China Economic Review xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

China Economic Review

A comparative study of shadow banking activities of non-financial firms in transition economies

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ARTICLE INFO

Article history:
Received 31 July 2016
Received in revised form 1 September 2016
Accepted 3 September 2016
Available online xxxx

JEL classification:
G23
G28
G32
L21

Keywords:
Shadow banking
Re-lending
Transition economies
Non-financial firms
Financial intermediaries

ABSTRACT

Shadow banking activities in transition economies have drawn scant attention in the literature. This paper examines a particular form of shadow banking business embedded in the operation of non-financial firms in China and transition economies in Central and Eastern Europe (CEE), in which firms borrow in order to lend. We verify its existence, especially in China and Russia, by two strategies to track the abnormal correlations between financial accounts. By exploring the national/regional variations, we find that a better development of financial market and legal system deters firms in both CEE and China from engaging in re-lending business. We also confirm that Chinese firms participate less actively in re-lending if they have better growth prospects and are located in cities with better development of high-tech industries.

1. Introduction

Shadow banking consists of a diverse set of financial institutions and markets that, collectively, carry out traditional banking functions outside, or in ways only loosely linked to, the traditional system of regulated depository institutions (Bernanke, speech in 2012[1]). This very US-specific term was broadened by the Financial Stability Board to cover all non-bank entities outside the regular banking sector, which are engaged in credit intermediation (FSB, 2015). Albeit much attention to shadow banking issues since the 2008 global financial crisis, it remains a great challenge to understand the shadow banking system in transition economies.

In this study, we focus on corporate re-lending, a particular form of shadow banking activity performed by non-financial firms in transition economies. Specifically, non-financial firms with good access to formal finance act as *de facto* financial intermediaries. They borrow from banks or issue bonds to raise money and then lend out to credit-constrained firms.

The re-lending business is a natural outcome of financial repression wherein state-owned and/or large enterprises have privileged access to formal finance with favorable terms but small privately-owned enterprises face serious obstacles to access formal finance. Financial repression is a prevalent phenomenon in transition economies. The vestige of the central planning system

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[1] "Some Reflections on the Crisis and the Policy Response," speech delivered by Ben S. Bernanke at "Rethinking Finance" conference, New York, April 13, 2012.

http://dx.doi.org/10.1016/j.chieco.2016.09.001
1043-951X/

adds elements of ownership-identity-based credit market discrimination to the financial repression regime both in China and some Central and Eastern European (CEE) Countries, which gives further impetus to the development of re-lending activities.

This study attempts to detect and compare the corporate re-lending activities in China and the transition economies in CEE. These transition economies are not only important emerging markets but also share the socialist central planning system in the past. In recent decades, they have been transiting toward market economies. Tremendous progress has been made in various aspects of market economy system building. Nonetheless, a host of challenges still remain for them, which include the challenging tasks of establishing a well-functioning financial system to promote economic growth.

It is widely agreed that financial development in transition economies still lags far behind reaching the goal of inclusive finance (see, e.g., Haselmann, Wachtel, & Sabott, 2016). It is true that the massive introduction of foreign banks, the great efforts made to build the banking sector institutions, and the development of security markets contributed much to the development of formal financial markets in China and CEE countries (Tasic & Valev, 2010). The formal financial system is, however, far from sufficient to serve the corporate finance needs. In China, the formal banking system mainly provides credit to state-owned enterprises or large politically-connected privately-owned enterprises. In CEE countries, many banks are focused more on households (i.e., mortgage loans) than on enterprises. A disproportionately large fraction of bank operations with enterprises is devoted to processing payments instead of provision of credit. Consequently, many enterprises are still unserved or underserved by the formal financial system (Haselmann et al., 2016).

