Conscientious Loan Officers and Loan Outcomes

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Using a unique data set of business loans from a commercial bank, I document how loan officers reallocate monitoring efforts within their loan portfolios when facing exogenous shocks to their attention. Effort reallocation creates negative spillover effects on the probability of default and renegotiation of other firms in their portfolios. This effect is 35–45% larger for loan officers with limited conscientiousness, which is defined as the tendency to be organized, responsible, and hardworking. Overall, these results suggest that the on-the-job soft skills employee selection policies are relevant for banks' efficiency.

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Abstract

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Keywords: Monitoring, Loan Officers, Banking, Conscientiousness, Loan Outcomes, Compensation.

JEL classification: G21, G41, J24, D23

The monitoring function of banks as financial intermediaries is fundamental. Indeed, one theory explaining the existence and uniqueness of banks emphasizes their ability to achieve economies of scale and scope while monitoring borrowers' credit risk (Townsend (1979), Diamond (1984), Fama (1985), Holmstrom and Tirole (1997), Rajan (1992)). Despite the fundamental nature of the financial intermediaries' monitoring function for efficient capital allocation, researchers find it challenging to observe monitoring choices and efforts. Because it is difficult to observe monitoring, previous empirical literature examines creditors' loan monitoring at the extremes, i.e., when firms breach the financial covenants of loan contracts.[1]

This paper examines loan monitoring in a setting that gives banks little opportunity or incentive to use financial covenants. I use a rich micro database from a major bank in Central America, where most firms do not have audited financial statements or access to public debt and equity markets. The lack of audited financial statements makes it challenging to write loan contracts with covenants and hence for loan officers to perform covenant-based monitoring. Because banks cannot enforce loan contracts with covenant-based monitoring, they must rely on information collected through *direct interaction* with the borrower through direct visits.

In this setting, the day-to-day efforts of loan officers to monitor borrowers become especially important for banks to manage credit risk. I observe detailed information about each loan, including its terms and performance; each corporate borrower, including its financial statements and the bank's risk assessment; and each loan officer, including their

[1] For examples, see the following empirical references on covenant-based bank monitoring: Nini, Smith, and Sufi (2012), Nini, Smith, and Sufi (2009), Chava and Roberts (2008), Berlin and Mester (1992), Gustafson, Ivanov, and Meisenzahl (2020), Spyridopoulos (2019), Demiroglu and James (2010).

compensation, personal characteristics based on internally administered psychometric tests, and observed effort on monitoring the borrowers in their portfolios. I use the data to analyze the effect on loan performance of the extensive and intensive margins of loan officers' monitoring decisions controlling for borrowers' credit risk at loan origination.

Because loans officers might not have the same monitoring capacity due to limited attention, I hypothesize that differences on the underlying personal psychological traits and attitudes of loan officers to choose and process information when firms face economic or financial shocks might be critical when loan officer choose how much to monitor a firm in their loan portfolio (Kacperczyk, Van Nieuwerburgh, and Veldkamp, (2016); Sims, (2003); Kacperczyk, Nieuwerburgh, and Veldkamp (2014)). I use internally administered intelligence and personality tests to investigate which inherent loan officers' personal characteristics-such as intelligence and conscientiousness - make them more effective at monitoring borrowers. Conscientiousness is associated with organizational skills, perseverance, achievement-oriented thinking, and the tendency to follow policies and procedures. Previous literature find that individuals with a higher level of conscientiousness are more likely to find a job, retain employment, have better wages, and succeed in the marriage market (Donato et al. (2017); Borghans et al. (2014), Heckman, Stixrud, and Urzua (2006); Dupuy and Galichon (2014)).

I use the Bank's internal monitoring efficacy measure to approximate the efforts of loan officers to collect and process borrowers' information. This explicit measure of monitoring intensity is a categorical variable that assess the efficacy of loan officers on collecting and processing the information through the life of the loan. This measure of monitoring allows me to test whether and how much monitoring reduces a borrower's

probability of default and loan renegotiation. The Bank routinely evaluates its employees, including assessing, measuring, and compensating the effort and efficacy of loan officers. The Bank provides an annual score that measures how loan officers perform their monitoring activities. Each loan officer receives a score for each firm in its loan portfolio. The loan officer can receive three possible monitoring scores: high, medium, and low. Loan officers must collect and analyze the financial statements every six months, cash flow estimations, collateral legal documentation, collateral appraisals, reports of field visits, and social and environmental risk evaluations. If at the end of the year the credit dossier of a given firm contains all the required information, the loan officer receives a high monitoring score. If two or fewer of the firm' credit dossier categories contain missing or outdated information, the loan officer receives a medium monitoring score. When there is a substantial amount of missing information or the information is outdated, the loan officer receives a low monitoring score.

In theory, monitoring deters the borrower's moral hazard because lenders may detect and punish borrowers' opportunistic behaviors, either by liquidation or through renegotiation (Park (2000), Diamond (1984), Townsend (1979)). But monitoring is costly, and provided loan officers having limited attention capacity, I hypothesize that a plausible exogeneous shock to the expected cash flows in their firms' loan portfolio will deviate their monitoring choices and consequently on the probability of default and renegotiation of the loans in their portfolios.

My empirical strategy is twofold. First, using a quasi-experimental design that exploits loan officers' variation in exposure to commodity price shocks, I test the hypothesis that loan officers reallocate their monitoring effort within their loan portfolios. Second, I test

the hypothesis that, as an unintended consequence of monitoring reallocations, there are adverse spillover effects on the probability of loan default and renegotiation for firms with a temporary reduction in monitoring.

Specifically, negative commodity price shocks affect some firms in loan officers' portfolios, but not others. These shocks provide exogenous variation in the urgency of monitoring firms that export commodities that incur a sudden drop in price. With limited capacity for monitoring, loan officers may turn their attention and effort to the shocked firms and disregard non-export firms in their portfolio. I use a triple difference procedure to test the impact of monitoring reallocations on the probability of default and renegotiation of non-export firms. The first difference is the response of loan outcomes to higher versus lower monitoring. The second difference is the response of loan outcomes to a shift in loan officers' attention due to the commodity price shocks. The third difference is the response of loan outcomes for monitoring reallocation by loan officers who have export firms in their portfolios (treatment group) against those loan officers of non-export firms only (control group). Consistent with the rational inattention hypothesis, after a commodity price shock loan officers in the treatment group substantially reallocate their effort: export firms are 30% more likely to be highly monitored compared to non-export firms (one standard deviation of the unconditional mean in the sample).

These reallocations of monitoring effort are important. The less monitored loans—even though they are not directly affected by the commodity price shock—default more and are more likely to be renegotiated. I find that the probability of default and renegotiation increases by 3.7 percentage points, and the probability of renegotiation increases by 4.2 percentage points for non-export firms one year after the exogenous shocks. These

magnitudes represent 0.1 and 0.3 standard deviations of the unconditional probability of those outcomes, respectively.

I hypothesize that the lack of human capital might prevent optimal monitoring. Human capital might take the form of innate ability, such as intelligence and conscientiousness, or may accrue to labor market experience (Gibbons and Waldman (2004), Heckman, Stixrud, and Urzua (2006)). I use the personality trait of conscientiousness to proxy for innate limited capacity for processing information. The data show that loan officers in the bottom quintile distribution of conscientiousness are worse at processing information and drive the increased probability of default and loan renegotiation by 35–45% after attention shocks. These results suggest that a limited conscientiousness in loan officers exacerbates time-varying attention shocks.

II. Related Literature

This paper contributes to several strands in the literature. The first strand relates to the role of loan officers on lending outcomes. Cole, Kanz, and Klapper (2015) find that a compensation scheme that only rewards loan origination reduces loan profitability and loan quality compared to a scheme that rewards loan origination and penalizes default. Agarwal and Ben-David (2018) analyze the effects of compensating loan officers based on volume origination to encourage loan prospecting for new business. The experimental settings of both papers consider only a lending model in which loan officers have a screening role but do not have monitoring responsibilities over the loan. Thus, an important contribution of my paper is to provide evidence that loan officers directly affect borrowers' ex post loan default and renegotiation outcomes through their monitoring effort.

My paper also contributes to the literature of rational inattention by providing direct evidence that loan officer monitoring choices during salient events affect the ex post loan performance. This result extends to the setting of bank lending, predictions from the theoretical literature on the consequences of rational inattention of institutional investors on corporates policies and mutual funds' investment allocation (Kempf, Manconi, and Spalt (2017), Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016)).

Finally, my findings contribute to the broader fields of finance, economics, and psychology by analyzing how individual characteristics affect corporate and personal decision-making.[2] My results suggest that differences in individuals' abilities to process information, proxied by the personality trait of conscientiousness, have implications for loan outcomes. These results are consistent with the burgeoning literature in financial economics that studies how the personality traits of individuals predict household financial distress (Parise and Peijnenburg (2019), Kuhnen and Melzer (2018)). Furthermore, these results are consistent with the literature in economics that find that higher conscientiousness individuals are more likely to find a job, retain employment, have better wages, and succeed in the marriage market (Donato et al. (2017), Borghans et al. (2014), Heckman, Stixrud, and Urzua (2006), Dupuy and Galichon (2014)). To my knowledge, this is the first paper to document the effect of conscientiousness on loan default and renegotiation outcomes through loan officer monitoring behavior.

[2] Existing work looks at the influence of loan officer gender (Beck, Behr, and Guettler (2013)) and numeracy skills (Brown, Kirschenmann, and Spycher (2017)).

III. Institutional Framework

III.A Data sources and sample construction

My sample comes from a proprietary data set of "The Bank," a bank belonging to a financial holding company headquartered in Panama, one that has a presence in several Latin American countries. The data that I use in this paper are from a bank subsidiary located in Nicaragua. The Bank is a commercial bank that offers retail, commercial, and investment services and holds the country's largest market share in deposits and commercial loans.

I began with the data set that contains all the business loans that the Bank had in its accounting books for the period 2013–2018. The reports include loans characteristics at the time of origination, as well as the required information the Bank reports on a monthly basis to the local bank authority. I observe loan balances, interest rates, maturities, the industry in which the borrower operates, whether the loan requires collateral, past due days for the principal and interest payments, whether the loan is a term loan or credit line, credit line amount approved, and external credit risk rating according to the national bank regulatory agency.

In the second step, I merge the loan data set with firm characteristics from borrowers' financial statements that the Bank periodically demands as part of its monitoring role. In the third step, I merge the firm and loan panel with the annual risk management report on loan officer monitoring scores. The credit risk management division is responsible for enforcing the annual policy of the Bank that stipulates an annual revision on loan officer monitoring performance based on an internal measure of effort. After this merger, I have a panel that identifies over time the loan officer responsible for monitoring a given firm. Finally, the information on loan officer characteristics, such as years of experience at the Bank, annual

compensation, age, level of education, and psychometric tests, come from the Human Resources Department that created specific reports for each loan officer in my sample.

III.B Measuring loan officer monitoring effort

A key variable in my analysis is a direct measurement of the monitoring effort of loan officers for the representative business loans of the Bank. Internal policy dictates that the loan officer can receive for each firm in their loan portfolio three possible monitoring scores: high, medium, and low.

Each loan officer monitors multiple borrowing firms and performs two tasks for each firm assigned to them. First, under the underwriting role, a loan officer presents to the credit committee the loan application and their supporting documentation, and recommends loan terms (e.g., interest rate, collateral, amount). The Bank's credit committee and the Board of Directors approve loans and final terms. Under the monitoring role, a loan officer collects, and reviews information provided by their borrower under the loan agreement, such as financial statements, projected cash flows, and collateral appraisals. Additionally, a loan officer conducts field visits to the borrower and observes the business premises, inventory, and other relevant information the borrowers can demonstrate. For example, if a firm plans to use the loan proceeds to purchase machinery and equipment, loan officers must verify the existence of the machinery as well as the insurance and the protection plan. Loan officers also discuss business matters with the entrepreneurs that may affect their repayment capacity and creditworthiness.

The loan officer must file a credit dossier containing the collected information so that upper management, external auditors, and the local banking regulatory agency can access it. When a borrower defaults, the loan officer is responsible for initially establishing

communication with the borrower and asking for a resolution of the overdue payments. If the payments remain overdue for more than 180 days, the legal department of the Bank begins a legal process to demand repayment of the loan or seize the collateral. Another bank's division resells the collateral to recoup losses.

The Bank's credit risk policy requires monthly and annual credit reviews to evaluate the credit risk profile of the loan portfolio based on local regulatory provisions. Another division of the risk management department provides an annual score that measures how loan officers perform their monitoring activities. Each loan officer receives a score for each firm in its loan portfolio. Internal policy dictates that the loan officer can receive three possible monitoring scores: high, medium, and low. The policy establishes that loan officers must collect and analyze the following information: financial statements every six months, cash flow estimations, collateral legal documentation, collateral appraisals, reports of field visits, and social and environmental risk evaluations. Once the credit dossier contains all the required information, the loan officer receives a high monitoring score. If two or fewer of the dossier categories contain missing or outdated information, the loan officer receives a medium monitoring score. For example, all the financial information of the firm is current and analyzed, but there is no evidence of field visits, and collateral documentation is missing. When there is a substantial amount of missing information or the information is outdated, the loan officer receives a low monitoring score.

While the Bank's policy aims to capture the effort that each loan officer exerts to monitor each firm, it could be that the borrower is not collaborating with the loan officer to facilitate the information collection process. In that case, analysts from the Bank's credit risk department require the loan officer to provide evidence of their due diligence on their

monitoring role (e.g., emails communication, phone calls, and visits to the borrower's physical location). The Bank's policy of requiring loan officers to perform direct visits to the borrowers' physical location is consistent with empirical papers that find in small business lending the physical distance between lenders and borrowers is critical for the monitoring role of banks, in particular when hard information is difficult to verify (Petersen and Rajan (2002)).

