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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Do audited firms have better access to credit?: Evidence from emerging countries

Yaqoub Alduraywish^{1*}

Abstract: This study aims to examine the relationship of having financial statements audited by external auditors and access to bank credit, using data from the Business Environment and Enterprise Performance Survey (BEEPS). Among firms having credit access, this research further analyses the impacts of auditing financial statements on loan value, loan rate, and loan term (duration) by applying the Heckman two-step models with sample selection. Results show that firms with audited financial statements have better formal credit access than their counterparts. Among these, audited firms obtain bigger loan value, have lower loan rates and shorter borrowing duration, as compared to non-audited firms. Results are robust when applying the Propensity Score Matching.

Subjects: Corporate Finance; Banking; Credit & Credit Institutions; Auditing; Financial Accounting

Keywords: audit; credit access; financial statements; firm and country levels

JEL classification: M42; G21; C21

1. Introduction

In today's global economy and with the increase in the population, public and private institutions increase their structures and sizes to meet such demand, implying more tasks on their people would be applied. On one hand, both the integrity, the quality, and the experience of people working within these institutions are not always the same: people including managers may override the controls, perpetuate fraud and/or errors by acting outside the system (Gay & Simnett, 2015). On the other hand, due to self-interest perspective (Jensen & Meckling, 1976), the performance with respect to these tasks prepared by responsible parties (e.g., managers) could be questionable especially from other groups (e.g., shareholders, government's agencies) who may depend on the outcome of these tasks to help them evaluating and trusting the outcome of such tasks (e.g., reports). Hence, there is a need to engage a third party (called outsiders) in order to increase the credibility of manager's reports. In fact, there are a number of outsiders as of corporate governance mechanisms that could be applied to increase the credibility of such reports including pointing independent and expert individual(s) such as auditors or assurance service providers to provide assurance engagement¹ (Skaife & Warfield, 2003).

Indeed, assurance engagement service provided by auditors is a fundamental aspect of financial statements (Minnis, 2011) as they reduce the likelihood of fraud occurrence (Beasley et al., 1999)

and earnings manipulation (Dechow et al., 1996), lower information asymmetry (Chang et al., 2008; Cormier et al., 2010; Kanagaretnam et al., 2007) and reduce information asymmetry component in the stock market (Schoenfeld, 2017; Shroff et al., 2013). Hence, it is expected that auditors reduce a firm's cost of debt. However, not all types of firms are required to have their financial statements audited as opposed to publicly held firms. For example, privately held firms without an assurance engagement by auditors may not disclose their financial statements publicly. The limitation of financial statements publicly disclosed by privately held firms may motivate researchers to examine the role of financial statement verification and a firm's cost of debt to use relatively smaller sample data with a particular econometric approach. This in turn may threaten the results especially when we select non-random data for empirical analysis, for example (Pham & Talavera, 2018). The author argues that firms with audited financial statements have better access to bank credit compared to firms without audited financial statements. To do so, this study—for the first time as we are aware of—uses large data consist of firm level and country level data that includes 32 countries of Eastern Europe and Central Asia and uses Heckman two-step models and Propensity Score Matching (PSM) to provide a more satisfactory basis for the aim of this research.

This study extends the literature in this area by providing evidence that auditors have an important role in reducing a firm's cost of debt. Specifically, using the Heckman two-stage approach and controlling for firm characteristics, this study finds that firms with audited financial statements have better formal credit access than their counterparts. Compared to non-audited firms, this study also finds that audited firms obtain bigger loan values by 19%, have lower loan rates by 52.4%. Further, this study finds that audited firms are approved for a longer loan term with a duration of three times longer than non-audited firms. The results based on Propensity Score Matching (PSM) show that the average treatment effect (ATE) yields a 6.5% higher probability of audited firms in having credit access than their non-audited peers. The average treatment effect on the treated (ATET) reports a similar result with 6.4% higher probability between audited firms and non-audited firms. These results are consistent with several studies that provide evidence about the relationship between the audited financial statements and a firm's cost of debt. For example, Jiangli et al. (2008), Kano et al. (2011), and Gopalan and Sasidharan (2020) find audited financial statements lower firm's cost of debt (i.e., a reduction in credit constraints, greater credit availability, lower odds of reporting denial of credit).

This study makes several contributions to the literature. First, unlike other studies relating the audited financial statements have better access to bank credit that uses a single setting and relatively small sample data, this study is the first in this area to use a large sample data with the use of Heckman two-step models and Propensity Score Matching (PSM) to confirm the robustness of the main findings. This is important given that these techniques correct for non-randomly selected samples and compare probability to have access to formal credit between audited (treated) and non-audited (untreated) firms to provide a more satisfactory basis for the aim of this research to increase the credibility of the results. Second, this study employs variety of variables related to the audited financial statements and access to bank credit, in a single study, to increase the understanding of how audited and non-audit financial statements with firm's cost of debt differs amongst its proxies. Finally, this study also contributes to the role of audit literature by providing evidence that privately held firms with audited financial statements have lower cost of debt than their non-audited peers. Therefore, regulators and standard setters may benefit from the results of this study and require such firms to mandatory have assurance services over the financial statements by audit firm. Findings of this study may also benefit potential buys and analysts in identifying firms that are likely to have better credit access than their peers, hence better investment decisions.

The paper is organized as follows: section 2 presents literature review and hypothesis development. Section 3 provides information about the data, followed by research methodology outlined in Section 4. Section 5 demonstrates empirical results and discussions. Section 6 concludes.

2. Literature review and hypothesis development

Professional standards require auditors to assess client-related risks (i.e., risks related to fraudulent reporting, internal controls, business risks), as the role of auditor is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement (AS 1001). This is because financial statements are very important for decision-making by stakeholders, including credit institutions and have an ability to predict future cash flows to repay the debt (e.g., Berger & Udell, 2006; Libby, 1979; Maines & Wahlen, 2006). Hence, auditors play a vital role in reducing problems in the financial statements such as fraud, information asymmetry, and a firm's cost of capital including lending costs. Extant literature has examined the corporate governance role of auditors. For example, previous studies find a negative linkage between the corporate governance role of external auditor and the likelihood of fraud occurrence (e.g., Beasley et al., 1999; Beasley, 1996; Law, 2011).