Within the CEE group, there are also large variations. In Russia and quite a few other former Soviet Union countries, the State has been regaining control of previously privatized banks through direct or indirect state ownership of banks, whereas in other transition economies in CEE foreign banks and domestic private banks play a dominant role so that state interference in the financial sector is mitigated (Vernikov, 2009, 2010). At the same time, state-owned enterprises (such as national champions) have come back and gained increasing importance in Russia, etc., especially in those strategically important sectors. As a means of supporting the rising state capitalism, the discriminatory credit policy favoring state-controlled national champions has become prevalent in Russia (Augustynowicz, 2014). In this sense, the financial system in Russia bears quite many similarities to that in China in terms of financial repression based on ownership-based discriminatory financial markets.

This situation gives rise to the shadow banking activities carried out by non-bank entities, in which re-lending or private credit market is one prominent form. Understandably, this phenomenon is particularly striking in China and Russia. For instance, it is reported that re-lending is a major component of private lending market in China, which remains unregulated. It has grown considerably in size in recent years. According to Moody's report in 2013, the informal lending between private entities with no financial agents constitutes about 17% of shadow banking in China. Moreover, the growth rates of shadow banking are very high in both China and Russia, ranked the 2nd and 4th worldwide according to the FSB (2015) report. We intend to address two sets of research questions in this paper: (1) Does re-lending business prevalently exist in the economies of China and CEE? (2) What aspects of economic environment stimulate the development of re-lending business and what kinds of firms are more likely to participate in re-lending?

Our sample consists of 1932 firms in 18 CEE countries and 2305 firms in China. We make great efforts to detect the re-lending business by digging into the balance sheets of listed companies through two strategies, given the illegitimate, illegal and unregulated features of shadow banking. According to the pecking order theory (Myers, 1984), liquidity holdings including cash and short-term investments should be negatively correlated with financial liabilities (the sum of short-term and long-term debts) in normal business operations, verified by the data of US firms. Our results suggest that non-financial firms in China and CEE countries both exhibit significantly positive relationship between financial assets and liabilities, driven by the financial intermediation function of re-lending business.

Furthermore, inspired by the carry trade experience of Japanese firms in the 1980s, we detect a non-negative (or even positive) correlation between liquid financial assets and business fixed investments in CEE and China, which provides additional evidence of the existence of re-lending activities in a dynamic perspective and excludes the possibility that simultaneous increases in financial liabilities and assets are caused by a mismatch of timing of business fixed investments and fund-raising.

There is striking heterogeneity among firms with different ownership natures. In China, the significantly positive correlation between financial assets and financial liabilities only hold in state-controlled firms, especially in central-government-controlled firms, while privately-controlled firms do not have substantial lending business. In CEE, though the data of ownership nature for each firm is unavailable, we make intra-CEE cross-country analysis. We observe that the re-lending business is most prominent in Russia. This can largely be explained by the dominance of state ownership in both real sector (42%) and banking sector (64%)[2] in Russia. In contrast, state ownership is less influential in other CEE economies (e.g. Poland, Hungary, etc.), where firms behave very similar to the U.S. firms and display no obvious sign of extensive participation in re-lending. This heterogeneity across Chinese firms and across countries in CEE suggests that re-lending business may well be a rational market response to credit market discrimination and financial underdevelopment in transition economies.

Next, we examine the national/regional characteristics. Our results demonstrate that better financial development and openness and higher quality of legal system deter firms from actively participating in re-lending business both in CEE countries and in China. Also European Union (EU) and European Monetary Union (EMU) membership, representing significantly higher scores of financial openness and rule of law index, obviously discourages firms in CEE from borrowing through an informal credit

[2] Bistrova & Lace, 2010; Sprenger, 2008.

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market. Yet we find that the profitability of the main business line and business expansion of firms generate a negative effect on the engagement of Chinese firms, but only a negligible effect in CEE.

Finally, we examine the effects of the 2008–2010 global financial crisis on corporate re-lending. The re-lending business, part of shadow banking activities, shrank in the crisis period, and the adverse effect was severe for state-owned firms in China and Russian firms, which both more actively participate in re-lending in our sample.

This paper presents the first paralleled analysis of shadow banking in China and CEE countries. It is stimulated by Shin and Zhao (2013) that studies the role of financial surrogate intermediaries by non-financial firms in China. Yet the strategy of detection in their paper has limitations, and ownership-based variations in shadow banking business, an important phenomenon in Chinese financial markets, have not been examined; also it does not extend to transition economies. Meanwhile, our work complements Acharya, Qian, and Yang (2015) and Allen, Qian, Tu, and Yu (2015) that examine wealth management products (WMP) and entrusted loans in China.