III.C Loan officers' compensation policy

Loans officers in the Bank receive compensation with three components: (i) a fixed wage $\overline{w}$, (ii) an annual bonus that is a function of loan origination, monitoring quality, and a subjective evaluation by the credit manager division, and (iii) financial perquisites in the form of a preferential interest rate on personal loans.

$$Total\ Compensation = \overline{w} + bonus(origination, monitoring, subjective) + financial\ perks \quad (1)$$

At the beginning of the employment relationship, each loan officer and the Bank agree on a fixed wage. The variation of the fixed wage among loan officers is explained by factors including differences in educational background (college or MBA institution) and years of experience in the banking industry. The loan officer receives an annual bonus that ranges from zero to 2.5 the monthly fixed wage $\overline{w}$, depending on the weighted average of the score on loan origination, firm monitoring, and the subjective evaluation.

During the first months of the year, the credit manager along with the human resources department evaluates loan officers and grants a bonus that can be zero *(Low Bonus*), one time the monthly salary (*Medium Bonus*), and 2.5 times the monthly salary (*High Bonus*). Figure A.1 specifies the weighting scheme that the Bank uses to calculate the annual performance of each loan officer. The role of loan origination receives a weight of

35%, loan monitoring 35%, and the subjective evaluation by their immediate supervisor receives a weight of 30%. In the annual' review, the bank calculates the origination score as the proportion of their annual goals of loan annual growth in percentage and amount. The monitoring score comes from the weighted average of the loan officer's average portfolio monitoring score (a simple average of the monitoring scores: High, Medium, and Low), and the proportion of non-performing loan in loan officers' portfolio. The third and last component of the bonus calculation is a subjective evaluation from his immediate supervisor that captures aspects of leadership and teamwork.

The compensation scheme of the Bank differs from previous studies on how loan officer compensation schemes affect lending outcomes. For example, in a controlled experiment in one of the largest banks in the U.S, Agarwal and Ben-David (2018) find that, when loan officer performance incentives are based solely on loan origination volume, both loan size and default are higher. In my setting, loan officers receive a bonus that rewards origination but also penalizes default. Most importantly, my setting penalizes a loan officer's lack of effort in monitoring their borrowing firms. Defaults can occur for macro or industry shocks, but the effort measurement captures the execution of due diligence on monitoring borrowers. The lending model in Agarwal and Ben-David (2018) did not consider a monitoring role by loan officers and focused only on the role of screening at loan issuance.

IV. Data and Summary Statistics

In the final sample (see Table A.2), I observe 32,766-booked loans belonging to 4,213 firms between January 2014 and December 2018. Half of the loans are small loans that loan officers do not directly monitor. Firm size ranges from small to the largest firms in

the country of the subsidiary, and, according to the local industry classification of the Central Bank, the firms operate in more than 60 industries. The panel contains each firm's characteristics, including assets, leverage, sales, net income, and the Bank's estimated ex ante probability of default. The panel also contains the loan amount, maturity and interest rate at origination, outstanding balance, and remaining maturity. It also tracks whether the loan is part of a credit line or a term loan, whether the loan has collateral, and whether the loan is in default or is renegotiated in a given year.

For the sample period, the monitored loans represent an average of 70% of the outstanding balance of the Bank's loan portfolio (see Figure 2).

[Insert Figure 2 here]

Table 1 shows the summary statistics of the loan-firm-level variables in the sample conditional on the Bank monitoring the firm. I observe 2,012 firms and 11,776 loans assigned to 144 loan officers for the sample period from 2014 and 2018.

[Insert Table 1 here]

The mean outstanding loan amount is $207,000 (median $45,000). A loan has an average remaining maturity of two years and an interest rate of 10%. 70% of loans have collateral. However, in the data set, I do not observe the exact type of collateral. 27% of loans are term loans as opposed to credit lines. An average firm in the sample has $6 million of assets (median $2 million) and an average leverage ratio of 52% (median 54%). The fraction of observations in the panel that is in default, as measured by 90 days or more past due, is nine percent, which is similar to studies with banking data in developing countries. The Bank renegotiates 2.5 percent of the loans in the sample. Renegotiation implies that, within a year, at least one of the following loan terms changes: amount, maturity, and interest

rate. The fraction of observations in the category of high monitoring is 34%, medium monitoring 53%, and low monitoring 13%.

The panel contains the following loan officer characteristics: tenure (the number of years the loan officer has worked at the bank), an intelligence score, and a conscientiousness score. I extract the measures of intelligence and conscientiousness from the psychometric test results that the human resources division of the Bank administers to the loan officers during the hiring process. The intelligence measurement is based on the Wonderlic Cognitive Ability Test, which was created in 1936 and was designed to measure an individual's general cognitive ability.[3] The test is often given to prospective employees as a means of evaluating their learning and problem-solving skills. A computer automatically generates a score based on the number of correct answers given in the allotted time.

The conscientiousness measure is based on The DiSC profile. Published by Wiley, it is a non-judgmental tool used to discuss people's behavioral differences.[4] A participant in a DiSC program completes a series of questions that produce a detailed report about their personality and behavior. The American Psychology Association defines conscientiousness as the tendency to be organized, responsible, and hardworking. Previous papers in the literature of CEOs' personality traits and firms polices, use conscientiousness as one of the traits from the "Big Five" framework, and document that conscientious CEOs employ financing strategies consistent with lower levels of risk-raking (e.g., lower leverage) (Kaplan, Larcker, and Zakolyukina (2016)).

[3] More details can be found in the following link (https://www.wonderlic.com/).
[4] Conscientiousness is based on The DiSC profile published by Wiley. More details can be found in the following link: (https://www.discprofile.com/)

Loan officers have an average of 8.2 years of experience (a median of 7.4). The average age of loan officers is 39, the average conscientiousness is 65 (median 70), and the average intelligence measurement is 101 (median 100). Table A.10 shows the correlation coefficients of the variables in the panel.

V. Methodology: Identification Strategy

I begin by illustrating why OLS's estimations of loan officer monitoring on loan performance outcomes (loan default and renegotiation) may be biased in the presence of reverse causality. For example, consider the following system of equations:

$$\text{Loan Performance}_{i,t+1} = \beta_1 \text{ Monitoring}_{i,t} + \varepsilon_{i,t} \,, \qquad (2)$$
$$\text{Monitoring}_{i,t} = \alpha \text{ Loan Performance}_{i,t} + \gamma_{i,t}$$

The β_1 coefficient provides the estimated effect of monitoring on loan's performance. To obtain unbiased estimates, the covariance between the variable of monitoring and the error terms must equal zero. However, the quality of the firms is highly persistent, and loan officers likely intensify their monitoring after loan performance deterioration.

The ideal experiment would involve a random assignment of monitoring effort across firms in the portfolios of loan officers. If the Bank would randomly assigns monitoring across loan officer portfolios, I can interpret the coefficient estimates of the monitoring proxies as the estimated causal effect. However, we do not have a random experiment in this setting, and I will first provide evidence on the selection of loan and firm characteristics.

Table 2 shows a mean comparison of loan and firm characteristics by the extensive margin of monitoring. Loans that the Bank actively monitors are generally twice as large and are less likely to be term loans or to have collateral than unmonitored loans. Monitored firms are bigger and more profitable than unmonitored firms. During the sample period, the

average outstanding balance of monitored loans is 75% of the book value of the loan portfolio of the Bank (see Figure 1 Panel A). These characteristics are consistent with previous empirical studies finding that banks monitor loans with higher exposure representing a larger portion of their loan portfolio (Plosser and Santos (2016)).

[Insert Table 2 here]

[Insert Figure 1 here]

Table 3 shows the comparison of means by the intensive margin of monitoring. The size of loans in the group of high monitoring are 1.5 and 2.5 larger than loans in the categories of medium monitoring and low monitoring, respectively. Additionally, these loans have lower maturity, are less likely to default, and less renegotiated. Table 3 displays evidence of a monotonic relationship between loan, firm characteristics, and the categories of high, medium, and low monitoring.

[Insert Table 3 here]

I employ a quasi-experimental setting using commodity prices as a source of exogenous variation in loan officer monitoring attention to test the hypothesis that loan officers are subject to rational attention constraints that influence their monitoring choices, and consequently the loan performance.

V.A Commodity price shocks

My empirical strategy relies on a quasi-experimental setting and granular data at the loan officer level. I construct a firm-loan officer matched panel data set, enabling me to

track loan officers across different firms and industries over time. This panel allows me to estimate how much of the variation on default and renegotiation can be attributed to the loan officer through their direct monitoring effort, after controlling for firm fixed effects, loan officer fixed effects, and time-varying firm and loan characteristics.

The main identification problem involves distinguishing changes in loan officer monitoring intensity due to exogenous reasons for a firm's creditworthiness. My estimation strategy relies on the variation in loan officer assignments across multiple corporate borrowers and industries. The identification strategy in this paper uses commodity prices as exogenous shocks to loan officers' monitoring. First, I identify industries with firms that export commodities firms such as coffee, beef, sugar, and tobacco, as opposed to non-export firms. I then use a large negative variation (more than 10% in a 12-month rolling average) in these commodity prices as exogenous shocks to the loan officer monitoring effort. I obtain monthly international commodity prices from The World Bank Commodity Price Data (The Pink Sheet).[5] Figure 3 shows the level of monthly prices, and Figure 4 displays the 12-month rolling average growth rate. These large negative variations on prices are concentrated in the year 2016 and part of 2017. These commodities represent 25% of total national exports and 10% of the national GDP (Figure 4).

[Insert Figures 3–4 here]

[5] Information on commodity prices can be found at https://www.worldbank.org/en/research/commodity-markets

In the main empirical test, I compare loan default and renegotiation outcomes of the firms monitored by loan officers who have export firms in their portfolios (treatment group) against those firms with loan officers with non-export firms (control group).

Distinguishing loan officers who change their monitoring intensity from those who keep their intensity constant provides useful information. Figure 5 provides a sketch of the identification strategy. Consider two loan officers, Loan Officer A and Loan Officer B. Loan Officer A's portfolio has firms in industries exposed to commodity price shocks (e.g., export firms) and non-export firms (e.g., those in commercial, construction, services, or manufacturing industries). However, Loan Officer B's portfolio only has firms in industries unrelated to commodity price shocks. Consider a year in which the international price of a commodity decreases, and export firms face a negative shock to their cash flows, increasing the likelihood of financial distress.

Under the assumption that loan officers are constrained by time and effort, they will change their time and effort allocation to optimize their expected payoff (the utility gain from maximizing the portfolio value net of exerting monitoring effort). Therefore, Loan Officer A will intensify monitoring to the commodity export firms and reduce monitoring intensity to other firms in their portfolios after the commodity price shock. Loan Officer B's monitoring intensity will remain consistent. The main identification assumption is that absent commodity price shocks, the average outcomes of default, and renegotiation for the "treatment" and "control" group would follow parallel trends over time. Figure 6 shows graphical evidence of the parallel trend assumption.

It could plausible that the Bank alter loan officers' assignment to firm during a shock. But based on interviews with the credit managers of the bank, loan officers keep relatively

the same firms in their portfolios across time. Only where there are exogenous events such as loan officers being on medical leave, maternity leave, and being removed from their position at the bank.

[Insert Figure 6 here]

VI. Results

VI.1 Does monitoring reduce the probability of loan default and renegotiation? The extensive margin of monitoring and moral hazard outcomes.

To test whether bank monitoring is associated with a reduced probability of loan default and renegotiation, I estimate the following regression:

$$\text{Loan Performance}_{l,i,j,t} = \alpha + \beta_1 \text{ Monitoring}_{i,j,t-1} + \sum_{i=1}^{n} \delta_i \text{Loan Controls}_{l,t-1} + \sum_{i=1}^{n} \upsilon_i \text{Firm Controls}_{i,t-1} + \delta_i + \eta_j + \text{Industry}X\text{YearFE} + \varepsilon_{l,i,j,t}. \quad (3)$$

Where loan performance is measured with the variables of *Default* and *Renegotiation*. These are dummy variables that take the value of 1 if the loan *l* of firm *i* monitored by loan officer *j* is in default or is renegotiated in a given year *t*. A loan is in *Default* when it becomes delinquent for more than 90 days in a given year. To control for unobserved heterogeneity at the firm and loan officer level, I add dummies to capture firm fixed effects, δ_i, and loan officer fixed effects, η_j. To control for aggregate macroeconomic conditions affecting the probability of loan default and renegotiation, I add industry-year fixed effects.

The explanatory variable of interest *Monitoring* takes the value of 1 if the borrower is in the subsample of firms that the bank actively monitored, and 0 otherwise. I use the lag

of the *Monitoring* variable to predict current default and renegotiation status. However, loan outcomes such as *Default* and *Renegotiation* may depend on other loan and firm characteristics. To isolate the effect of Monitoring on these loan outcomes, I include the loan controls and firm controls in Equation 3.

Table 4 shows the results of the regression analysis of Equation 4. Columns 1 and 3 show that a loan that is actively monitored is 1.2 percent less likely to default and be renegotiated. The economic magnitude is equivalent to 11% and 40% of the unconditional mean of the probability of loan default and renegotiation, respectively. Columns 2 and 4 suggest that loan officer fixed effects explain additional variation in the default and renegotiation outcomes that is not accounted in the firm fixed effects. The adjusted R^2 increases for the outcome of *Default* from 0.438 in Column 1 to 0.548 in Column 2. Similarly, for the outcome of *Renegotiation*, the adjusted R^2 increases from 0.278 in Column 3 to 0.392 in Column 4.