It is empirically documented that firms with better corporate governance have a lower level of information asymmetry (Chang et al., 2008; Cormier et al., 2010; Kanagaretnam et al., 2007). In addition, firms with higher audit quality engage less in earnings management (Burgstahler et al., 2006; Van Tendeloo & Vanstraelen, 2008). This result is consistent with the findings of previous studies (Becker et al., 1998; Klein, 2002). External auditors increase the quality of financial reporting (Cohen et al., 2004), increase credibility to financial statement (Costello & Wittenberg-Moerman, 2011), and auditors disclosures reduce information asymmetry component in the market (Schoenfeld, 2017; Shroff et al., 2013).

Furthermore, auditors are required to gain a deep understanding of a firm environment (IAASB, 2009). As a part of this, International Standards on Auditing No. 315 (ISA 315.14) requires auditors to evaluate whether the management has created and maintained a culture of honesty and ethical behaviour (IAASB, 2009). Auditors are also required to examine and report directly on the effectiveness of internal control when planning audit strategy (AICPA, 2016). Based on this, it is reasonably assumed that auditors play an important role. Hence, previous studies examine the linkage between credit constraints² and firm control environment.³

For example, Kim, Simunic, et al. (2011) study the linkage between the effectiveness of firm internal control and loan contracting in U.S. firms. Using probit regression, they find that loan spreads significantly increase for internal control weakness (ICW) firms after SOX Section 404 disclosures⁴ than for non-ICW firms. They also find fewer lenders who are willing to lend ICW firms and banks increase loan rates charged to ICW firms after such firms disclose weakness in internal control. Similar results are reported by Ashbaugh-skaife et al. (2009), Bharath et al. (2008), Dhaliwal et al. (2011), Graham et al. (2008), and Ashbaugh-skaife et al. (2009). Using evidence from a survey of 471 bank loan officers in Spain, Palazuelos et al. (2018) use a structural equation model to examine whether external auditors increase the willingness of small firms to grant them credit. The authors find that if the accounting information is audited, the loan officers are more willing to facilitate SMEs to access credit. However, this is not the case for non-audited firms. Within this context, Moro and Fink (2013) find that firms with a high level of trust are more likely to obtain more credit and are less constrained.

Using a sample of 4,004 small firms based in the U.S., Allee and Yohn (2009) use ordered probit analyses to show that firms with regulated financial reporting by the Securities and Exchange Commission (SEC) to be audited benefit greater access to credit and receive a lower cost of credit compared to unregulated ones. They find no link between existence of financial statements and firm's access to credit which indicates that lenders would like to see audited financial statements rather than the existence of financial statements to grant access to credit.

Using a sample of 540 common stocks traded on the New York Stock Exchange, Barton and Waymire (2004) show that audited financial statements lower price declines when stock prices drop. Based in South Korea, Kim, Simunic, et al. (2011) find that audited firms receive an interest

rate spread 56–124 basis points lower than their counterparts. Their findings suggest that external auditors provide valuable information in the credit markets. Likewise, Blackwell et al. (1998) provide evidence that firms with audited financial statements receive a 25 basis point reduction in their interest rate than unaudited firms. These findings are drawn from the use of ordinary least squares regression and based on a sample of 212 revolving credit agreements active. These findings, however, are opposed to Johnson et al. (1996) who find no significant relation between loan interest rates and auditor association in their experiment study with loan officers. Using a sample of 855 small privately held U.S. companies and based on probit model, Cassar et al. (2015) also find no significant relation between accounting information to prepare a firm's financial reports and loan denial.

Unlike the zero to one scale that uses, for example, structural equation model, Hope et al. (2011) apply a different approach that uses a scale from 0 (no problems with access to finance) to 4 (most severe constraints) to study the role of audit in increasing the credibility of accounting information which in turn influence financing constraints. They find that when auditors reviewed financial statements, firms experienced less problems received in gaining access to external finance. This finding is similar to those of Cole and Frost (2018) who find that firms with audited financial statements have lower odds of reporting denial of credit than firms without audited financial statements.

Equally importantly, many researchers examine auditing's effect on a firm's cost of capital. For example, Minnis (2011) finds that audited firms have a significantly lower cost of debt and that lenders place more weight on audited financial information in setting the interest rate. Booth et al. (2001) argue that outside monitoring reduces lending costs. Mansi et al. (2004) and Pittman and Fortin (2004) broadly find that the cost of debt is lower for firms with larger auditors. Cole and Frost (2018) find that audited financial statements have lower odds of reporting denial of credit on their most recent credit application. Furthermore, banks collect audited financial statements less frequently from borrowers with low risk (Diamond, 1991) compared to borrowers with middle-tier credit risk (Minnis & Sutherland, 2017).

Based on emerging markets and developing economies, Gopalan and Sasidharan (2020) study the linkage between credit constraints and financial liberalization focussing on the influence of foreign bank presence on firm credit constraints. The authors employ an ordered probit model on cross-sectional analysis of country and firm level data and find that firms with audited financial statements tend to experience a reduction in credit constraints and foreign bank presence tends to ease firms' credit constraints.

In the case of Japan, Kano et al. (2011) study the relationships between loan contract terms and credit availability and verifiability of information. In their study, information verifiability is proxied by dummy variables representing the availability of audited financial statements. They, however, find no relationships between credit constraints and information verifiability. Using a sample of four countries in Asia, Jiangli et al. (2008) study the effects of banks credit decisions during the Asian financial crisis of July 1997 through the end of 1998. They find that, in Indonesia, firms with audited financial statements have greater credit availability compared with firms that voluntarily provide audits of their financial statements. However, this effect does not hold for firms in Korea and the Philippines.