Our paper makes several contributions and provides some policy implications. Firstly, it provides evidences on the prevalence of informal lending spurred by financial repression in transition economies, especially in China and Russia. This form of less studied shadow banking activities is conducted outside the regulated banking sector and could transmit shocks among firms without up/down stream links. Secondly, it examines the national/regional features that promote the expansion of re-lending business, thus providing valuable information to the regulatory authority. Finally, it contributes to the literature on comparisons of financial markets between China and CEE countries.

The remainder of this paper is organized as follows. Section 2 briefly introduces the background and related literature on shadow banking in transition economies. Section 3 specifies the identification strategies and describes the data and summary statistics. Sections 4 present empirical results. Section 5 concludes.

2. Shadow banking in transition economies

Despite a large literature on the shadow banking system in the advanced economies since the 2008 global financial crisis (Adelino, 2009; Ashcraft, Goldsmith-Pinkham, & Vickery, 2010; Gennaioli, Shleifer, & Vishny, 2013; Gorton & Metrick, 2012), the attention paid to their counterparts in emerging economies, especially transition economies, has been scant.

2.1. China

Chinese shadow banking system has been expanding explosively in recent years. According to FSB calculation, its size takes the fifth place in the world in 2012 and the third in 2014. By the end of March in 2014, social financing[3] from shadow banking accounts for 35% of GDP, and its growth rate is nearly twice that of bank credit. The value generated in shadow banking sector is approximately 35% of GDP in 2014. Unlike the capital market-based system in the US, the shadow banking system in China is bank-centric and thus has greater interaction with the traditional banks (Dang, Wang, & Yao, 2014). The major components of the Chinese shadow banking sector include Wealth Management Products (WMP), entrusted loans, agencies of assets management, trust business and private lending.

The rapid growth of shadow banking in China is driven by both demand and supply factors. On the one hand, a considerable number of firms with high productivity suffer from discrimination in credit markets and credit constraints due to their limited collateral and lack of political support (Song, Storesletten, & Zilibotti, 2011, and the references therein). On the other hand, less developed financial market is short of solid investment instruments.

Very recently, researchers have paid attention to several specific forms of shadow banking activities in China. Acharya et al. (2015) examine the characteristics of the largest component of shadow banking, wealth management products (WMP), and explore the impacts of interest rate policies and bank regulation on the development of WMP. Allen et al. (2015) argue that firms with privileged access to financial markets tend to lend more to less privileged non-financial firms through entrusted loans, and differentiate lenders and loan characteristics between non-affiliated and affiliated loans. Chen, Ren, and Zha (2016) explore the links between monetary tightening and entrusted lending in China. These studies rely on the public information release and examine the relatively transparent parts of the Chinese shadow banking system.

The focus of this paper is “re-lending” business, in which non-financial firms borrow in order to lend. This is a kind of direct lending among non-financial firms without commercial banks as intermediaries or agents, which is different from entrusted loans. Normally, if firm A has spare funds or could borrow freely from banks but no good investment project in their main business line, it then transfers the funds to another firm B faced with high credit constraints. The interest rates charged in such inter-corporate loan market are typically very high, reaching 6 or even 8 times as large as the regulated interest rates in the formal credit market according to the president of Zhejiang Supreme People's Court. This is the most important form in private lending and one of the opaquest parts of the shadow banking sector in China.

The scale of private lending was estimated to be about 3.38 trillion Yuan, and this figure might jump to 4.5–5.5 trillion at the end of 2014[4]. The inter-corporate loans, as one form of private lending, are also growing rapidly. Because of the illegal feature of re-lending business, we cannot tell the exact amount. Some implications could be drawn from the number and money involved in

[3] Social financing from shadow banking equals to total social financing computed by People's Bank of China deducting bank loans, equity-like items and bond issues.
[4] This figure is predicted by ANZ research reports.