[Insert Table 4 here]

These results offer new insight to the findings of existing literature. First, the vast majority of loans in the sample of this paper do not have financial covenants. In developing countries, it is costly for most firms to access domestic auditors, and most private firms do not issue audited financial statements (Lisowsky, Minnis, and Sutherland (2017), Sinha and Watts (2001)). Banks know ex ante that they may be exposed to fraudulent financial statements filings and find little value in financial covenants, with the exception of firms with foreign external auditors (Fortin, Hirata Barros, and Cutler (2009). Second, in the literature of empirical banking, authors proxy the variable of monitoring at the extensive margin with variables that measure the existence of covenants. One the one hand, previous

papers have found that monitoring and financial covenants are complements in loan agreements and that banks increase monitoring to push renegotiation after loan covenant violations (Gustafson, Ivanov, and Meisenzahl (2020). On the other hand, active monitoring may substitute financial covenants when financial information requires additional verification for example loan officers establishing direct visits and inspections to validate collateral values (Rajan and Winton (1995). Because loan in my sample do not contain financial covenants, these findings suggest that active monitoring captures an additional aspect of bank monitoring that is not directly available through financial covenants.

VI.2 Does higher monitoring effort reduce the probability of loan default and renegotiation? The intensive margin of monitoring and moral hazard outcomes

To test whether monitoring intensity decreases the probability of loan default and renegotiation, I run the following OLS regression:

$$\text{Loan performance}_{l,i,j,t} = \alpha + \beta_1 \text{High Monitoring}_{i,j,t-1} + \beta_2 \text{Medium Monitoring}_{i,j,t-1} + \sum_{i=1}^{n} \delta_i \text{Loan Controls}_{l,j,t-1} + \sum_{i=1}^{n} \upsilon_i \text{Firm Controls}_{i,j,t-1} + \delta_i + \eta_j + \text{Industry} X \text{YearFE} + \varepsilon_{i,j,t} \quad (4)$$

Table 5 shows the OLS regression results of Equation 4 in columns 1 and 2. Similarly as in regression Equation 3, I control for loan and firm characteristics that predict the intensive margin of monitoring. The OLS results suggest that there is a negative association between monitoring intensity and the probability of default and a positive relationship with renegotiation. High Monitoring decreases the probability of loan default by one percent and

increases the probability of renegotiation by 1.3 percent, respectively relative to Low Monitoring. Results for the variable that measures Medium Monitoring are smaller in magnitude and with less statistically significance.

[Insert Table 5 here]

VI.3. Exogenous shocks to Loan Officer' Monitoring.

VI.3.1 Loan officer monitoring reallocation across firms

The section examines the hypothesis that a negative and large drop on the price of commodities will lead to monitoring effort reallocations across loan officer portfolios. To test this hypothesis, I run the following regression specification:

$$\text{Monitoring Score}_{j,i,t} = \alpha + \beta_1 \text{Exporter Firm}_{j,t} * \text{Commodity Price Reduction}_{j,t} + \beta_2 \text{Exporter Firm}_{j,t} + \sum_{i=1}^{n} \delta_i X_{j,t-1} + \delta_i + \varepsilon_{j,i,t} \quad (5)$$

The outcome variable is the monitoring score a loan officer *i* receives for firm *j* at time *t*. This score can be High, Medium, or Low. The variable *Export Firm* is a dummy that takes the value of 1 if firm *j* is a commodity export firm at time *t*, and zero otherwise. The variable *Commodity Price Reduction* is a dummy that takes the value of 1 if in year *t*, the price of the commodity of the export firm decreases by 10% or more (measured in 12-month rolling average).

As with the previous regression analyses, I control for loan and firm characteristics that predict the intensive margin of monitoring: Maturity is the number of years before loan expiration, Interest Rate is the current Annual Percentage Rate (APR) that the Bank uses to accrue daily interest, and *Ln* (Loan Amount) is the natural logarithm of the Loan Outstanding

Balance. Additional controls include the number of firms in a loan officer's portfolio and the firm's external credit rating from the previous year. I also include loan officer fixed effects to control for any unobserved heterogeneity at the loan officer level. To control for industry or macroeconomic shocks, I add industry-year fixed effects.

Table 6 shows the comparison of means of loans and firm characteristics by the treatment status of the loan officers. I define loans monitored by loan officers who have export firms in their portfolios as the treatment group and loans monitored by loan officers with non-export firms as the control group. Loans in the treatment group are generally of a larger size, lower spread, and lower maturity than those in the control group. In addition, loans in the treatment group are less likely to default but more likely to be renegotiated. Borrowers are bigger firms that are more profitable and have a higher leverage ratio. On average, loan officers in the treatment group originate more loans and have more firms in their portfolios. They also have lower conscientiousness and higher intelligence scores.

[Insert Table 6 here]

Table 7 shows the OLS estimates of regression Equation 5 (linear probability model estimation). The first column in Table 7 indicates that export firms are 32% more likely to be highly monitored during the years in which there are negative large variations of the commodity price they export relative to non-export firms. In results that have not been tabulated, I run an ordered logistical regression, and the conclusions are similar. These results suggest that loan officers shift their monitoring effort towards commodity exports due to the potential increase in financial distress.

[Insert Table 7 here]

VI.3.2 Spillover effects of monitoring reallocation on the probability of default and loan renegotiation

The main hypotheses I test in this paper is that loan officers monitoring reallocation has adverse spillover effects on the probability of default and loan renegotiation of firms that are unrelated to the commodity markets. To test this hypothesis, I consider only the sample of loans of firms unrelated to commodity markets and I estimate a triple differences model measuring the effect of monitoring efforts reallocations on the probability of default and loan renegotiation. The following regression equation summarizes the empirical test:

$$\begin{aligned}\text{LoanPerformance}_{l,i,j,t} = \alpha \\ + \beta_1 \text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} \times \text{Post}_{i,t} + \beta_2 \text{Post}_{i,t} + \beta_3 \text{Treatment}_{j,t} \\ + \beta_4 \text{Treatment}_{j,t} \times \text{Post}_{i,t} + \beta_5 \text{High Monitoring}_{i,j,t-1} + \beta_6 \text{Post}_{i,t} \times \text{High Monitoring}_{i,j,t-1} \\ + \beta_7 \text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} + \sum_{i=1}^{n} \delta_i X_{l,j,t-1} + \delta_i + \eta_j + \text{Industry} X \text{YearFE} + \varepsilon_{l,i,j,t} \quad (6)\end{aligned}$$

In regression Equation 6, subscript *l*, refers to loan *l* of firm *i*, monitored by the loan officer *j*, and *t* refers to the year. I compare loan default and renegotiation outcomes of firms monitored by loan officers who have export firms in their portfolios (treatment group) with firms monitored by loan officers with non-export firms (control group). The coefficient β_1 on Equation 6 represents the interaction of $\text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} \times \text{Post}_{i,t}$. This interaction measures the differential effect of monitoring reallocation on the probability of default and loan renegotiation across treatment and control groups after a decrease of 10% or more on commodities prices. There are two outcome variables of interest: the first is a

dummy *Default* that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. The second outcome variable is a dummy *Renegotiation* that takes the value of one if any of the following loan terms changes: maturity, interest rate, amount or collateral in a given year. The variable High Monitoring $_{i,j,t-1}$ is a dummy that takes the value one if the loan officer receives a high monitoring score the year before the reduction on the commodity price. The variable Treatment $_{j,t}$ takes the value of one if the loan officer *j* monitoring firm *i* in year *t* has at least one export firm in their portfolio. Post $_{i,t}$ is a dummy that takes the value of one for years in which there is a decrease of 10% or more on price of a commodity exported by firms in the portfolio of loan officer *j* at year *t.*

Table 8 shows the results of the regression Equation 7. The coefficient of the triple interaction term $\text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} \times \text{Post}_{i,t}$ in Column 1 is the differential effect of monitoring reallocation on the probability of default. Column 2 shows the effects on the probability of loan renegotiation. I find that the probability of default and loan renegotiation increase by three and four percentage points for the firms in the portfolios in the treatment group, respectively. These are economically significant values representing 30% and 20% of the unconditional probability of default and loan renegotiation in the full sample, respectively.

[Insert Table 8 here]

These results control for loan characteristics: *Maturity* is the number of years left before loan expiration, *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks uses to accrue daily interest, and *Ln (Loan Amount)* is the natural logarithm of the Loan Outstanding Balance. I also add control for firm characteristics using the following

controls: *Ln* (Loan Assets) is the natural logarithm of the firm's assets, *Leverage* is measured as the ratio of liabilities over total assets, and ex ante *Probability of Default* is a bank's estimation of the probability of the default of the borrower. These results also control for unobserved heterogeneity at the firm and loan officer level by adding as a control loan officer fixed effects and firm fixed effects. In addition, to control for industry or macroeconomics shocks trends, I control industry-year fixed effects. Results that have not been tabulated show that these findings are robust to non-linear models such as probit and conditional logit.

VI.6.3 Does monitoring intensity interact with loan officers' cognitive skills and personality traits?

In the hiring process, the human resources department of The Bank administers a series of psychometric tests to measure cognitive ability and personality traits. In this section, I test whether the effect of loan officers monitoring reallocation on default and renegotiation varies with loan officer conscientiousness and intelligence. The conscientiousness and intelligence scores do not change over time because loans officers take these tests only during the hiring process. To test the hypothesis, I run regression analysis of Equation 6 on the subsample of loan officers in the bottom quintile of the measure of conscientiousness. In untabulated results, I also run the analysis with the measure of intelligence, but results are not statistically significant. Across loan officers there is a higher variation on the measure of conscientiousness than in the measure of intelligence. In other words, loan officers on average they are equally intelligent but that are not equally conscientious.

Table 9 shows the results of two outcomes, *Default* and *Renegotiation.* Columns 1 and 2 of Table 9 show the coefficient of interest. I find that firms with loan officers who exerted high monitoring the year before the commodity shock and firms that are in the

bottom quintile of the distribution of conscientiousness are 35–45% more likely to observe a loan default or renegotiation. These results suggest that differences in individuals' abilities to process information have implications for loan outcomes. These results are consistent with previous empirical studies that find that individuals with a higher level of conscientiousness are more likely to find a job, retain employment, have better wages, and succeed in the marriage market (Donato et al., 2017; Borghans et al., 2014; Heckman, Stixrud, and Urzua, 2006; Dupuy and Galichon (2014).

[Insert Table 9 here]

VII. Conclusions

I use a novel data set containing internal records of a large Central American bank's business loan portfolio to analyze whether and how the heterogeneity in loan officer monitoring effort affects moral hazard between the Bank and its borrower. I find that the intensive margin of monitoring has a significant effect on default and renegotiation outcomes. This finding contributes to our understanding of the role of bank monitoring in reducing information asymmetries (Sufi, 2007; Hertzberg, Liberti, and Paravisini, 2011; Behr et al., 2019; Petersen and Rajan, 2002; Liberti and Peterson (2019); Norden and Weber, 2010; Mester, Nakamura, and Renault, 2007).

Because the role of monitoring requires direct interaction with borrowers and following the Bank's guidelines and policies, and loan officers have a finite capacity to process and act on information. I use commodity price shocks as an exogenous variation on loan officers' attention to document reallocation effects of monitoring within their portfolios. These effort reallocations are important and create negative spillover effects in the probability of loan default and renegotiation of firms that are not directly hit by the commodity price shock. Based on the nascent literature on how individual characteristics affect corporate and personal decision-making when there are time-varying attention shocks, I use loan officers' psychometrics tests to document how their cognitive and non-cognitive skills impact their performance. I find that the effect of monitoring reallocations on the probability of default and renegotiation is 35–45% larger for loan officers in the bottom quintile of the conscientiousness distribution. The previous results suggest that the lack of innate human capital has important consequences on loan officers' job performance.

Altogether my results highlight some key policy implications for bank organization's design and incentive schemes. For example, what is the optimal portfolio allocation considering the human capital that banks hire to perform the role of monitors? Is there any loan officer profile based on desirable attributes related to good performance that banks should look for recruiting their personnel? I show in this setting that compensation schemes contribute to aligning incentives within principal-agent frameworks. However, when individuals are subject to attention shocks, the heterogeneity on the individuals' innate ability matters for their job performance's efficacy with important implications on moral hazard between the bank and their borrowers. Because of these unintended consequences, we need to understand better how to model decision making of very resource-constrained individuals and how financial intermediaries adjust their internal organizations and incentives schemes to reduce inefficiencies.

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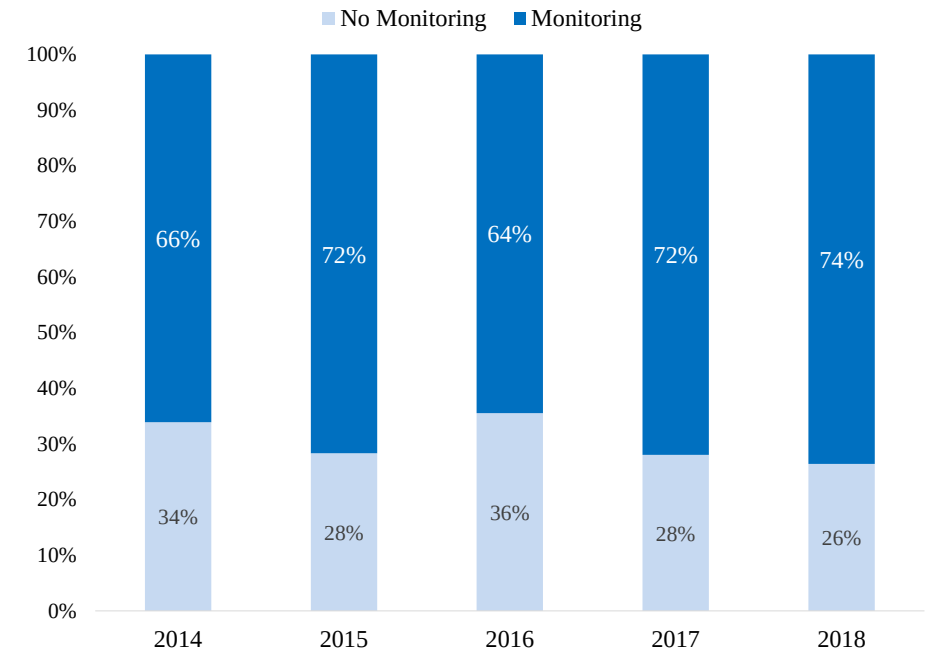
Figure 1. Extensive and Intensive Margin of Monitoring in the sample

This figure shows in panel A the proportion outstanding balance of loans. The Bank actively monitors relative to the total portfolio of booked loans for the period 2014-2018. Panel B displays conditional on loans to be actively monitored, the proportion of outstanding loan balance in *High Monitoring, Medium Monitoring, and Low Monitoring*.