Other studies extend this context by arguing that not only audited financial statements impact loan pricing but also the type of audit report and the opinion of the audit report. For example, Firth (1980) finds a statistically significant difference in the mean of loans between the "clean" audit report state and audit report of (going-concern qualification and asset valuation qualification). These results indicate that firms that are more likely to go bankrupt have higher cost of loans. Similar results are also found of those studies (e.g., Amin et al., 2014; Bharath et al., 2008; Niemi & Sundgren, 2012; Pittman & Fortin, 2004). Therefore, while each of the above studies makes

significant contributions, there remains an opportunity to examine the relation between assurance engagement by auditors and formal credit access (i.e., loan value, loan rate, and loan term (duration) using a large sample data of 16,028 firm level and 32 country level of Eastern Europe and Central Asia and based on advanced techniques (i.e., Heckman two-step models, Propensity Score Matching (PSM)).

Accordingly, this paper develops the following hypothesis:

Hypothesis. Firms having financial statements audited have better access to formal credit.

3. Data and variables

3.1. Data

This study uses data at firm level and country level, extracted from the 5th Business Environment and Enterprise Performance Survey (BEEPS)—an extensive economic survey conducted jointly by the World Bank and the European Bank for Reconstruction and Development (EBRD). The BEEPS was conducted in 32 countries of Eastern Europe and Central Asia with the purpose to provide data and information on important aspects of firms in emerging countries.⁵ A primary goal of the Survey was to capture indicators of the business environment and business-government interaction, which allows for evaluation of the business environment impacts on the growth and development of the private sector, as well as for impact assessments of reforms. Topics that BEEPS covers include firm's general information, infrastructure and services, sales and supplies, competition, innovation, capacity, land and permits, crime, finance, business-government relations, use of consulting services, labour, business environment, performance, and perception of obstacles. Data and information were collected via face-to-face interviews with around 14,000 managerial representatives of the surveyed countries (see Table A1 in Appendix). Approximate 90% of questions in the survey instrument aim to determine the characteristics of business environment for private sector. The remaining 10% focus on personal opinions and assessment of the respondents on firm-related aspects.

3.2. Variables

In this study, self-reported information of managerial respondents is used to construct variables. Details are as follows:

Dependent variables: This study focuses on the relationship between audit and access to credit, thus this paper constructs the dependent variable access to credit as a dummy variable based on the following question: "Does this establishment have a line of credit or a loan from a financial institution?". Answers are provided with Yes, No, or Don't know. We then remove firm observations whose respondents answer Don't know to avoid sample bias. The variable credit is coded 1 if the answer is Yes, and 0 for No. Among those answering Yes, we are further interested in loan-related aspects, including loan value, loan rate, and loan term or duration, following Pham and Talavera (2018).

- (i) In this study, *loan value* is formed as the logarithm of value of the most recent line of credit/loan at the time of approval upon the following question: "Referring only to this most recent loan or line of credit, what was its value at the time of approval?". Those whose answers are *Don't know* or *Refusal* are omitted. Loan value in local currency units is converted to that in euro upon the average exchange rate of the surveyed years and deflated to 2010 prices using the GDP deflators.
- (ii) In this paper, *loan rate* is considered as the annual nominal interest rate of the most recent line of credit/loan based on the information from the question: "Referring only to this most

recent loan or line of credit, what was its value at the time of approval?”. As well, this research omits observations that have missing information.

- (iii) Duration is constructed based on the question: “What was the original duration of the most recent line of credit or loan in months?”. Again, we eliminate those answering *Don’t know* or *Refusal* to ensure the balanced sample.

Key independent variable: Audit is the key independent variable in this research. We construct this variable based on the following question in the survey questionnaire: “In the last fiscal year, did this establishment have the financial statements checked and certified by an external auditor?”. Respondents provide the answers of Yes, No, or *Don’t know*. We eliminate observations with missing information and code data with 1 for Yes and 0 for No.

Control variables: Following literature such as those of, for example, Archer et al. (2020) and Nguyen et al. (2019), this study explores a vector of variables to control for the characteristics of firms and managers. The list includes firm size (small, medium), overdraft, firm age, sales (log.), manufacturing (to control for sector), investment (log.), gender, experience, and business city (to control for location). Year and country effects are also included.

Instruments: Following previous studies, for example, Archer et al. (2020) and Pham and Talavera (2018), this study uses three instruments, including informal credit, personal loans of firm owners, and managerial time, to mitigate the problem of selection bias. Further discussion of these instruments is presented in the method section.

Details of all variables are described in Table 1.

4. Methods

As discussed above, this study follows Pham and Talavera (2018) in constructing the dependent variable, credit access as a dummy variable to examine whether or not a firm has a line of credit or a loan from a financial institution. Among those responding that they have a line of credit or a loan from a financial institution, this study examines further firms’ credit information, including loan value, loan rate, and loan term or duration. To do that, this paper proposes a baseline model using a Probit model to analyze the probability of a firm to have access to credit. To further examine the relationship between audit and loan value, loan rate, and loan duration, the current paper applies a linear regression as presented in Section 4.1 below.

