(.11)
Log age of bank	.03	(.06)
Bank in a reserve city	.02	(.13)
Log pop. of county	-.16*	(.10)
Log distance to New York	-.51***	(.13)
State has mining	.44***	(.13)
Ratio of income from ag. to income from ag. and manufacturing	.54*	(.28)
Observations	145	
LR $\chi^2$ /	55.1	
F-statistic		
Pseudo / adjusted R <sup>2</sup>	.29	

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively. We report marginal effects.

Table 11  
 Examiner and charge-off rates  
 (Tobit)

Dependent variable: ratio of charge-offs to assets on last exam

	Specification 1		Specification 2	
	Coefficient	Standard error	Coefficient	Standard error
Examiner recommended no dividend	.76**	(.32)		
Subjective information		α	.39***	(.09)
Borrows using CDs	-.15	(.38)	.25	(.38)
Checking to indiv. dep.	-.002	(.01)	-.002	(.006)
RE loans to total loans	.005	(.03)	.02	(.03)
Demand loans to loans	-.009	(.01)	-.02	(.01)
Legally bad loans to loans	-.02	(.04)	-.10**	(.04)
Mgmt ownership	.001	(.005)	.003	(.05)
Number board meetings	-.10	(.12)	.04	(.12)
Active discount committee	-.47*	(.23)	-.75***	(.23)
President bonded	.10	(.23)	-.10	(.22)
Log assets	.17	(.21)	.12	(.20)
Net worth to assets	.02	(.02)	.02	(.02)
Cash to assets	-.05*	(.03)	-.07**	(.03)
OREO to assets	.05	(.14)	.46***	(.16)
Indiv. dep. to assets	.01	(.01)	.003	(.01)
Uses bills of rediscount	.14	(.32)	.18	(.31)
Log age of bank	.26	(.17)	.29*	(.17)
Bank in a reserve city	.23	(.27)	-.45	(.37)
Log pop. of county	.05	(.27)	.41*	(.25)
Log distance to New York	.63*	(.36)	.92**	(.36)
State has mining	.06	(.38)	-.21	(.37)
Ratio of income from ag. to income from ag. and manufacturing	-1.03	(.75)	-.20	(.73)
Constant	-6.7*	(3.8)	-9.2**	(3.72)
Observations		142		142
LR $\chi^2$		30.6		40.7
Pseudo R <sup>2</sup>		.07		.09

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively.

Table 12  
Impact of missing dividend payments on borrowing rate in the “borrowed funds” market  
(OLS)

Dependent variable: weighted average rate paid of funds borrowed in money markets

	Coefficient	Standard error
Bank had not paid a dividend in the past six months	.68**	(.34)
Log assets	.45*	(.26)
Cash to assets (1891)	-.05	(.05)
Other real estate owned to assets (1891)	.07	(.10)
Log age of bank	-.40	(.27)
Bank in a reserve city	.04	(.49)
Log pop. of county	-.45	(.31)
Log distance to New York	1.3**	(.52)
State has mining	-.84*	(.49)
Ratio of income from ag. to income from ag. and manufacturing	.42	(1.1)
Crop moving season	-.38	(.32)
Constant	-6.8	(5.4)
Observations		67
F-statistic		3.8
Adjusted R <sup>2</sup>		.32

Note: the symbols \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels respectively.