Panel A Extensive margin of loan monitoring



Panel B Intensive Margin of Loan Monitoring

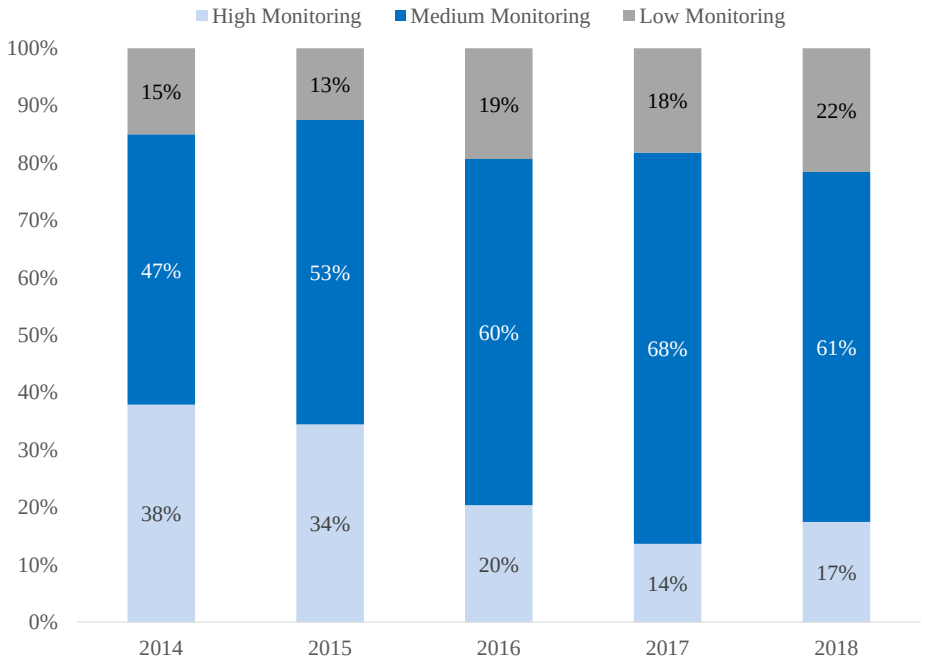
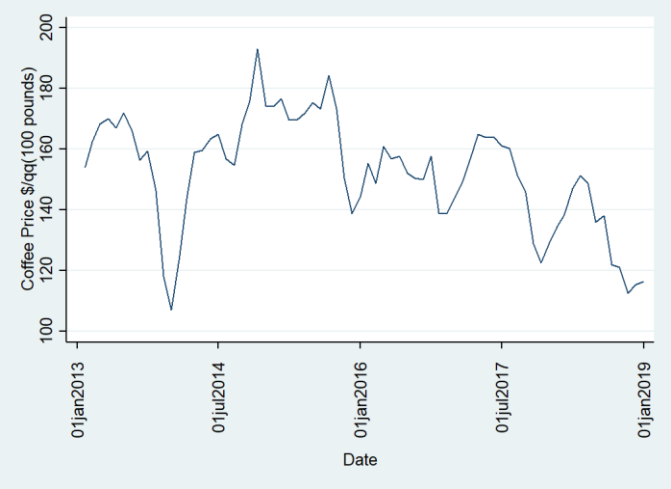


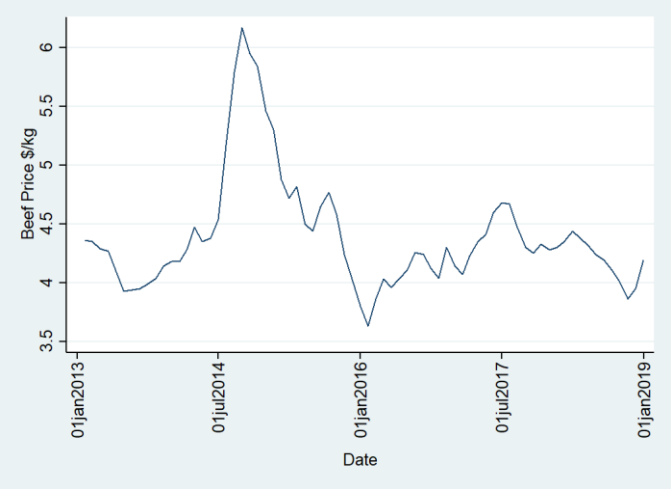
Figure 2. Monthly Commodity Prices. World Bank Commodity Price Data

Figure 3 shows a monthly time series of the commodities' level of prices in our sample for the period January 2014-December 2018. The source of the data is the Commodity World Bank Commodity Price Data (The Pink Sheet).

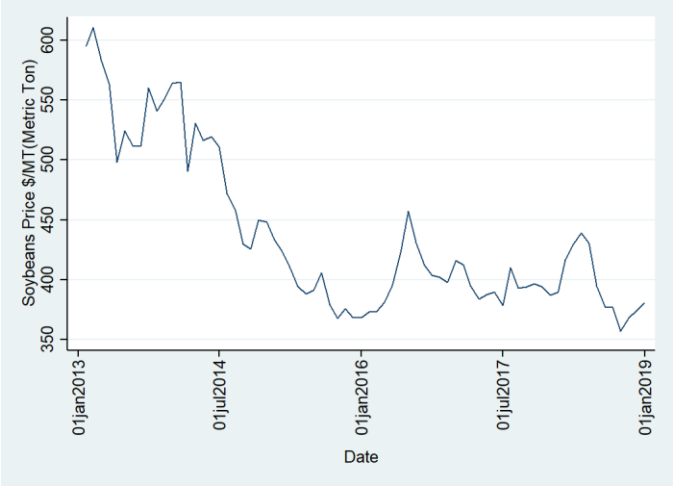
Coffee



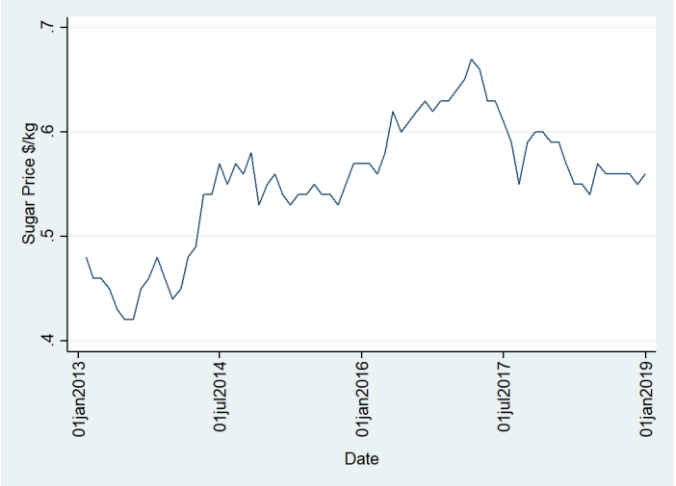
Beef



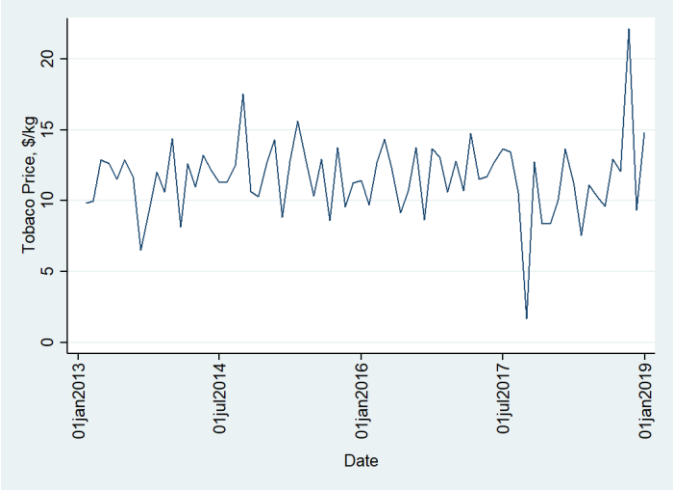
Soybean



Sugar



Tobacco



Peanut

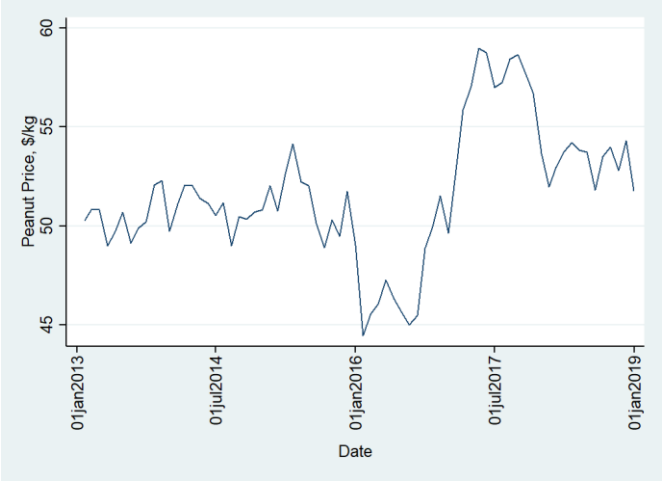
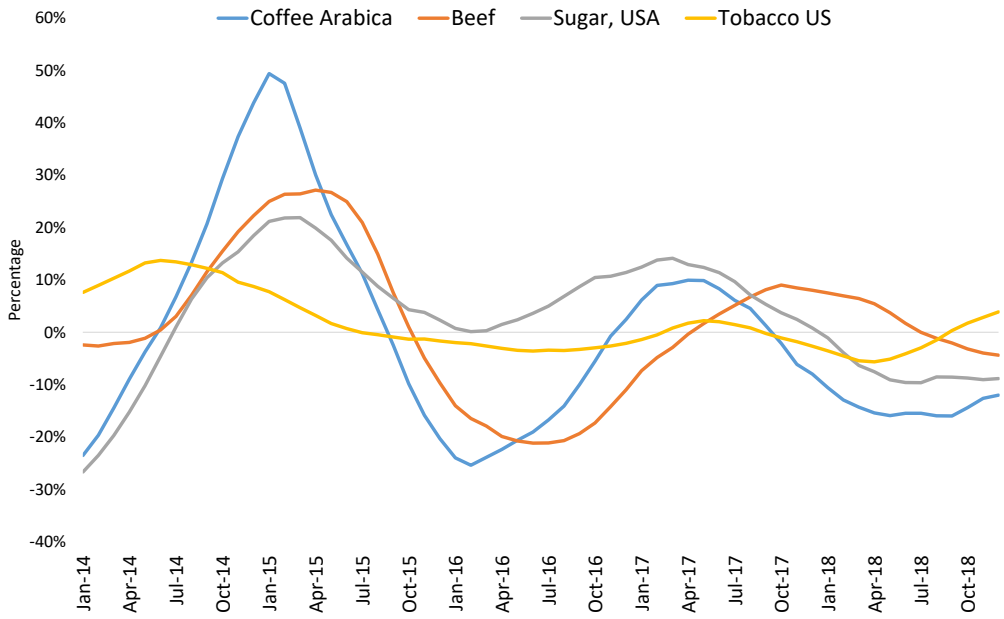


Figure 3. Commodity Prices Growth Rates 12-Month Moving Average

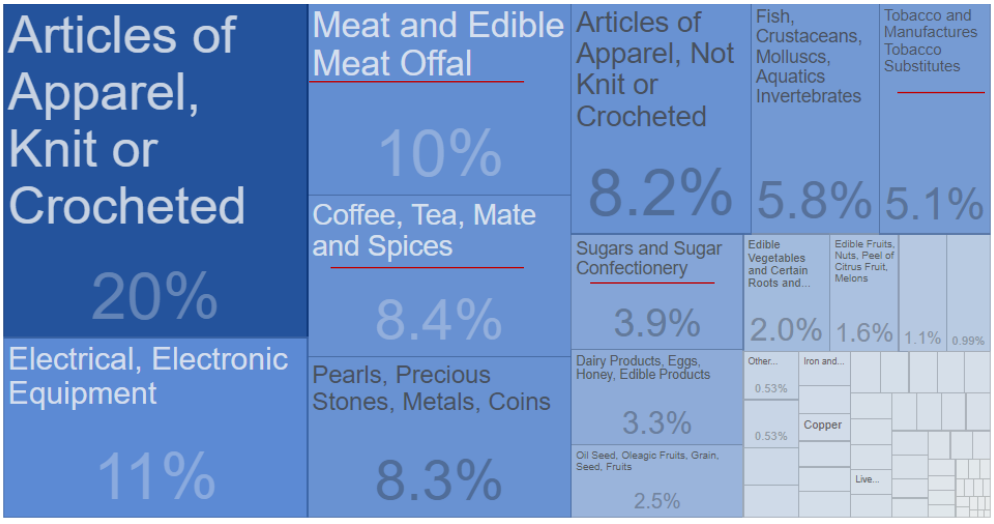
Figure 4 shows the commodity prices growth rate over the sample period for the four-commodity products category with the largest participation in the bank portfolio.