However, the impacts of having financial statements audited on credit access, loan value, loan rate, and duration might cause an issue of sample selection bias (for example, see Pham and Talavera (2018) with regard to firm’s credit access). This occurs when we select non-random data for empirical analysis, that is, we select firms with a Yes answer of having access to finance in order to further examine their loan value, loan rate, and loan duration. To address the selection bias problem, this study applies Heckman two-step models (Gronau, 1974; Heckman, 1976; Lewis, 1974) with the purpose to yield unbiased results. Models are presented in Section 4.2 below. Details of research methods are provided as follows:

4.1. Baseline models

(i) *Audit and access to credit: A Probit model*

$$CREDIT_{ict} = \begin{cases} CREDIT_{ict}^* & \text{if } CREDIT_{ict}^* > 0 \\ 0 & \text{if } CREDIT_{ict}^* \leq 0 \end{cases} \quad (1)$$

where $CREDIT_{ict}^*$ is the latent variable of access to credit ($CREDIT_{ict}$) that has the functional form with firm-fixed effect (θ_i), country fixed effect (ω_c) and year fixed effect (δ_t) as follows:

$$CREDIT_{ict}^* = \alpha_0 + \alpha_1 AUDIT_{ict} + \alpha_2 X_{ict} + \theta_i + \omega_c + \delta_t + \varepsilon_{ict} \quad (2)$$

Table 1. Variable description

Variables	Definition
<i>Dependent variables</i>	
Credit	Dummy variable; = 1 if a firm had a line of credit or loan from a financial institution; = 0 otherwise
Loan value (log.)	The logarithm of value of the most recent line of credit/loan at the time of approval. Loan value in local currency units is converted to that in euro upon the average exchange rate of the surveyed years and deflated to 2010 prices using the GDP deflators.
Loan rate	The annual nominal interest rate of the most recent line of credit/loan (%)
Duration	The original duration of the most recent line of credit/loan in months
<i>Independent variables</i>	
Audit	Dummy variable; = 1 if a firm had the annual financial statements checked and certified by an external auditor; = 0 otherwise
Small	Dummy variable; = 1 if a firm had less than 20 employees; = 0 otherwise
Medium	Dummy variable; = 1 if a firm had from 20 to less than 100 employees; = 0 otherwise
Overdraft	Dummy variable; = 1 if a firm had an overdraft facility at time of the interview; = 0 otherwise
Firm age	The number of years since a firm's establishment till the year of survey
Sales (log.)	The logarithm of total annual sales for all products and services that a firm gained in the fiscal year prior to the surveyed years. Sales in local currency units are converted to those in euro upon the average exchange rate of the surveyed years and deflated to 2010 prices using the GDP deflators.
Manufacturing	Dummy variable; = 1 if a firm operated in the manufacturing industry; = 0 otherwise (retail services and other services). This variable is used to control for sector effects.
Investment (log.)	The logarithm of the amount of money that a firm spent on the purchases of machinery, vehicles, equipment, land, and buildings. The investments in local currency units are converted to those in euro upon the average exchange rate of the surveyed years and deflated to 2010 prices using the GDP deflators.
Gender	Dummy variable; = 1 if the Top Manager is male; = 0 if female
Experience	The number of years of experience working in the sector of the Top Manager
Business city	Dummy variable; = 1 if a firm is located in the main business city; = 0 otherwise
<i>Instruments</i>	
Informal credit	Dummy variable; = 1 if a firm had its working capital or fixed assets financed from non-bank financial institutions which include microfinance institutions, credit cooperatives, credit unions, or finance companies, and/or credit from suppliers and advances from customers, and/or from other sources (moneylenders, friends, relatives, etc.)

(Continued)

Table 1. (Continued)

Variables	Definition
Personal loans	Dummy variable; = 1 if a firm had outstanding personal loans used to finance establishment's business activities; = 0 otherwise
Managerial time	Share of total time in days that senior managers spent on dealing with requirements imposed by government regulations

where $AUDIT_{ict}$ is the key independent variable, showing if a firm had its financial statements audited by external auditors; X_{ict} is a vector of control variables, including small, medium, overdraft, firm age, sales (log.), manufacturing, investment (log.), gender, experience, and business city. Variable description is presented in Table 1. α_0 is the constant term; α_1 captures the effect of having financial statements audited on access to credit; α_2 captures the effects of the control variables on access to credit; ε_{ict} denotes the error term and $\varepsilon_{ict} \sim N(0, \sigma_\varepsilon^2)$.

(ii) *Audit and loan value: A linear regression*

$$VALUE_{ict} = \beta_0 + \beta_1 AUDIT_{ict} + \beta_2 X_{ict} + \theta_i + \omega_c + \delta_t + \varepsilon_{ict} \quad (3)$$

where $VALUE_{ict}$ denotes the logarithm of value of the most recent line of credit/loan at the time of approval; β_0 is the constant term; β_1 captures the effect of having financial statements audited on loan value; β_2 captures the effects of the control variables on the dependent variable.

(iii) *Audit and loan rate: A linear regression*

$$RATE_{ict} = \gamma_0 + \gamma_1 AUDIT_{ict} + \gamma_2 X_{ict} + \theta_i + \omega_c + \delta_t + \varepsilon_{ict} \quad (4)$$

where $RATE_{ict}$ denotes the annual nominal interest rate of the most recent line of credit/loan; γ_0 is the constant term; γ_1 captures the effect of having financial statements audited on loan rate; γ_2 captures the effects of the control variables on the dependent variable.

(iv) *Audit and loan duration: A linear regression*

$$DURATION_{ict} = \delta_0 + \delta_1 AUDIT_{ict} + \delta_2 X_{ict} + \theta_i + \omega_c + \delta_t + \varepsilon_{ict} \quad (5)$$

where $DURATION_{ict}$ denotes the original duration of the most recent line of credit/loan in months; δ_0 is the constant term; δ_1 captures the effect of having financial statements audited on loan duration; δ_2 captures the effects of the control variables on the dependent variable.