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the legal cases related to private lending: the number of relevant legal cases jumped from 488,301 in 2008 to more than 1 million in 2014, and the average size of amount involved in each case nearly increased by 150% from 2008 to 2013[5].

By examining illegal and illegitimate re-lending, our analysis complements current studies so as to provide a more complete picture of shadow banking activities in corporate China.

2.2. Eastern European countries

There is basically a general agreement in the literature that banking systems in transition economies are not well developed (Bonin & Wachtel, 2003; Buch, 1996; Murrell, 1996), and credit shortage prevails in Eastern European economies (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997, 1998, 2000). Moreover, plenty of variations in bank credits across CEE are prominent. Harper and McNulty (2008) define a "transition economy effect", and find that bank lending to the private sector is about 10% on average in former Soviet Union countries, 29% in non-Soviet transition countries, while it is 32% in other developing countries. Gorton and Winton (1998) argue that transition economies have a bad debt overhang, which creates incentives for banks to provide loans to inefficient, formerly state-owned enterprises, very similar to the case of China.

Studies on shadow banking in transitional economies are much scant, usually a minor section in whole analysis. Michael (2014) states that shadow banking serves as a complement to traditional banking in some countries (like South Africa, China) and as a substitute in others (like Russia, Chile). FSB (2015) reports that the size of shadow banking assets was below 10% of GDP in Russia, while the figure reached 86% in United States; but the growth rate of shadow banking in 2014 was around 20% in Russia, only behind Argentina, China, and Hong Kong.

China and Eastern European transitional economies have many similarities not only in the condition of financial markets but also in the growing trend of shadow banking sector in recent years. Thus cross-country comparisons have the potential to generate new questions and insights, complementing the literature of shadow banking in transition economies.

3. Methodology and data

3.1. Methodology

Re-lending behavior should be reflected in the snapshot of balance sheets, especially for lending firms. In this paper, we employ two approaches to detect re-lending activities. One is the method developed by Shin and Zhao (2013), and the other is based on the identification strategy of carry-trade behavior by non-financial firms in Japan in the 1980s. These two methods can reinforce each other.

3.1.1. Strategy 1

The basic methodology of this paper relies on one of the most accepted explanations for firm financing behavior, "pecking order" theory. According to the influential "pecking order" theory (Myers, 1984), when a firm needs to finance an investment project, it first uses the cheapest form of finance, i.e., internal funds, and only when the internal funds are inadequate will it turn to more expensive channels, such as bank loans. Asymmetric information, transaction costs and interest rates charged make external borrowing more expensive than internal funds. Thus, internal financing is a first shot. Although the "pecking order" theory does not claim that managers will follow this principle in every single case and it is also possible that in certain situations external financing turns out to be more affordable, on average and at the aggregate level this logic prevails.

Consequently, the liquidity holdings and debts on the balance sheets of non-financial firms should be negatively correlated, capturing the movements of firms borrowing external funds and consuming internal funds at the same time. When a firm intends to finance investments, it begins with a decrease in liquid assets, such as cash holdings or bank deposits, and then it turns to borrow from banks or issue new bonds either because internal funds are inadequate or the firm plans to keep some liquid assets for daily operations. Then we should observe that liquid assets and financial liabilities move in opposite directions.

The cornerstone of this approach is that financial intermediaries have a very distinctive feature of their balance sheets. Banks borrow in order to lend, and the increases in deposits are accompanied with increases in loans or stock of securities. This co-movement of financial assets and liabilities is a representation of the core banking function, i.e., financial intermediation.

Likewise, if non-financial firms are involved in re-lending business, which means they borrow in order to lend, the predictions of the pecking order theory will be violated. Financial liabilities (debts) would not exhibit a negative correlation with liquid assets, or would even show a positive relationship because firms tend to re-lend a proportion of funds raised externally to other firms and keep the remaining funds on the subject items of financial assets waiting for future usage. The financial intermediary function, i.e., the simultaneous borrowing and lending, definitely leads to simultaneous increases in both cash holdings and debts. This pattern of movements in the balance sheets can reflect re-lending activities regardless of whether the firm reports or not the lending behavior publicly, which enables us to detect the hidden re-lending activities.