Source: Based on the World Bank Commodity Price Data (The Pink Sheet)

Figure 4.
National Exports by Category of The Country where The Bank's Subsidiary is located

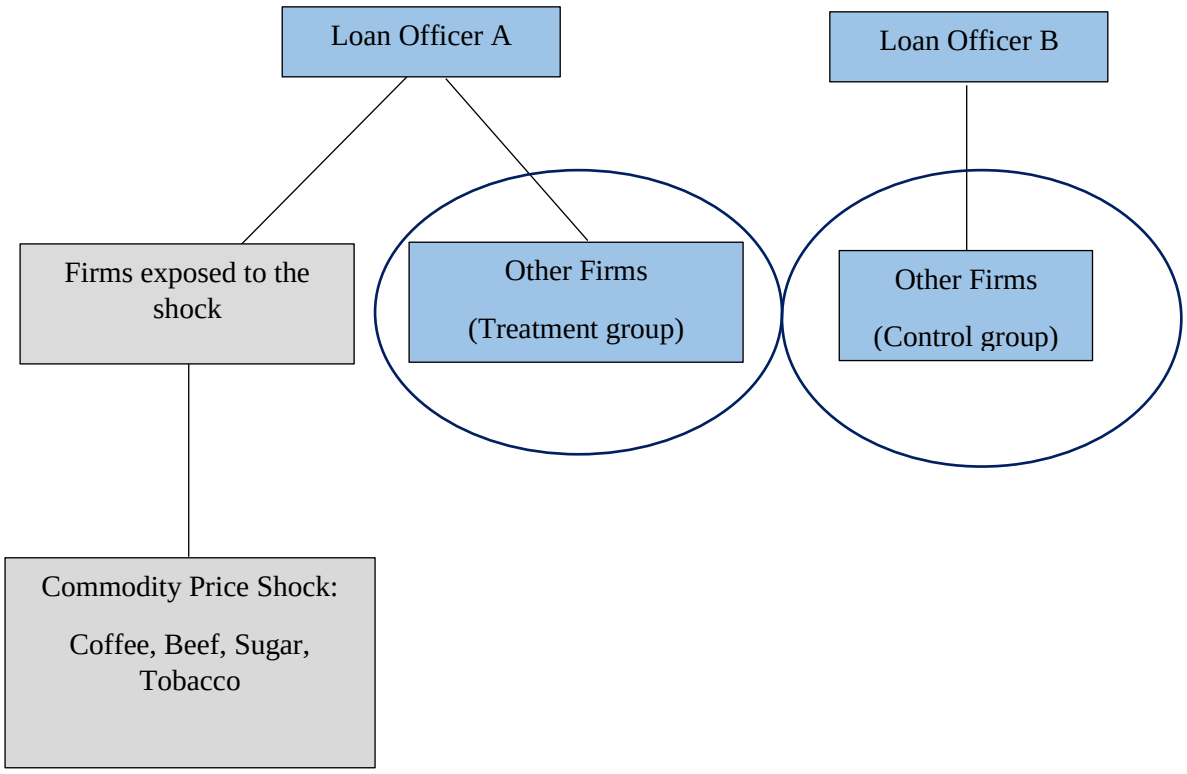
Figure 5 shows the relative importance in national exports of the four commodities indicated in figure 4.



Source: United Nations COMTRADE database on International Trade.

Figure 5. Identification Strategy

Figure 5 provides a sketch of the identification strategy. Consider two loan officers, Loan Officer A and loan officer B. Loan Officer A's portfolio has firms in industries exposed to commodity price shocks (e.g., export firms) and firms that are non-export (e.g., those in commercial, construction, services, or manufacturing industries). However, Loan Officer B's portfolio has only firms in industries unrelated to commodity price shocks. Consider a year in which the international price of a commodity decreases, and export firms face a negative shock to their cash flows, increasing the likelihood of financial distress.

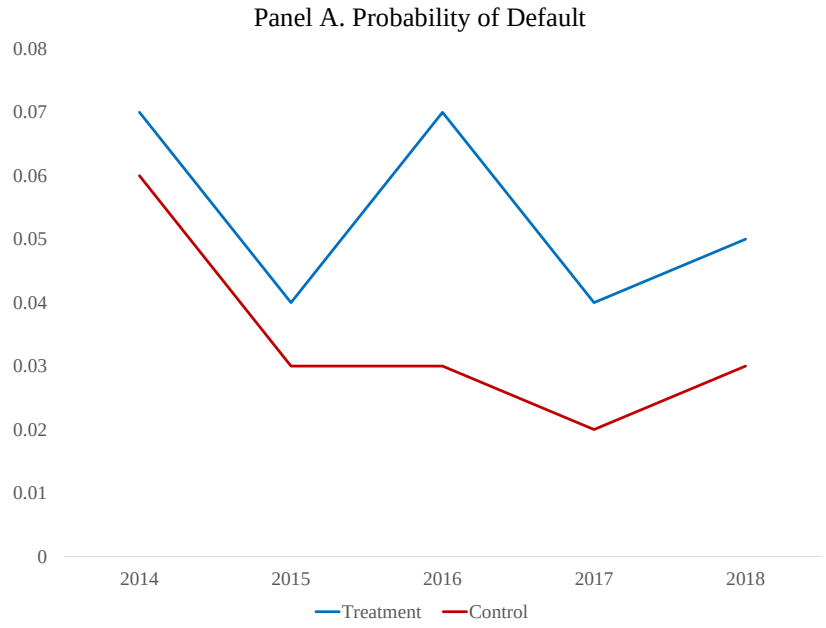


Loan Officer A allocates his monitoring effort away from other firms to firms exposed to the shock

Loan Officer B does not change his monitoring efforts

Figure 6. Probability of Default and Renegotiation.

Figures 6.A and 6.B show the mean values of the probability of default and loan renegotiation for the treated and control groups from 2014 until 2018 for the sample of firms that are not commodity export firms. I compare loan default and renegotiation outcomes of the firms monitored by loan officers who have export firms in their portfolios (Treatment group) against those firms with loan officers with non-export firms (Control group). In the sample, the most significant adverse commodity price shocks are in the year of 2016.



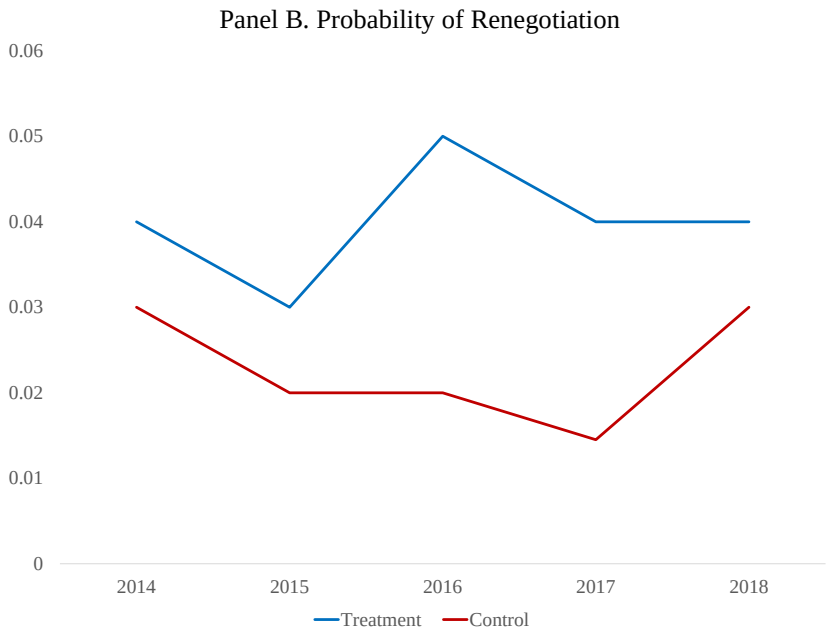


Table 1: Summary Statistics of the sample

This table reports summary statistics for the loan-firm-loan officer panel conditional on being monitored by the Bank. The sample covers five years from 2014 to 2018. I observe 2,012 firms, 144 loan officers, and 11,776 loans. Panel A reports the loan characteristics: *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *Loan Amount* is the Loan Outstanding Balance in thousands of USD dollars. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest for a given loan. *Maturity* is the number of days left to the expiration of the loan. *Term Loan* and *Collateral* are dummy variables that take the value of one if the loan is a term loan and has collateral, respectively. Panel B reports the summary statistics for the firm characteristics. Firms' accounting variables are from the borrowers' financial statements. *Credit Risk Score* is the firm's annual credit risk score based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier). *Loan Assets* is the firm's assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. *Leverage* is defined as the ratio of liabilities over total assets. *High monitoring* is a dummy that takes the value of one when the loan officer receives a high monitoring score, and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officer receives a medium monitoring score, and zero otherwise. *Low monitoring* is a dummy that takes the value of one when the loan officer receives a low monitoring score, and zero otherwise. Panel C reports the loan officers characteristics. Tenure is the number of years of experience. Age (years) is the age of the loan officer monitoring a given loan. *The intelligence score* is the cognitive ability score based on the Wonderlic Test. *Conscientiousness* is the score on that personality trait of the loan officer's psychometric test. Appendix A.1 contains detailed definitions for each variable.

	Mean	Standard dev.	p25	p50	p75	p90	N
Panel A: Loan Characteristics							
Default	0.09	0.29	0	0	0	0	23,630
Renegotiation	0.025	0.15	0	0	0	0	23,630
Loan Amount($1000)	207	548	20	45	127	425	23,630
Interest Rate	10	3	8.8	9.7	11	14	23,630
Maturity (Days)	730	1,028	163	292	539	2,192	23,630
Term Loan	0.27	0.44	0	0	1	1	23,630
Collateral	0.7	0.46	0	1	1	1	23,630
Panel B: Firm Characteristics							
Credit Risk Score	1.2	0.58	1	1	1	3	23,630
Assets ($1000)	6,306	13,002	818	2,108	5,948	11,725	23,630
Liabilities ($1000)	3,677	8,136	313	940	2,885	8,260	23,630
Sales ($1000)	5,199	12,692	398	1,373	4,900	9,508	23,630
Ex ante Prob. Default	0.031	0.029	0.012	0.024	0.039	0.066	20,632
Ln(Assets)	7.6	1.6	6.7	7.7	8.7	9.4	23,630
Net Income ($1000)	246	569	20	100	300	594	23,630
Leverage	52	26	33	54	74	86	20,632
High Monitoring	0.34	0.47	0	0	1	1	23,630
Medium Monitoring	0.53	0.5	0	1	1	1	23,630
Low Monitoring	0.13	0.34	0	0	0	1	23,630

Panel C: Loan Officers Characteristics

	Mean	Standard dev.	p25	p50	p75	p90	N
Tenure	8.2	5.7	3.2	7.4	12	16	22,518
Intelligence Measure	101	5.6	98	100	105	108	22,518
Age	39	8.5	33	39	46	51	22,518
Conscientiousness	65	26	42	70	90	94	22,518
# of firms in the portfolio	16.8	10.4	9	17	24	32	22,518

Table 2: Comparison of Means by Extensive Margin of Monitoring

This table compares the means between the two sub-samples of table A.1 based on the monitoring status. Panel A reports the loan characteristics: *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *Loan Amount* is the Loan Outstanding Balance in thousands of USD dollars. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest for a given loan. *Maturity* is the number of days left to the expiration of the loan. *Term Loan* and *Collateral* are dummy variables that take the value of one if the loan is a term loan and has collateral, respectively. Panel B reports the summary statistics for the firm characteristics. Firms' accounting variables are from the borrowers' financial statements. *Credit Risk Score* is the firm's annual credit risk score based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier). *Loan Assets* is the firm's assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. *Leverage* is defined as the ratio of liabilities over total assets. In the last column, I present the difference in means. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) N=31,988 1.Monitoring	(2) N=28,296 2.No Monitoring	(3) Diff. 1-2
Panel A: Loan Characteristics			
Loan Amount ($1,000)	176.25	92.38	83.88***
Interest Rate	9.83	10.87	-1.04**
Maturity (Year)	2.25	3.42	-1.17***
Maturity Left(Days)	501.23	775.90	-274.66***
Collateral	0.68	0.72	-0.04***
Term Loan	0.32	0.63	-0.31***
Default	0.02	0.06	-0.04***
Renegotiation	0.03	0.03	-0.00
Panel B: Firm Characteristics			
Credit Risk Score	1.16	1.26	-0.10***
Total Assets	6059.10	3063.73	2995.37***
Total Liabilities	3491.09	1667.62	1823.47***
Sales	4663.28	2166.95	2496.33***
Operating Profit	450.65	261.70	188.95***
Net Income	233.35	160.89	72.46***
Ex ante prob. default	0.03	0.03	0.00***
Leverage	52.42	42.18	10.24***

Table 3: Comparison of Means by the Intensive Margin of Monitoring

This table presents a comparison of means of loan characteristics and firm characteristics by the intensive margin of monitoring. Panel A reports the loan characteristics: *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *Loan Amount* is the Loan Outstanding Balance in thousand of USD dollars. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest for a given loan. *Maturity* is the number of days left to the expiration of the loan. *Term Loan* and *Collateral* are dummy variables that take the value of one if the loan is a term loan and has collateral, respectively. Panel B reports the summary statistics for the firm characteristics. Firms' accounting variables are from the borrowers' financial statements. *Credit Risk Score* is the firm's annual credit risk score based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier). *Loan Assets* is the firm's assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. *Leverage* is defined as the ratio of liabilities over total assets.. In the last column, I present the difference in means. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	N=9,996	N=17,373	N=3,880	Test	
	High Monitoring	Medium Monitoring	Low Monitoring	Diff. 1-2	Diff. 2-3
Panel A: Loan Characteristics					
Loan Amount	235.30	162.24	95.34	73.06***	66.89***
Interest Rate	9.86	9.84	10.51	0.02**	0.67**
Maturity (Year)	1.79	2.33	2.98	-0.54***	-0.65***
Credit line Amount Unused	699.73	516.85	379.20	182.88***	137.65***
Credit line Amount	2238.99	1466.89	860.06	772.10***	606.83***
Collateral	0.46	0.76	0.87	-0.30***	-0.11***
Term Loan	0.24	0.33	0.43	-0.09***	-0.10***
Default	0.00	0.03	0.06	-0.02***	-0.03***
Renegotiation	0.01	0.03	0.07	-0.02***	-0.04***
Panel B: Firms Characteristics					
Credit Risk Score	1.08	1.16	1.30	-0.08***	-0.14***
Total Assets	7568.78	5802.94	3476.65	1765.84***	2326.29***
Total Liabilities	4497.58	3351.27	1592.16	1146.31***	1759.11***
Sales	6262.88	4352.33	1875.43	1910.55***	2476.90***
Operating Profit	558.17	428.86	275.68	129.31***	153.18***
Net Income	265.24	225.61	183.62	39.63***	41.99***
Ex-ante prob. default	0.03	0.03	0.03	0.00**	-0.00***
Leverage	58.86	50.13	43.83	8.72***	6.31***

Table 4: The Effect of the Extensive Margin of Monitoring on Default and Renegotiation.