4.2. Heckman two-step models with sample selection

As discussed, the impacts of audit on credit access, loan value, loan rate, and duration arise a problem of selection bias. In fact, the specifications of the effects of $AUDIT_{ict}$ on loan value, loan rate, and duration, as shown in Equations (3), (4), and (5), are conditional on the probability of having access to credit. Specifically, only firms having credit access sign the contract with banks or financial institutions regarding loan value, loan rate, and duration, among others. Estimates from the baseline regressions may not be accurate if selection bias is not addressed. Given that, we employ the Heckman two-step models with sample selection (e.g., Pham & Talavera, 2018). The Heckman selection models (Gronau, 1974; Heckman, 1976; Lewis, 1974) assume that there exists an underlying relationship as follows:

$$Y_{ict} = \omega_0 + \omega_1 AUDIT_{ict} + \omega_2 X_{ict} + u_{1ict} \quad \text{regression equation} \quad (6)$$

where Y_{ict} represents for $VALUE_{ict}$, $RATE_{ict}$, and $DURATION_{ict}$ as specified in Equations (3), (4), and (5) above. The *regression equation* is observed and estimated for the sample of firms having access to credit, or the *selection equation* as follows:

$$CREDIT_{ict} + u_{2ict} > 0 \quad \text{selection equation} \quad (7)$$

where $u_{1ict} \sim N(0, \sigma)$ and $u_{2ict} \sim N(0, 1)$ and $corr(u_1, u_2) = \rho$.

Applying Heckman two-step models with sample selection requires instruments that affect the likelihood of firms having access to credit but do not affect the decision of banks or financial institutions regarding loan value, loan rate, and duration. Following Archer et al. (2020) and Pham and Talavera (2018), the current paper uses three instruments including informal credit, personal loans, and managerial time. *First*, informal credit is observed when a firm had its working capital or fixed assets financed from non-bank financial institutions which include microfinance institutions, credit cooperatives, credit unions, or finance companies, and/or credit from suppliers and advances from customers, and/or from other sources (moneylenders, friends, relatives, etc.). As suggested by Archer et al. (2020), firms borrow informal loans when they are credit constrained in the formal markets or less likely to have formal credit access. This instrument is valid as formal financial institutions cannot observe a firm's informal loans to decide the loan value, loan rate, and duration. *Second*, this paper uses the instrument *personal loans* as per our argument: if firm owners have their personal loans to support firm operations, they are less likely to seek loans from the formal markets. This instrument is valid as well because bank's decision in loan value, rate, and duration does not depend on firm owners' personal loans. *Third*, *managerial time* is used as an instrument because time that senior managers spent on dealing with requirements imposed by government regulations may affect their preparation for formal loan applications (Pham & Talavera, 2018), which then affects the credit accessibility (firms are less likely to obtain formal loans).

4.3. Robustness checks: Propensity Score Matching

To ensure the robustness of the main findings, this study uses Propensity Score Matching (PSM) method as a non-parametric approach used to estimate the average treatment effects with non-experimental data (Guo & Fraser, 2014). PSM estimates propensity score between the treated group and the control group through the probability of receiving treatment of the covariates based on similar characteristics of the two groups. Basically, PSM matches treated firms (those having their financial statements audited, or audited firms) and control firms (those not having their financial statement audited, or non-audited firms) based on their observed characteristics X_{it} . The difference of their performance is estimated depending on the treatment. Propensity score (PS) is given as follows:

$$PS = Probability(X_{ict}) = Probability(AUDIT_{ict} = 1 | X_{ict}) \quad (8)$$

where $AUDIT_{ict}$ denotes those having their financial statements audited as:

$$AUDIT_{ict} = \{1, \text{if treatment (audited firms)}; 0, \text{if no treatment (non-audited firms)}\} \quad (9)$$

Let's consider Y_{1ict} and Y_{0ict} to represent for credit access, loan value, loan rate, and duration of audited firms and non-audited firms, correspondingly. Y_{1ict} , Y_{0ict} , and the difference ($Y_{1ict} - Y_{0ict}$) are random variables. The mathematical expectation operator $E[.]$ is given as follows:

$$E[Y_{0ict} | X_{ict}, AUDIT_{ict}] = X_{ict}'\beta \quad (10)$$

where β is a vector of regression coefficients; X_{ict} is a vector of observed covariates (or control variables); X_{ict} and $AUDIT_{ict}$ may be correlated. It is assumed that the effect of covariates Y_{0ict} is not linear. Thus, the average treatment effect (ATE) and average treatment effect on the treated (ATET) are formulated as:

$$\begin{aligned} ATE &= E(\alpha) = E(Y_1 - Y_0) \\ ATET &= E(Y_1 - Y_0 | AUDIT = 1) \end{aligned} \quad (11)$$

Table 2. Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Credit (Yes = 1)	14,525	0.286	0.452	0.000	1.000
Loan value (log.)	3,588	11.375	1.882	-2.551	19.533
Loan rate	4,148	11.591	7.736	0.000	100.000
Duration	3,915	37.979	39.806	1.000	360.000
Audit (Yes = 1)	14,525	0.336	0.472	0.000	1.000
Small (Yes = 1)	14,525	0.543	0.498	0.000	1.000
Medium (Yes = 1)	14,525	0.314	0.464	0.000	1.000
Overdraft (Yes = 1)	14,160	0.300	0.458	0.000	1.000
Firm age	14,403	13.735	11.979	0.000	173.000
Sales (log.)	11,436	12.958	1.983	-0.909	28.276
Manufacturing (Yes = 1)	14,525	0.382	0.486	0.000	1.000
Investment (log.)	14,525	3.358	4.920	-3.375	21.755
Gender (Male = 1)	14,525	0.800	0.400	0.000	1.000
Experience	14,131	16.795	10.141	1.000	60.000
Business city (Yes = 1)	14,525	0.217	0.412	0.000	1.000

Notes: Descriptive statistics report means of individual variables, followed by standard deviations, minimum, and maximum values.

5. Results

5.1. Descriptive statistics

This study presents in Table 2 descriptive statistics, including mean, standard deviation, minimum, and maximum values, of all variables. On average, 28.6% of firms in the survey had a line of credit or loan from a financial institution. Among these, the average of loan value was approximate 11.4 (in logs), the average annual nominal interest rate of the most recent line of credit/loan was around 11.6%. Mean of original duration of the most recent line of credit/loan in months was almost 38 months. In the survey, 33.6% of firms reported to have their financial statements audited by external auditors.