Therefore, the key point in this methodology is the relationship between liquid financial assets (cash holdings and short-term investments) and financial liabilities (short-term and long-term debts). In normal operations of non-financial firms, they should

[5] The figures are from the official website of Supreme People's Court of China.

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move in the opposite directions; yet if considerable amounts of borrowed funds are used for re-lending, the negative correlation may disappear, or even get reversed.

To employ this strategy, we carry out regressions of financial assets on financial liabilities as well as several control variables. The sign and statistical significance of the estimated coefficients of financial liabilities are our focus. We will run analogous regressions using the sample of firms in China and in 18 CEE countries, respectively. To reinforce our findings, we compare the estimated coefficients of financial liabilities in CEE and China with that of the U.S. to further detect the potential re-lending activities of firms in transition economies against the benchmark case of U.S. firms.

It is noteworthy that this strategy is subject to the effects of alternative firm behaviors. On one hand, if firms borrow from banks or issue bonds and retain funds for precautionary purpose, we could observe an increase in debts accompanied with an increase in cash holdings. This possibility will be excluded through the results of sub-samples in strategy 1 in Section 4.

On the other hand, the timing of raising funds and that of project investments are not perfectly matched. Firms may hold a proportion of raised funds and wait for a better timing of investments. In such a case, the positive correlation between financial assets and financial liabilities is also likely to emerge. Generally speaking, the funding costs are relatively high in emerging markets; firms usually carefully schedule the timing of borrowing and real investments. Hence the mismatching is likely to be uncommon in both China and CEE.

3.1.2. Strategy 2

Strategy 2 is inspired by the carry-trade of non-financial firms in Japan in the 1980s. It helps verify whether the observed co-movements between the liquid financial assets and financial liabilities in Strategy 1 are the result of shadow banking or firms' chasing better opportunities. Going back to the starting point of Strategy 1, the disbursement of business fixed investments is accompanied by a decrease in liquidity holdings. If the positive correlation between liquid financial assets and financial liabilities is due to a mismatch of the timing of obtaining external finance and that of investments, we should still observe that the retained funds staying in the accounting subject of financial assets indeed flow into the business fixed investments.

Based on the experiences of Japanese non-financial firms conducting "carry trade" in the 1980s (Hattori, Shin, & Takahashi, 2010), firms earn profits by issuing corporate bonds in international markets and depositing such funds into banks because of liberalized interest rates of commercial banks in Japan at that time. This is similar to the case that firms in transition economies borrow from banks or issue bonds, and then lend to other firms, in order to earn the interest rate spreads.

Hattori et al. (2010) reveal the pattern partly by the changes in the correlation between liquidity ratio and business fixed investments. If firms borrow in order to finance investments, then these two items should be negatively correlated. But if firms behave like financial intermediaries, either in the carry-trade in Japan or in re-lending to other firms in CEE and China, the correlation between these two items becomes weak or vanishes. Even they may turn out a co-movement, as raised funds may partly flow to investments and partly flow to re-lending business.

Thus, Strategy 2 is implemented by regressing financial assets on one-year lagged fixed investments along with several control variables. The key point is the sign and significance of the estimated coefficient of the variable of lagged business fixed investment. Similarly, we use U.S. firms as a benchmark for comparison.

3.1.3. Effects of national/regional and firm characteristics on re-lending

To explore the factors shaping heterogeneous re-lending activities across firms, we examine the national factors in CEE and regional factors in China that may affect the extent of re-lending activities. Moreover, we also examine the effects of firm attributes on re-lending activities.

Strategy 1 is applied in this analysis. We include interaction terms of the key independent variable, financial liabilities, with country/region/firm-level variables, and investigate whether these variables strengthen or weaken the re-lending activities. We also divide firms into sub-samples based on the value of variables of interest to examine whether the correlation would change across subsamples.