This table reports estimates of the impact of the extensive margin of monitoring on the probability of loan *Default* and *Renegotiation*. Columns one and three are OLS regressions with the loan and firm controls. In column two and four, I also add loan officer fixed effects. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	Default	Default	Renegotiation	Renegotiation
	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
Monitoring	-0.012***	-0.011**	-0.011***	-0.012***
	(0.004)	(0.004)	(0.003)	(0.003)
Ln(Loan Amount)	0.000	-0.001*	0.007***	0.007***
	(0.000)	(0.000)	(0.001)	(0.001)
Ln(Maturity)	-0.002***	0.000	0.012***	0.013***
	(0.001)	(0.001)	(0.002)	(0.002)
Interest Rate Contract	0.001*	0.001**	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Ln(Assets)	-0.006***	-0.000	0.006	0.012**
	(0.002)	(0.000)	(0.005)	(0.006)
Leverage	-0.000	-0.000***	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	0.152***	0.133***	0.058***	0.059***
	(0.007)	(0.006)	(0.006)	(0.006)
Collateral	0.001	0.005***	-0.021***	-0.019***
	(0.001)	(0.001)	(0.004)	(0.004)
Term Loan	-0.001	-0.002	0.008	0.007
	(0.002)	(0.002)	(0.006)	(0.006)
Constant	-0.114***	-0.124***	-0.127***	-0.176***
	(0.017)	(0.007)	(0.042)	(0.044)
Observations	30772	30783	30772	30761
Adjusted R^2	0.438	0.548	0.278	0.392
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	No	Yes	No	Yes
Industry by Year	Yes	Yes	Yes	Yes

Table 5: The Effect of the Intensive Margin of Monitoring on Default and Renegotiation.

This table reports estimates of the impact of the intensive margin of monitoring on the probability of loan *Default* and *Renegotiation*. Columns one and two are OLS regressions with the loan and firm controls. In columns three and four, I instrument for High Monitoring and Medium Monitoring using two dummy variables High Cash Bonus and Medium Cash Bonus. Each one takes the value of one when loan officers reach the highest and the second highest annual cash bonus, respectively. Other controls refer to the following variables: the number of loans and the growth rate of loan officers' portfolio size. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	Default	Renegotiation	Default	Renegotiation
Specification:	(OLS)	(OLS)	(IV)	(IV)
	(1)	(2)	(3)	(4)
High Monitoring	-0.009***	0.013**	-0.047**	-0.124***
	(0.003)	(0.005)	(0.021)	(0.045)
Medium Monitoring	-0.005**	-0.006	-0.013**	-0.034**
	(0.003)	(0.005)	(0.006)	(0.016)
Ln(Loan Amount)	-0.001**	0.007***	0.001**	0.007***
	(0.000)	(0.001)	(0.000)	(0.001)
Ln(Maturity)	0.010***	0.010***	0.002***	0.010***
	(0.002)	(0.002)	(0.001)	(0.002)
Interest Rate Contract	0.000	0.001	0.001*	0.002**
	(0.000)	(0.001)	(0.000)	(0.001)
Ln(Assets)	-0.000	0.001	0.002	0.011
	(0.000)	(0.007)	(0.002)	(0.008)
Ex-ante prob. default	-0.234***	0.269**	-0.136***	0.191*
	(0.025)	(0.106)	(0.034)	(0.114)
Leverage	-0.000***	-0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	0.119***	0.075***	0.139***	0.075***
	(0.007)	(0.008)	(0.009)	(0.009)
Collateral	0.007***	-0.019***	-0.000	-0.022***
	(0.002)	(0.004)	(0.002)	(0.004)
Term Loan	-0.003*	0.007	0.004*	0.009
	(0.002)	(0.007)	(0.002)	(0.007)
High Tenure	-0.082**	-0.070**	-0.062**	-0.068**
	(0.032)	(0.032)	(0.028)	(0.032)
Constant	-0.104***	-0.092*		
	(0.008)	(0.056)		
Other controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry by Year FE	Yes	Yes	Yes	Yes
Observations	23295	23243	23,243	23,243
Adjusted R^2	0.430	0.349	0.318	0.311
Cragg-Donald Wald F			68.18	68.18

Table 6: Comparison of Means by Loan Officer Treatment Group

This table compares the means between the treatment group: loans monitored by loan officers with at least one commodity exporter firm in their loan portfolios and the control group: loans monitored by loan officers with no commodity exporters firms. Panel A reports the loan characteristics: *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *Loan Amount* is the Loan Outstanding Balance in thousands of USD dollars. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest for a given loan. *Maturity* is the number of days left to the expiration of the loan. *Term Loan* and *Collateral* are dummy variables that take the value of one if the loan is a term loan and has collateral, respectively. Panel B reports the summary statistics for the firm characteristics. Firms' accounting variables are from the borrowers' financial statements. *Credit Risk Score* is the firm's annual credit risk score based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier). *Loan Assets* is the firm's assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. *Leverage* is defined as the ratio of liabilities over total assets. Panel C reports the loan officers characteristics. Tenure is the number of years of experience. Age (years) is the age of the loan officer monitoring a given loan. *Intelligence score* is the cognitive ability score based on the Wonderlic Test. *Conscientiousness* is the score on that personality trait of the loan officer's psychometric test. In the last column, I present the difference in means. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) 1.Treatment Commodity Exporter N=4,216	(2) 2.Control Non-Commodity Exporter N=19,414	(3) 2-1 Diff.
Panel A: Loan Characteristics			
Loan Amount (USD)	243.10	139.87	-103.23***
Interest Rate	9.55	10.68	1.13***
Maturity (Year)	2.41	2.94	0.54***
Collateral	0.67	0.67	0.00
Term Loan	0.32	0.48	0.16***
High Monitoring	0.36	0.40	0.04***
Medium Monitoring	0.52	0.51	-0.01
Low Monitoring	0.11	0.07	-0.04***
Default	0.04	0.05	0.02
Renegotiation	0.04	0.03	-0.01
Panel B: Firms Characteristics			
Credit Risk Score	1.12	1.13	0.01
Total Assets	8094.80	6118.49	-1976.31***
Total Liabilities	5069.04	3811.78	-1257.26***
Sales	8137.54	5245.01	-2892.53***
Operating Profit	638.80	455.29	-183.51***
Net Income	320.40	220.64	-99.76***
Ex-ante prob. default	0.04	0.03	-0.01***
Leverage	63.47	59.91	-3.56***
Panel C: Loan Officers Characteristics			
Number of loans originated	110.36	103.97	-6.39***
Number of firms monitored	16.51	15.18	-1.32***
Intelligence Test	102.02	101.55	-0.47***
Conscientiousness	62.59	65.31	2.72***
Tenure	8.62	6.96	-1.66***

Table 7: Reallocation of Loan Officers Monitoring Intensity and Commodity Prices Shocks.

This table presents ordinary least squares (OLS) estimates of the following regression equation:

$$\text{Monitoring Score}_{j,i,t} = \alpha + \beta_1 \text{Export Firm}_{j,t} * \text{Commodity Price Reduction}_{j,t} + \beta_2 \text{Export Firm}_{j,t} + \sum_{i=1}^{n} \delta_i X_{j,t-1} + \delta_i + \varepsilon_{j,i,t} \quad (5)$$

The outcome variable is the monitoring score a loan officer *i* receives for firm *j* at time *t*. The variable *Export Firm* is a dummy that takes the value of one if the firm is a commodity export firm at time *t* and zero otherwise. The *variable Commodity Price Reduction* is a dummy that takes the value of one if at year t, the price of any of the commodities in the portfolios of loan officer *i* decreases by 10 percent or more. Column 1 is a dummy *High Monitoring* that takes the value of one when the loan officers receive a high monitoring score for firm j at year t and zero otherwise. Column 2 is a dummy *Medium Monitoring* that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. Column 3 is a dummy *Low Monitoring* that takes the value of one when the loan officers receive a low monitoring score for firm j at year t and zero otherwise. *Maturity* is the number of years left for the expiration of the loan. *Interest Rate* is the current Annual Percentage Rate (APR) that the Bank uses to accrue daily interest. *Ln(Loan Amount)* is the natural logarithm of the Loan Outstanding Balance. Additional controls include the *Number of firms* in the loan officer's portfolio, the previous year *Credit Risk Score* of the firms in that portfolio, and *Tenure* of the loan officer. Standard errors, adjusted for clustering at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	High Monitoring	Medium Monitoring	Low Monitoring
	(1)	(2)	(3)
Exporter *commodity price reduction	0.325**	0.167**	-0.125*
	(0.126)	(0.08)	(0.068)
Exporter	0.230	0.089	0.117
	(0.195)	(0.07)	(0.09)
Maturity (Year)	0.00242*	0.000814	0.000411
	(0.00122)	(0.000572)	(0.000774)
Interest Rate	-0.00158	0.000314	-0.000144
	(0.000835)	(0.000247)	(0.000101)
Ln(Loan Amount)	0.0000981	-0.000248	-0.000178
	(0.00110)	(0.000268)	(0.000301)
Additional Controls	Yes	Yes	Yes
Loan officer FE	Yes	Yes	Yes
Industry ByYear FE	Yes	Yes	Yes
Observations	23630	23630	23630
R^2	0.230	0.318	0.371

Table 8: Spillovers Effects of Monitoring Reallocation on the Probability of Default and Loan Renegotiation of Non-Export Firms

This table presents the results of the following triple-differences model:

$$\text{Loan Performance}_{l,i,j,t} = \alpha + \beta_1 \text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} \times \text{Post}_{i,t} + \beta_2 \text{Post}_{i,t} + \beta_3 \text{Treatment}_{j,t} + \beta_4 \text{Treatment}_{j,t} \times \text{Post}_{i,t} + \beta_5 \text{High Monitoring}_{i,j,t-1} + \beta_6 \text{Post}_{i,t} \times \text{High Monitoring}_{i,j,t-1} + \beta_7 \text{High Monitoring}_{i,j,t-1} \times \text{Treatment}_{j,t} + \sum_{i=1}^{n} \delta_i X_{l,j,t-1} + \delta_i + \eta_j + \text{Industry X Year FE} + \varepsilon_{l,i,j,t} \quad (7)$$

The outcome variable in column 1 is the default status of the loan. *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. The outcome variable in column 2 is the renegotiation status. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *High monitoring* is a dummy that takes the value of when the loan officer receives a high monitoring score the year before the negative price shock, and zero if the received score is medium or low. The variable *Treatment* $_{j,t}$ takes the value of one of the loan officer *j* monitoring firm *i* in year *t* is has an export firm in his portfolio. *Post* $_{i,t}$ is a dummy that takes the value of one for years in which there is a decrease of 10 percent or more on the price of a commodity exported by firms in the portfolio of loan officer *j* at year *t.* Additional controls: *Maturity* is the number of years left to the expiration of the loan. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest. *Ln(Loan Amount)* is the natural logarithm of the Loan Outstanding Balance. *Ln(Loan Assets)* is the natural logarithm of the firm's assets, and *Leverage* is defined as the ratio of liabilities over total assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. Other controls included are the *Number of firms* in the loan officer portfolio, the previous year *Credit Risk Score* of the firms in that portfolio, and *Tenure* of the loan officer. Standard errors, adjusted for clustering at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	Default	Renegotiation
	(1)	(2)
High Monitoring x Treatment x Post	0.0377***	0.0417***
	(0.011)	(0.014)
Post	0.0143*	0.0147*
	(0.0075)	(0.0074)
Treatment	-0.0132	-0.0132
	(0.079)	(0.02)
Treatment x Post	0.0027	0.000258
	(0.052)	(0.045)
High Monitoring	-0.028***	-0.037***
	(0.01)	(0.013)
Post x High Monitoring	0.0112***	0.0157***
	(0.00295)	(0.00296)
High Monitoring x Treatment	0.00990***	0.00990***
	(0.00231)	(0.00231)
Firms, loan, loan officer controls	Yes	Yes
Firm FE	Yes	Yes
Loan officer FE	Yes	Yes
Industry-Year FE	Yes	Yes
Observations	23630	23630
Adjusted R^2	0.656	0.441

Table 9: Loan Officers Conscientiousness and Monitoring Intensity.

This table presents the triple difference model of equation seven divided in two into subsamples.