In terms of firm size, 54.3% was small-sized firms with less than 20 employees, while 31.4% was medium-sized with from 20 to less than 100 employees. On average, 30% of firms had an overdraft facility at time of the interview. The average age of businesses was approximately 13.7 years. In the sample, the average total annual sales for all products and services that a firm gained in the fiscal year prior to the surveyed years was around 13 (in logs), while the mean of investment that a firm spent on the purchases of machinery, vehicles, equipment, land, and buildings was 3.6 (in logs). 38.2% of firms operated in the manufacturing industry. On average, 80% of firms were run by male managers. At mean, managers had 16.8 years of experience working in the sector. In terms of location, 21.7% of surveyed firms are located in the main business city.

Table 3 presents summary statistics and *t*-test statistics regarding the loan-related difference between audited and non-audited firms. Generally, 38.1% of audited firms had access to credit, while only 23.7% of non-audited firms did—this difference is statistically significant at 1% level. Among those having credit access, audited firms also reported a 1% statistically higher loan value than their peers. Compared to non-audited firms, audited firms reported a lower loan rate; yet, this

Table 3. Summary statistics: Audited vs. non-audited firms

Variables	Audited firms		Non-audited firms		t-test
	Obs.	Mean	Obs.	Mean	Diff.>0
		[1]		[2]	[1] – [2]
Credit (Yes = 1)	4,886	0.381 (0.486)	9,639	0.237 (0.425)	18.433***
Loan value (log.)	1,608	11.861 (1.996)	1,980	10.980 (1.684)	14.338***
Loan rate	1,864	10.966 (8.308)	2,284	12.101 (7.198)	-4.712
Duration	1,755	38.909 (43.889)	2,160	37.223 (36.144)	1.319*

Notes: Difference of variables is reported by using t-test to test the null hypotheses H_0 : difference of mean is not greater than 0. *** denotes significance at the 1% level. Standard deviations are in parentheses.

difference is not significant. In terms of loan duration, audited firms obtained a longer loan term than their counterparts, significance at 10%.

5.2. Empirical results

5.2.1. Baseline results

Table 4 shows the baseline results on the relationship between audit and access to credit, loan value, loan rate, and duration without considering the selection bias problem. As demonstrated, the coefficient of audit is positive and significant in relation with credit (column [1]), suggesting that firms with audited financial statements have better credit access than their peers. Holding other things unchanged, audited firms have a 15.3% higher probability of obtaining formal credit. In column [2], it shows a significant and positive impact of audit on loan value, suggesting that audited firms obtain a bigger loan value than non-audited firms. Column [3] demonstrates a positive nexus between audit and loan rate; yet, the coefficient is not significant. In column [4], the coefficient of audit vis-à-vis loan duration relationship is positive and significant, showing that audited firms have a shorter loan term than their non-audited counterparts.

However, the baseline results presented in columns [2], [3], and [4] might likely be biased when the problem of selection bias is not considered. As previously discussed, only firms having credit access sign the contract with formal financial institutions regarding loan value, loan rate, and duration, among others. In other words, the specifications of loan value, loan rate, and duration are executed on the sample of firms having access to credit only. Therefore, the estimated coefficients of audit in relation with loan value, loan rate, and duration are potentially biased if we do not address the issue of selection bias. The argument in this paper is consistent with Pham and Talavera (2018) who conducted a study on firm's access to finance of small and medium enterprises in an emerging market.

The current also finds some significant relationship between control variables and access to credit as shown in column [1]. The coefficient of *overdraft* is positive and significant, which suggests that firms having an overdraft facility are more likely to have credit access. In terms of sales, firms with higher total annual sales for all products and services in the fiscal year tend to have better credit access. Those operating in the manufacturing sector are more likely to access formal credit. Regarding investment, firms spending on the purchases of machinery, vehicles, equipment, land, and buildings show a higher probability of obtaining formal loans. In terms of location, the coefficient of *business city* is negative and significant, suggesting that firms locating in the main business city are less likely to have credit access than their peers.

Table 4. Audit and access to credit: Baseline results

Variables	Credit	Loan value	Loan rate	Duration
	Probit	OLS	OLS	OLS
	[1]	[2]	[3]	[4]
Audit (Yes = 1)	0.153*** (0.031)	0.212*** (0.060)	-0.312 (0.246)	-2.814* (1.442)
Small (Yes = 1)	-0.001 (0.047)	-0.764*** (0.094)	0.654* (0.375)	-7.503*** (2.209)
Medium (Yes = 1)	0.041 (0.043)	-0.456*** (0.083)	0.190 (0.331)	-5.222*** (1.945)
Overdraft (Yes = 1)	0.656*** (0.032)	-0.008 (0.060)	-0.365 (0.245)	-3.106** (1.435)
Firm age	0.002 (0.001)	0.006*** (0.002)	0.007 (0.008)	0.048 (0.049)
Sales (log.)	0.103*** (0.009)	0.436*** (0.019)	-0.376*** (0.076)	-1.749*** (0.445)
Manuf. (Yes = 1)	0.102*** (0.029)	0.148*** (0.057)	0.207 (0.232)	1.050 (1.354)
Investment (log.)	0.037*** (0.003)	0.017*** (0.005)	-0.031 (0.021)	-0.040 (0.121)
Gender (Male = 1)	-0.015 (0.035)	0.108 (0.070)	-0.204 (0.289)	0.445 (1.681)
Experience	-0.001 (0.001)	-0.002 (0.003)	0.010 (0.012)	-0.033 (0.067)
Business city (Yes = 1)	-0.200*** (0.036)	0.186*** (0.071)	-0.084 (0.291)	-0.006 (1.703)
Country effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Obs.	10,951	3,170	3,526	3,357

Notes: Dependent variables are credit (column [1]), loan value (column [2]), loan rate (column [3]), and duration (column [4]). Column [1] reports results from probit regression, while columns [2], [3], and [4] report results from Ordinary Least Square (OLS) regressions. Coefficients of individual variables are reported, followed by standard errors in parentheses. *, **, and *** denote the levels of significance at 10%, 5%, and 1%, respectively. All regressions include a constant term.