Informal lending in transitional economies is normally regarded as a natural outcome of financial repression. The efficiency of law enforcement, including protection of private property rights or the trust in the judicial system, contributes a great deal to financial development (Allen, Qian, & Qian, 2005; Ball, Kothari, & Robin, 2000; La Porta et al., 1998), which is in turn expected to affect the prevalence of shadow banking. Therefore, we intend to explore the potential determinants of re-lending behaviour from the perspective of local financial development and the quality of judicial system. At the same time, the growth and profitability of lending firms can also affect re-lending activity intensity.

Based on the features of cross-country analysis in CEE and cross-region analysis in China and because of the constraint on data availability, the measures of potential factors are slightly different between CEE and China. To examine the access of firms to financial resources, we choose three indictors for CEE countries: Chinn and Ito's KAOPEN index[6] (Chinn & Ito, 2006), Schindler's KA index[7] (Schindler, 2009) and KOF index[8] of economic globalization dimension (Dreher, 2006); and three indicators of regional

[6] Chinn and Ito index was firstly introduced in Chinn and Ito (2006) and has been updated to 2014. KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (*AREAER*).

[7] Shindler's KA index is constructed based on the text of *AREAER* and has been updated to 2013 in Fernández, Klein, Rebucci, Schindler and Uribe (2015) "Capital Control Measures: A New Dataset".

[8] KOF index has been updated to 2013.

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financial resources are applied in the sample of China: the financial marketization index (Fan, Wang, & Zhu, 2011), total marketization index (Fan et al., 2011), and household savings (National Bureau of Statistics of China).

We examine the variation of law environment in CEE countries by the index Rule of Law (*ruleoflaw*) constructed by the World Bank, an integrated measure of the overall quality of the judicial system and the efficiency of law enforcement; the provincial level of judicial institutions in China is measured by an index in Fan et al. (2011), which incorporates the development of property protections, accounting rules, and legal environment. Besides, the output of city-level high-tech industries is used to measure the growth prospects of the Chinese cities where lending firms are located, and lagged ROA and growth of total assets are applied to signal the growth opportunities and profitability over the individual firm level both in China and in CEE. It's reasonable to hypothesize that well-operating firms with great growth potentials would not need to actively participate in the informal lending business.

3.2. Data and variables

The financial information of balance sheets for non-financial firms in China and CEE are both collected from Compustat Database, sponsored by Standard & Poor's financial services. We supplement it with the data from WIND for Chinese firms, which provide the information on ownership structure. The sample period for Chinese firms is 1990–2013. Observations without necessary financial variables are dropped from our sample, such as cash and short-term investment, PPE, etc. After the exclusion, the data set consists of 2303 firms and 27,417 observations. For cross-region analysis, we collect annual city-level data over 1995–2013 from China's National Bureau of Statistics[9] and provincial data from the reports on the progress of marketization in China (Fan et al., 2011).

For a parallel analysis, we choose CEE transition economies. According to the S&P's Capital IQ database's (2015) classification, 22 countries are defined as "European Emerging Economies".

Out of these 22 countries, 21 are located in Central and Eastern Europe and are former socialist countries, or in other words, have socialist legal origin (La Porta, Lopez-de-Silanes, & Schleifer, 2008). The only exception is the Republic of Malta, which is a former colony of Great Britain in the Mediterranean area. To ensure consistency for comparison, we drop this nation from the sample. Albania, Belarus and Kosovo also are instantly excluded due to lack of data. The remaining 18 countries are listed in Table 1 with some basic information, such as their relationship to the Soviet Union before the transition, relationship to the EU/EMU, and GDP.

The sample period of CEE firms is from 2005 to 2014. The biggest enlargement of the European Union occurred in 2004, and 8 countries in our sample joined EU then. Thus taking 2005 as a starting point is convenient for us to explore the differences between EU and non-EU countries. Finally, we end up with 1932 firms for the sample of CEE.