Columns one and two show the regression analysis results for the subsample with the loan officers in the bottom quintile of the distribution of conscientiousness. Columns three and four show the regression analysis results for the sub-sample that contain loan officers in the first, second, and third quintile measure of conscientiousness. The outcome variable in column one is the default status of the loan. *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. The outcome variable in column two is the renegotiation status. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *High monitoring* is a dummy that takes the value of one when the loan officer receives a high monitoring score the year before the negative price shock, and zero otherwise. The variable *Treatment* $_{j,t}$ takes the value of one if the loan officer *j* monitoring firm *i* in year *t* is has export firms in his portfolio. *Post* $_{i,t}$ is a dummy that takes the value of one for years in which there is a decrease of 10 percent or more on the price of a commodity exported by firms in the portfolio of loan officer *j* at year *t.* Conscientiousness is the score in that personality trait of the internally administered psychometric test. Additional controls are: *Maturity* is the number of days left to the expiration of the loan. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest. *Ln(Loan Amount)* is the natural logarithm of the Loan Outstanding Balance. *Ln(Loan Assets)* is the natural logarithm of the firm's assets, *Leverage*. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. Other controls include the *Number of firms* in the loan officer portfolio, the previous year *Credit Risk Score* of the firms in that portfolio, and the *Tenure* of the loan officer. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	Lowest Quintile in Conscientiousness		Q1-Q3 Conscientiousness	
	Default	Renegotiation	Default	Renegotiation
	(1)	(2)	(3)	(4)
High Monitoring x Treatment x Post	0.059***	0.039***	0.027	0.012
	(0.024)	(0.009)	(0.019)	(0.018)
Post	0.014**	0.019***	0.012	0.014
	(0.006)	(0.007)	(0.009)	(0.009)
Treatment	-0.013	-0.013	-0.013	-0.013
	(0.079)	(0.02)	(0.079)	(0.02)
Treatment x Post	0.003	0.004	0.003	0.027
	(0.052)	(0.045)	(0.052)	(0.01)
High Monitoring	-0.028***	-0.037***	-0.028***	-0.037***
	(0.01)	(0.013)	(0.01)	(0.013)
Post x High Monitoring	0.012***	0.016***	0.012***	0.016***
	(0.003)	(0.003)	(0.003)	(0.003)
High Monitoring x Treatment	0.019***	0.029***	0.006***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Firms, loan, loan officer controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan officer FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	4,726	4,726	18,904	18,904
R^2	0.646	0.421	0.613	0.414

Appendix

Table A.1 Variable Definitions

Variable Name	Definition
Loan characteristics	
Loan Amount(($1000))	Loan Outstanding Balance
Interest Rate	Current Annual Percentage Rate (APR) that the Banks uses to accrue daily interest
Default	A dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year
Renegotiation	A dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, collateral, or amount.
Maturity	Number of days left to the expiration of the loan
Term Loan	A dummy variable takes the value of one if the loan is a term loan and zero if it is a credit line.
Collateral	A dummy variable that takes the value of one if the loan has collateral.
Firm characteristics	
Credit Risk Score	The firm's annual credit risk score is based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier).
Assets ($1000)	Firm's asset in thousands of dollars
Liabilities ($1000)	Firm's liabilities in thousands of dollars
Sales ($1000)	Firm's sales in thousands of dollars
Ex ante Prob. Default	The Bank's estimation of the probability of the default of the borrower
Net Income ($1000)	Firm's net in thousands of dollars
Leverage	The ratio of liabilities over total assets
High Monitoring	A dummy that takes the value of one when the loan officer receives a high monitoring score, and zero otherwise. See institutional framework.
Medium Monitoring	A dummy that takes the value of one when the loan officer receives a medium monitoring score, and zero otherwise. See institutional framework.
Low Monitoring	A dummy that takes the value of one when the loan officer receives a low monitoring score, and zero otherwise. See institutional framework.
Loan Officer characteristics	
Tenure	The number of years of experience
High Tenure	A dummy that takes the value of one if the loan officer is above the median in the number of years of experience.
Intelligence Measure (IQ)	The cognitive ability score based on the Wonderlic Test
Age	Age of the loan officer monitoring a firm
Conscientiousness	The score on that personality trait of the loan officer's internally administered psychometric test.
Instrumental Variables	
High Cash Bonus	A dummy that takes the value of one if the loan officer hits the target to receive the highest annual cash bonus.
Medium Cash Bonus	A dummy that takes the value of one if the loan officer hits the target to receive the second highest annual cash bonus.

Figure Appendix 1.A. Loan Officers' Compensation Structure

Figure 1.A. shows the loan officers' bonus compensation structure of The Bank. Total compensation has the following components:

$$Total\ Compensation = \bar{w} + bonus(origination, monitoring, subjective) + financial\ perks \quad (1)$$

Where, $\bar{w}$ is the monthly fixed wage (annualized). Loan officers receive an annual cash bonus as a proportion of the weighted average scores on their roles of loan origination (35%), loan monitoring (35%), and a subjective evaluation by their immediate supervisor (30%). In the annual' review, the bank calculates the origination score as the proportion of their annual goals of loan annual growth in percentage and amount. The monitoring score comes from the weighted average of the loan officer's average portfolio monitoring score (a simple average of the monitoring scores: High, Medium, and Low), and the proportion of non-performing loan in loan officers' portfolio. The third and last component of the bonus is a subjective evaluation from his immediate supervisor.

Bonus Structure

Category	Weight
Origination	**35%**
Annual Growth (in percentage)	50%
Annual Growth (Amount)	50%
Monitoring	**35%**
Monitoring Score	60%
The proportion of Non-Performing Loan of Gross Loans	40%
Subjective (Being proactive, initiative, responsibility, leadership, customer service.	**30%**

Table A.2: Summary Statistics of all booked loans (Full sample)

This table reports summary statistics for the year-loan-firm-loan officer panel. The sample covers five years from 2014 to 2018. I observe 4,213 firms, 179 loan officers, and 32,766 loans. Panel A reports the loan characteristics: *Default* is a dummy that takes the value of one if the loan becomes delinquent for more than 90 days in a given year. *Renegotiation* is a dummy that takes the value of one if any of the following loan terms changes over the year: maturity, interest rate, or amount. *Loan Amount* is the Loan Outstanding Balance in thousand of USD dollars. *Interest Rate* is the current Annual Percentage Rate (APR) that the Banks use to accrue daily interest for a given loan. *Maturity* is the number of days left to the expiration of the loan. *Term Loan* and *Collateral* are dummy variables that take the value of one if the loan is a term loan and has collateral, respectively. Panel B reports the summary statistics for the firm characteristics. Firms' accounting variables are from the borrowers' financial statements. *Credit Risk Score* is the firm's annual credit risk score based on the country's risk manual of the banking regulatory agency. The scale goes from 1 to 5 (less risky to riskier). *Loan Assets* is the firm's assets. *Ex ante Probability of Default* is the Bank's estimation of the probability of the borrower's default. *Leverage* is defined as the ratio of liabilities over total assets. *High monitoring* is a dummy that takes the value of one when the loan officer receives a high monitoring score, and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officer receives a medium monitoring score, and zero otherwise. *Low monitoring* is a dummy that takes the value of one when the loan officer receives a low monitoring score, and zero otherwise.

	Mean	Std Dev.	p25	p50	p75	p90	N
Panel A: Loan Characteristics							
Loan Amount Outstanding (USD)	92	249	11	23	59	177	60,284
Interest Rate (APR)	10	2.4	9	10	12	14	60,284
Maturity (Year)	2.8	3.2	.5	1	5	7.3	60,284
Default	.054	.37	0	0	0	0	60,284
Renegotiation	.03	.17	0	0	0	0	60,284
Collateral	.7	.46	0	1	1	1	60,284
Term Loan	.46	.5	0	0	1	1	60,284
Panel B: Firm Characteristics							
Monitoring	.53	0.49	0	1	1	1	60,284
High Monitoring	.31	.46	0	0	1	1	31,989
Medium Monitoring	.54	.5	0	1	1	1	31,989
Low Monitoring	.12	.33	0	0	0	1	31,989
Credit Risk Score	1.2	.7	1	1	1	2	60,284
Total Assets	5,255	10,786	730	1,800	5,197	10,820	36,738
Total Liabilities	3,001	6,702	220	754	2,478	7,515	36,738
Sales	3,993	8,953	342	1,220	3,945	8,630	36,738
Operating Profit	400	848	43	157	435	920	36,738
Net Income	214	488	20	90	270	571	36,738
Ex-ante prob. default	.03	.027	.012	.024	.038	.063	30,821
Leverage	50	27	29	50	72	85	30,821

Table A.3: Determinants of Monitoring Intensity

This table reports estimates from a linear probability model: the dependent variable *High Monitoring* is a dummy that takes the value of one when the loan officers receive a high monitoring score for firm j at year t and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. *High Cash Bonus* and *Medium Cash Bonus* are dummy variables. Each one takes the value of one when a loan officers reach the highest and the second highest annual cash bonus, respectively. Colum two and four include loan officer fixed effect in addition to the firm and industry-year fixed effects. Observations are at the loan by year level. *Other controls* refer to the following variables: the number of loans and the size growth rate of loan officers' portfolio. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	High Monitoring	High Monitoring	Medium Monitoring	Medium Monitoring
	(1)	(2)	(3)	(4)
High Cash Bonus	0.104***	0.063***	0.043***	0.113***
	(0.011)	(0.012)	(0.013)	(0.015)
Medium Cash Bonus	0.029***	0.035***	0.201***	0.221***
	(0.009)	(0.010)	(0.012)	(0.015)
Ln(Loan Amount)	0.004**	0.004**	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Ln(Maturity)	-0.013***	-0.006	0.012***	0.009**
	(0.004)	(0.004)	(0.004)	(0.004)
Interest Rate Contract	0.005***	0.008***	0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Ln(Assets)	0.040***	0.049***	-0.067***	-0.071***
	(0.014)	(0.013)	(0.018)	(0.018)
Ex-ante prob. default	-0.096	-0.106	0.199	0.119
	(0.222)	(0.227)	(0.251)	(0.268)
Leverage	0.004***	0.004***	-0.005***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	-0.001	0.005	-0.052***	-0.065***
	(0.008)	(0.008)	(0.013)	(0.013)
Collateral	-0.001	-0.002	0.005	0.005
	(0.010)	(0.010)	(0.011)	(0.011)
Term Loan	0.021**	0.016	-0.025**	-0.021*
	(0.010)	(0.010)	(0.012)	(0.011)
High Tenure	0.135***	0.199***	-0.115***	-0.164***
	(0.011)	(0.013)	(0.012)	(0.015)
Constant	-0.295***	-0.397***	1.902***	1.545***
	(0.108)	(0.103)	(0.131)	(0.131)
Other controls	Yes	Yes	Yes	Yes
Observations	23,249	23,243	23,249	23,243
Adjusted R-squared	0.623	0.762	0.540	0.684
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	No	Yes	No	Yes
Industry by Year	Yes	Yes	Yes	Yes

Table A.4: The Effect of the Intensive Margin of Monitoring on Default and Renegotiation.

This table reports estimates of the impact of the intensive margin of monitoring on the probability of loan *Default* and *Renegotiation*. Columns one and two are OLS regressions with the loan and firm controls. In columns three and four, I instrument for High Monitoring and Medium Monitoring using two dummy variables High Cash Bonus and Medium Cash Bonus. Each one takes the value of one when loan officers reach the highest and the second highest annual cash bonus, respectively. Other controls refer to the following variables: the number of loans and the growth rate of loan officers' portfolio size. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	Default	Renegotiation	Default	Renegotiation
Specification:	(OLS)	(OLS)	(IV)	(IV)
	(1)	(2)	(3)	(4)
High Monitoring	-0.009***	0.013**	-0.047**	-0.124***
	(0.003)	(0.005)	(0.021)	(0.045)
Medium Monitoring	-0.005**	-0.006	-0.013**	-0.034**
	(0.003)	(0.005)	(0.006)	(0.016)
Ln(Loan Amount)	-0.001**	0.007***	0.001**	0.007***
	(0.000)	(0.001)	(0.000)	(0.001)
Ln(Maturity)	0.010***	0.010***	0.002***	0.010***
	(0.002)	(0.002)	(0.001)	(0.002)
Interest Rate Contract	0.000	0.001	0.001*	0.002**
	(0.000)	(0.001)	(0.000)	(0.001)
Ln(Assets)	-0.000	0.001	0.002	0.011
	(0.000)	(0.007)	(0.002)	(0.008)
Ex-ante prob. default	-0.234***	0.269**	-0.136***	0.191*
	(0.025)	(0.106)	(0.034)	(0.114)
Leverage	-0.000***	-0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	0.119***	0.075***	0.139***	0.075***
	(0.007)	(0.008)	(0.009)	(0.009)
Collateral	0.007***	-0.019***	-0.000	-0.022***
	(0.002)	(0.004)	(0.002)	(0.004)
Term Loan	-0.003*	0.007	0.004*	0.009
	(0.002)	(0.007)	(0.002)	(0.007)
High Tenure	-0.082**	-0.070**	-0.062**	-0.068**
	(0.032)	(0.032)	(0.028)	(0.032)
Constant	-0.104***	-0.092*		
	(0.008)	(0.056)		
Other controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry by Year FE	Yes	Yes	Yes	Yes
Observations	23295	23243	23,243	23,243
Adjusted R^2	0.430	0.349	0.318	0.311
Cragg-Donald Wald F			68.18	68.18

Table A.5: How loan officers with a higher intelligence measure respond to compensation incentives?