5.2.2. Main findings

Table 5 demonstrates the main findings on the impacts of audit on loan value, loan rate, and duration. Overall, empirical results from using the Heckman two-stage approach, after controlling for firm characteristics, suggest that having financial statements audited does affect loan value, rate, and term. The coefficient of *audit* is positive and significant in column [1], suggesting a statistically significantly positive impact of audit on loan value. In particular, firms having their financial statements audited were given a bigger loan value by 19.3% than those without having audited financial statements. In other words, firms with audited financial statements are more favoured by lending institutions so that they were able to obtain a bigger value than non-audited firms. Adversely, the coefficient of *audit* is negative and significant in columns [2] and [3], showing a negative nexus between audit and loan term and duration. As such, firms with audited financial statements are able to borrow at a lower interest rate (or financial cost) by 52.4% opposed to their non-audited counterparts, holding other factors unchanged. Further, audited firms are approved a longer loan term with a duration of three times longer than non-audited firms.

This study also shows the link between control variables and loan-related variables. The results show significant and negative coefficients of firm size (small and medium sized) in relation to loan value (column [1]) and loan term (column [3]), suggesting that small firms obtain smaller bank loans and shorter duration. Regarding overdraft, results in Table 5 show that firms having overdraft

Table 5. Audit and access to credit: Heckman two-step estimates

Variables	Loan value	Loan rate	Duration
	[1]	[2]	[3]
Audit (Yes = 1)	0.193*** (0.063)	-0.524** (0.247)	-3.011** (1.518)
Small (Yes = 1)	-0.785*** (0.097)	0.618 (0.377)	-7.266*** (2.331)
Medium (Yes = 1)	-0.448*** (0.086)	0.222 (0.333)	-4.377** (2.059)
Overdraft (Yes = 1)	0.023 (0.062)	-0.341 (0.246)	-3.165** (1.513)
Firm age	0.008*** (0.002)	0.002 (0.008)	0.067 (0.052)
Sales (log.)	0.433*** (0.019)	-0.318*** (0.075)	-1.679*** (0.464)
Manuf. (Yes = 1)	0.128** (0.059)	0.152 (0.232)	1.309 (1.424)
Investment (log.)	0.017*** (0.005)	-0.033 (0.021)	-0.048 (0.128)
Gender (Male = 1)	0.108 (0.072)	-0.258 (0.287)	-0.239 (1.754)
Experience	-0.003 (0.003)	0.006 (0.012)	-0.069 (0.071)
Business city (Yes = 1)	0.198*** (0.073)	0.092 (0.290)	0.174 (1.780)
Country effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
<i>Selection equation instruments</i>			
	Credit	Credit	Credit
Informal credit	0.399*** (0.027)	0.409*** (0.027)	0.400*** (0.027)
Personal loans	0.280*** (0.035)	0.303*** (0.035)	0.289*** (0.035)
Managerial time	0.001** (0.001)	0.001** (0.001)	0.002*** (0.001)
Mills ratio	0.390** (0.166)	-1.989*** (0.648)	0.349 (3.981)
Observations	11,845	11,691	11,742
Censored observations	8,959	8,535	8,727
Uncensored observations	2,886	3,156	3,015

Notes: Dependent variables are loan value (column [1]), loan rate (column [2]), and duration (column [3]). Heckman two-step estimates (regression model with sample selection) are reported. *, **, and *** denote the levels of significance at 10%, 5%, and 1%, respectively.

facilities can access bank loans with shorter duration (column [3]). Firm age significantly and positively affects loan value (column [1]), although the magnitude is relatively small at less than 1%, showing that older firms can obtain bigger loans than younger firms. Regarding sales, those having higher value of sales from goods and services hold bigger loans (column [1]), are charged lower loan rates (column [2]) and get shorter loan terms (column [4]).

The coefficients of manufacturing and investment are positive and significant as shown in column [1], suggesting that manufacturing firms obtain bigger bank loans than those operated in details and services industries and that firms making investment in fixed assets hold a bigger

loan size. As well, in column [1], those located in the main business city can obtain bigger loans from banks than those located in non-business cities.

Regarding the instruments in the selection equations, results show significant and positive coefficients of all the three instruments (informal credit, personal loans, and managerial time) in association with access to formal credit (columns [1], [2], and [3]). The positive relationship between informal credit and access to credit suggests that firms tend to apply for informal loans before seeking formal credit. Similarly, significant and positive coefficients of *personal loans* in all the three columns refer to a positive nexus between outstanding personal loans used to finance establishment's business activities and access to formal credit. In terms of *managerial time*, results show that the more time that senior managers spend on dealing with requirements imposed by government regulations, the more likely their firms have access to formal credit.

5.3. Robustness checks

Table 6 presents the results from a non-parametric method PSM (as discussed in the method section) to check the robustness of this study's main findings. It shows the comparison of probability to have access to formal credit between audited (treated) and non-audited (untreated) firms, in which the latter is the base. Control variables are included in the PSM technique. Results show that the average treatment effect (ATE) yields a 6.5% higher probability of audited firms in having credit access than their non-audited peers (column [1]). The average treatment effect on the treated (ATET) reports a similar result with 6.4% higher probability between audited firms and non-audited firms. The results of this test confirm main findings in the previous section that audited firms are able to access bank loans better than non-audited firms.

Among those having formal credit access, the average treatment effect shows that those having their financial statements audited obtain a bigger loan value of 27.9% as compared to those whose financial statements are not audited (column [2]). Slightly higher, the average treatment effect on the treated (ATET) yields the loan-value difference of 33%, suggesting a bigger loan value that audited firms can obtain as compared to their counterparts. In terms of loan rate, ATE and ATET results show that audited firms can access the bank loans at a lower rate of 59.2% and 70.7%, respectively (column [3]). The positive impact of audit on loan value and the negative link between audit and loan rate confirm this paper's key findings in the empirical results section as shown previously. In column [4], it presents the relationship between audit and duration; yet, it is not statistically significant.

Table 6. Robustness checks: Propensity Score Matching				
	Credit	Loan value	Loan rate	Duration
	[1]	[2]	[3]	[4]
Average treatment effect (ATE)	0.065*** (0.011)	0.279*** (0.061)	-0.592** (0.289)	2.535 (1.758)
Average treatment effect on the treated (ATET)	0.064*** (0.013)	0.330*** (0.075)	-0.707** (0.315)	1.541 (1.925)
Control variables	Yes	Yes	Yes	Yes
Observations	10,951	3,170	3,526	3,357

Notes: Dependent variables are credit (column [1]), loan value (column [2]), loan rate (column [3]), and duration (column [4]). Propensity Score Matching estimations are applied with two matches per treated. Abadie-Imbens (AI) robust standard errors are in parentheses. ** and *** denote the levels of significance at 5% and 1%, respectively. Base: non-audited firms.

6. Conclusions

This study explores the role of assurance engagement by auditors in enhancing the degree of confidence of the intended users other than the responsible party (e.g., managers) about the subject matter information. The paper shows the relation between access to credit and audited financial statements. Unlike previous research that uses a single setting (for example, see Kim, Simunic, et al. (2011), Allee and Yohn (2009), Kano et al. (2011), and Palazuelos et al. (2018)), this study uses data at firm level and country level which include 32 countries of Eastern Europe and Central Asia to provide more fresh evidence on the link between auditing financial statements and having credit access. To test the linkage between audit and loan value, loan rate, and loan duration, this study applies Heckman two-step models to avoid the issue of sample selection bias with the use of Probit model as similar work of (Gopalan & Sasidharan, 2020; Kano et al., 2011; Palazuelos et al., 2018) may face.

This study extends the literature in this area by producing evidence that assurance engagement by auditors on accounting information has a negative and statistically significant influence on a firm's cost of debt. More specifically, this study finds that firms with audited financial statements have better formal credit access than their counterparts. Compared to non-audited firms, this study also finds that audited firms obtain bigger loan value, have lower loan rates and shorter borrowing duration which, all in all, lower cost of debt. The findings of this study are consistent with previous research that finds firms with audited financial statements have (1) greater credit availability (Jiangli et al., 2008), (2) lower odds of reporting denial of credit (Cole & Frost, 2018), (3) a reduction in credit constraints (Gopalan & Sasidharan, 2020), and (4) a lower cost of debt (Booth et al., 2001; Mansi et al., 2004; Minnis, 2011; Pittman & Fortin, 2004). This study findings are robust to an alternative estimation method that is Propensity Score Matching (PSM) method. In doing so, Propensity Score Matching (PSM) provides the same results as those obtained from the previous regression that firms with audited financial statements are able to access bank loans better than non-audited firms. The overall findings suggest that auditors reduce information asymmetry, and firm's cost of debt.

This study is subject to several limitations. First, while this study adopts the most accurate proxy to measure audit presence, there are several proxies could be used. It is possible that other audit' governance, and characteristics may have an impact on loan value, loan rate, and loan term (duration). Second, although this paper addresses the selection bias problem, there may be still risk choice-supportive bias as this study is based on survey questions and limited to non-listed firms. Hence, future research can extend this paper by (1) including more proxies of audit' governance, and characteristics with their effects on credit access, and (2) using sample of listed firms to exam if the results still hold.

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Notes

1. The International Auditing and Assurance Standards Board (IAASB) published the International Framework

for Assurance Engagements in 2004 and updated it in 2013. The Framework defines assurance engagement as "an engagement in which a practitioner aims to obtain sufficient appropriate evidence in order to express a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the subject matter information (that is, the outcome of the measurement or evaluation of an underlying subject matter against criteria".

2. Credit constraint refers to a limitation or restriction on borrowing from the formal financial sector by various economic agents, including individuals, households, and businesses (Bigsten et al., 2003; Feder et al., 1990; Nguyen et al., 2019).
3. The term of a firm control environment is widely used by auditing standards setters. This term is important in Identifying entity-level controls and how these controls might allow the auditor to increase/reduce the testing nature, timing, and extent of procedures the auditor performs on other controls (PCAOB, AS 2201).

4. The Sarbanes–Oxley Act requires management of publicly traded companies to assess the effectiveness of the internal control over financial reporting and requires a publicly held company's auditor to evaluate and to report on management's assessment of firm internal control (Kim, Song, et al., 2011).
 5. The following countries are covered under the 5th BEEPS: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, FYR Macedonia, Georgia, Greece, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine, and Uzbekistan.
- Disclosure statement**
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Appendix

Table A1. Number of surveyed firms by country

Country	Year of survey	Number of firms
Albania	2012	360
Armenia	2012	360
Azerbaijan	2012	390
Belarus	2012	360
Bosnia and Herzegovina	2012	360
Bulgaria	2012	293
Croatia	2012	360
Cyprus	2016	357
Czech Republic	2013	254
Estonia	2012	273
FYR Macedonia	2012	360
Georgia	2012	360
Greece	2016	323
Hungary	2012	310
Kazakhstan	2012	600
Kosovo	2012	202
Kyrgyz Republic	2012	270
Latvia	2012	336
Lithuania	2012	270
Moldova	2012	360
Mongolia	2012	360
Montenegro	2012	150
Poland	2012	542
Romania	2012	540
Russia	2011	4,217
Serbia	2012	360
Slovak Republic	2013	268
Slovenia	2012	270
Tajikistan	2012	359
Turkey	2013	1,344
Ukraine	2012	1,002
Uzbekistan	2012	390