This table reports estimates of the effect of monitoring intensity and loan officers' intelligence proxy on the probability of loan default and loan renegotiation. *High monitoring* is a dummy that takes the value of one when the loan officers receive a high monitoring score for firm j, and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. Columns one and two are OLS regressions with loan and firm controls. In columns three and four, I instrument for *High Monitoring* and *Medium Monitorin*g using two dummy variables *High Cash Bonus* and *Medium Cash Bonus*. Each one takes the value of one when loan officers reach the highest and the second highest annual cash bonus, respectively. *High IQ* is a dummy that takes the value of one if a given loan officer is in the top quintile of the internally administered psychometric tests' intelligence measure and zero otherwise. *Other controls* refer to the following variables: the number of loans and the size growth rate of loan officers' portfolio. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

	(1)	(2)	(1)	(2)
Dependent Variable:	Default	Renegotiation	Default	Renegotiation
Specification:	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)
High Monitoring	-0.008*	0.012**	-0.085**	-0.124***
	(0.004)	(0.005)	(0.035)	(0.047)
Medium Monitoring	-0.002	0.003	-0.016**	-0.021**
	(0.005)	(0.005)	(0.007)	(0.009)
High Monitoring*High IQ	0.032	0.026	-0.069	0.032
	(0.024)	(0.021)	(0.103)	(0.120)
Medium Monitoring*High IQ	0.029	0.054***	-0.120	-0.058
	(0.026)	(0.019)	(0.119)	(0.123)
High IQ	-0.038	-0.045**	0.097	0.056
	(0.025)	(0.019)	(0.102)	(0.105)
Ln(Loan Amount)	0.001	0.007***	0.001**	0.007***
	(0.000)	(0.001)	(0.000)	(0.001)
Ln(Maturity)	-0.003***	0.010***	-0.004***	0.010***
	(0.001)	(0.002)	(0.001)	(0.002)
Interest Rate Contract	0.001	0.001	0.001**	0.002**
	(0.000)	(0.001)	(0.001)	(0.001)
Ln(Assets)	-0.007**	0.001	0.000	0.010
	(0.004)	(0.007)	(0.004)	(0.008)
Ex-ante prob. Default	-0.213***	0.269**	-0.247***	0.190*
	(0.042)	(0.105)	(0.056)	(0.115)
Leverage	0.000	-0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	0.218***	0.076***	0.218***	0.076***
	(0.015)	(0.008)	(0.015)	(0.009)
Collateral	0.000	-0.019***	-0.001	-0.022***
	(0.002)	(0.004)	(0.002)	(0.004)
Term Loan	0.004	0.007	0.006**	0.009
	(0.003)	(0.007)	(0.003)	(0.007)
Other Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry by Year FE	Yes	Yes	Yes	Yes
Observations	23,243	23,243	23,243	23,243
Adjusted R-squared	0.597	0.373	0.291	0.225
Cragg-Donald Wald F			30.338	30.338

Table A.6: How more conscientious loan officers respond to compensation incentives?

This table reports estimates of the effect of the monitoring intensity and loan officers' personality trait of conscientiousness on the probability of loan default and loan renegotiation. *High monitoring* is a dummy that takes the value of one when the loan officers receive a high monitoring score for firm j at year t and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. Columns one and two are OLS regressions with loans and firm controls. In columns three and four, I instrument for High Monitoring and Medium Monitoring intensity using two dummy variables High Cash Bonus and Medium Cash Bonus. Each one takes the value of one when loan officers reach the highest and the second highest annual cash bonus, respectively. *High Conscientiousness* is a dummy that takes the value of one if a given loan officer is in the top quintile of the conscientiousness distribution of the internally administered psychometric tests and zero otherwise. *Other controls* refer to the following variables: the number of loans and the size growth rate of loan officers' portfolio. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

	(1)	(2)	(1)	(2)
Dependent Variable:	Default	Renegotiation	Default	Renegotiation
Specification:	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)
High Monitoring	-0.010**	-0.012**	-0.065**	-0.089***
	(0.005)	(0.005)	(0.035)	(0.037)
Medium Monitoring	-0.000	0.008	-0.013**	-0.019**
	(0.005)	(0.005)	(0.006)	(0.009)
High Monitoring*High Cons.	-0.034***	0.008	-3.244	-3.244
	(0.012)	(0.022)	(5.818)	(5.818)
Medium Monitoring*High Cons.	0.017	-0.014	-3.225	-3.225
	(0.012)	(0.022)	(5.664)	(5.664)
High Cons.	-0.039***	0.011	3.181	3.181
	(0.012)	(0.022)	(5.641)	(5.641)
Ln(Loan Amount)	0.001	0.007***	0.007***	0.007***
	(0.000)	(0.001)	(0.002)	(0.002)
Ln(Maturity)	-0.003***	0.011***	0.009**	0.009**
	(0.001)	(0.002)	(0.004)	(0.004)
Interest Rate Contract	0.001*	0.001	0.003	0.003
	(0.000)	(0.001)	(0.005)	(0.005)
Ln(Assets)	-0.006*	0.001	-0.037	-0.037
	(0.004)	(0.007)	(0.076)	(0.076)
Ex-ante prob. Default	0.191***	0.293***	0.467**	0.467**
	(0.044)	(0.106)	(0.208)	(0.208)
Leverage	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.001)
Credit Risk Score	0.218***	0.076***	0.073***	0.073***
	(0.016)	(0.008)	(0.018)	(0.018)
Collateral	0.001	-0.020***	-0.017	-0.017
	(0.002)	(0.004)	(0.012)	(0.012)
Term Loan	0.004	0.007	-0.003	-0.003
	(0.003)	(0.007)	(0.019)	(0.019)
Other Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry by Year FE	Yes	Yes	Yes	Yes
Observations	23,243	23,243	23,243	23,243
Adjusted R-squared	0.597	0.373	0.291	0.225
Cragg-Donald Wald F			30.338	30.338

Table A.7: How loan officers with a higher intelligence measure respond to compensation incentives? First Stage Regression Analysis

This table reports estimates of the first stage regression of the IV approach in Table 7 using a linear probability model: the dependent variable *High Monitoring* is a dummy that takes the value of one when the loan officers receive a high monitoring score for firm j at year t and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. *High IQ* is a dummy that takes the value of one if a given loan officer is in the top quintile of the internally administered psychometric tests' intelligence measure and zero otherwise. *Other controls* refer to the following variables: the number of loans and the size growth rate of loan officers' portfolio. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	High Monitoring	Medium Monitoring	High monitoring* High IQ	Medium monitoring* High IQ
	(1)	(2)	(3)	(4)
High IQ	0.111***	-0.024	0.058***	0.681***
	(0.019)	(0.023)	(0.020)	(0.032)
High Bonus*High IQ			0.502***	-0.270***
			(0.069)	(0.074)
Medium Bonus*High IQ			0.047*	0.134***
			(0.027)	(0.038)
High Cash Bonus	0.065***	0.101***	0.002	-0.000
	(0.012)	(0.015)	(0.002)	(0.002)
Medium Cash Bonus	-0.025**	0.198***	-0.002	0.004
	(0.010)	(0.014)	(0.002)	(0.002)
Ln(Loan Outstanding)	0.005**	-0.002	-0.001**	0.001
	(0.002)	(0.002)	(0.000)	(0.001)
Ln(Maturity	-0.003	0.008*	0.002**	-0.003***
	(0.004)	(0.004)	(0.001)	(0.001)
Interest Rate Contract	0.008***	-0.000	0.000	0.000
	(0.002)	(0.002)	(0.000)	(0.000)
Ln(Assets)	0.065***	-0.109***	0.014***	-0.006
	(0.013)	(0.017)	(0.004)	(0.004)
Ex-ante prob. default	-0.508***	-0.693***	0.086***	-0.073**
	(0.191)	(0.236)	(0.027)	(0.034)
Leverage	0.004***	-0.004***	0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	-0.002	-0.045***	-0.001	-0.009***
	(0.008)	(0.013)	(0.002)	(0.003)
Collateral	-0.014	0.013	0.003	-0.001
	(0.010)	(0.011)	(0.002)	(0.003)
Term Loan	0.012	-0.018	-0.002	0.002
	(0.010)	(0.012)	(0.002)	(0.003)
Constant	-0.454***	1.540***	-0.116***	0.050
	(0.097)	(0.130)	(0.028)	(0.033)
Observations	23,243	23,243	23,243	23,243
Adjusted R-squared	0.663	0.584	0.558	0.882
Other Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry-Year	Yes	Yes	Yes	Yes

Table A.8: How more conscientious loan officers respond to compensation incentives? First Stage Regression Analysis

This table reports estimates of the first stage regression of the IV approach in Table 8 using a linear probability model: the dependent variable *High Monitoring* is a dummy that takes the value of one when the loan officers receive a high monitoring score for firm j at year t and zero otherwise. *Medium monitoring* is a dummy that takes the value of one when the loan officers receive a medium monitoring score for firm j at year t and zero otherwise. *High Conscientiousness* is a dummy that takes the value of one if a given loan officer is in the top quintile of the conscientiousness distribution of the internally administered psychometric tests and zero otherwise. *Other controls* refer to the following variables: the number of loans and the size growth rate of loan officers' portfolio. Observations are at the loan by year level. Standard errors, adjusted for clustering at the loan and firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A1.

Dependent Variable:	High Monitoring	Medium Monitoring	High Monitoring* High Cons.	Medium Monitoring* High Cons.
	(1)	(2)	(3)	(4)
High Cons.	0.141***	0.213***	0.852***	0.122***
	(0.015)	(0.016)	(0.019)	(0.022)
High Bonus*High Cons.			0.608***	0.624***
			(0.024)	(0.026)
Medium Bonus*High Cons.			0.442***	0.446***
			(0.026)	(0.030)
High Cash Bonus	0.023*	0.152***	-0.086***	0.084***
	(0.012)	(0.016)	(0.006)	(0.006)
Medium Cash Bonus	-0.062***	0.246***	-0.049***	0.047***
	(0.010)	(0.015)	(0.004)	(0.005)
Ln(Loan Outstanding)	0.005***	-0.002	0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Ln(Maturity)	-0.003	0.008*	-0.002	0.001
	(0.004)	(0.004)	(0.002)	(0.002)
Interest Rate Contract	0.008***	-0.000	-0.000	0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Ln(Assets)	0.077***	-0.119***	-0.017***	0.005
	(0.013)	(0.017)	(0.006)	(0.006)
Ex-ante prob. default	-0.517***	-0.714***	-0.907***	0.974***
	(0.192)	(0.237)	(0.108)	(0.111)
Leverage	0.003***	-0.004***	0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Credit Risk Score	-0.007	-0.038***	-0.042***	0.041***
	(0.009)	(0.013)	(0.004)	(0.004)
Collateral	-0.013	0.009	0.001	0.000
	(0.010)	(0.011)	(0.004)	(0.004)
Term Loan	0.012	-0.015	0.003	-0.006
	(0.010)	(0.012)	(0.004)	(0.004)
Constant	-0.450***	1.501***	0.147***	-0.064
	(0.098)	(0.129)	(0.046)	(0.050)
Observations	23,243	23,243	23,243	23,243
Adjusted R-squared	0.558	0.664	0.719	0.840
Other Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Loan Officer FE	Yes	Yes	Yes	Yes
Industry-Year	Yes	Yes	Yes	Yes

Table A.9: Summary Statistics by loan officers' rotation in the sample

This table compares the means between two groups of loans conditional on The Bank actively monitoring these loans. Column one displays the mean of loan observations in which there is at least one loan officer rotation over the sample period. Column 2 shows the mean of loan observation in which there is no loan officer rotation. Panel A shows the loan characteristics, Panel B shows the firms characteristics, and Panel C shows the loan officers characteristics. In the last column, I present the difference in means. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively. All variables are defined in Appendix A1.

	(1) N=6,471	(2) N=25,497	(3)
	1.Rotation	2.Non-Rotation	1-2
Panel A: Loan Characteristics			
Loan Amount (USD)	170.58	177.80	7.22
Interest Rate	9.92	9.82	-0.10***
Maturity (Year)	2.01	2.31	0.31***
Collateral	0.65	0.69	0.03***
Term Loan	0.28	0.33	0.05***
High Monitoring	0.23	0.33	0.11***
Medium Monitoring	0.64	0.52	-0.12***
Low Monitoring	0.11	0.12	0.01*
Default	0.03	0.02	-0.00
Renegotiation	0.03	0.03	0.00
Panel B: Firm Characteristics			
Credit Risk Score	1.15	1.16	0.01
Total Assets	5112.88	6322.35	1209.47***
Total Liabilities	2922.83	3649.11	726.28***
Sales	3629.08	4950.30	1321.22***
Operating Profit	400.02	464.77	64.75***
Net Income	205.29	241.18	35.89***
Ex-ante prob. default	0.03	0.03	0.00***
Leverage	53.81	52.01	-1.80***
Firm Commodity Exporter	0.30	0.36	0.06***
Panel C: Loan Officers Characteristics			
Number of loan originated	129.82	130.31	0.49
Number of firms monitored	11.63	17.89	6.26***
Intelligence Test	102.00	102.06	0.06
Conscientiousness	64.55	63.27	-1.28***
Loan Officer with Firm Commodity Exporter	0.41	0.54	0.14***

Table A.10 Correlation Matrix.

This table presents the cross-sectional correlation coefficients for the loan-year-firm panel according to the sample depicted in Table 1.

	Loan Amount(USD)	Interest Rate	Default	Maturity (Years)	Assets	Leverage	High Monitoring	Medium Monitoring	Low Monitoring	Tenure	Intelligence Score
Loan Amount(USD)	1										
Interest Rate	-0.18***	1									
Default	0.07***	0.07***	1								
Maturity (Days)	0.39***	-0.09***	0.110***	1							
Assets	0.37***	-0.121***	-0.026**	0.046***	1						
Net Income	0.09***	-0.001	-0.123***	-0.046***	0.472***						
Leverage	0.09***	0.001	0.085***	-0.116***	0.097***	1					
High Monitoring	0.06***	-0.036***	-0.060***	-0.028**	0.077***	0.179***	1				
Medium Monitoring	-0.02	0.019*	0.019*	0.004	-0.03**	-0.124***	-0.797***	1			
Low Monitoring	-0.06***	0.024**	0.0613***	0.035***	-0.07***	-0.075***	-0.255***	-0.381***	1		
Tenure	0.05***	0.014	0.070***	0.049***	0.05***	-0.050***	-0.039***	0.07***	-0.06***	1	
Intelligence Score	0.02*	-0.086***	-0.029**	0.035***	0.03***	0.104***	0.058***	0.04**	0.08***	0.035***	1
Conscientiousness	0.04***	0.118***	-0.156***	0.031**	0.09***	0.050***	0.237***	0.105***	-0.112***	0.311***	-0.168***