Table 2 provides summary statistics of common key variables for CEE and China in Panel A and Panel B, respectively. Comparing these two samples, we observe that Chinese firms are obviously larger than CEE firms, i.e., the mean size of the former doubles that of the latter. The mean and median of most important variables, financial assets and financial liabilities, are also larger in the sample of Chinese firms: the mean values of financial assets in China and CEE are 614 and 89 million dollars respectively; and the mean values of financial liabilities in China and CEE are 1014 and 278 million dollars respectively. Furthermore, we could observe that the mean scale of business fixed investments in China is nearly 7 times that in CEE, which strongly supports the rapid growth of Chinese economy in recent years. Besides, the growth rate of total assets has a negative mean value in CEE, a passive signal for the macro-economy environment for businesses.

4. Empirical results

4.1. The prevalence of re-lending business in CEE and China

4.1.1. Baseline results

Table 3 presents the regression results of Strategy 1 in Section 3.1 for Chinese and CEE firms, respectively. In this specification, we include measures of profitability and indebtedness, i.e., ROA and leverage, as well as indicators of firm size and collateral, i.e., logarithm of sales and the ratio of tangible assets in total assets, which are all highly correlated with liquidity holdings of firms. The focus is the sign of the estimated coefficients of financial liabilities.

Column (1) shows that liquid financial assets have a significantly positive correlation with financial liabilities in the CEE sample. Columns (2)–(3) suggest that the unexpectedly positive relationship is unchanged after including control variables, firm and year fixed effects, which violate the predictions of the pecking order theory. Based on Column (3), a one-unit increase in the log ratio of financial liabilities would lead to a 0.04-point increase in log ratio of financial assets. Though the coefficient is relatively small, the sign reveals something unusual.

In other words, internal liquid funds and external borrowings are not used simultaneously for investments in real investment projects; they maintain a co-movement just like the case of financial intermediaries. As long as internal funds are deployed for business investments, the positive correlation cannot hold, even though firms do not strictly follow the pattern of pecking

[9] National Bureau of Statistics only provides data of 36 important cities, so after incorporating city-level data, we have 13,702 observations.

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Table 1
Eighteen Eastern Europe countries in our sample.

Country	Relationship to Soviet Union	GDP p.c.	EU member	EMU member
Bulgaria	Non-Soviet	4915.85	Yes (2007)	No
Bosnia and Herzegovina	Non-Soviet (Yugoslavia)	3456.5	No	No
Croatia	Non-Soviet (Yugoslavia)	10,561.28	Yes (2013)	No
Czech Republik	Non-Soviet (Czechslovakia)	14,944.52	Yes (2004)	No
Estonia	Part	12,348.08	Yes (2004)	Yes (2011)
Hungary	Non-Soviet	11,888.11	Yes (2004)	No
Latvia	Part	9973.57	Yes (2004)	Yes (2014)
Lithuania	Part	11,073.88	Yes (2004)	Yes (2015)
Republic of Macedonia	Non-Soviet	3979.19	No	No
Moldova	Part	1190.7	No	No
Montenegro	Non-Soviet (Yugoslavia)	4757.3	No	No
Poland	Non-Soviet	11,304.62	Yes (2004)	No
Romania	Non-Soviet	6195.84	Yes (2007)	No
Russia	Part	6843.92	No	No
Serbia	Non-Soviet (Yugoslavia)	4245.5	No	No
Slovak Republic	Non-Soviet (Czechslovakia)	15,726.85	Yes (2004)	Yes (2009)
Slovenia	Non-Soviet (Yugoslavia)	19,110.56	Yes (2004)	Yes (2007)
Ukraine	Part	2081.05	No	No

Source: World Bank World Development Indicators (2014) and The European Commission (2015b).
Notes: 1. There are two types of Eastern European transition countries: those which are former Soviet Union countries and those which were socialist and "comrades" to the CCCP, but had their sovereignty. We indicate the previous name of the country in the parenthesis of Column 2, if the name changed after the transition. 2. The years in parenthesis of Column 3 and 4 suggest the years entering EU or EMU. 3. GDP per capita is based on 2005 constant price.

order theory. Therefore, the co-movement of financial assets and financial liabilities must be explained by activities other than business investments.

Re-lending business just coincides with such features. In this process, firms have a simultaneous borrowing and lending in order to earn interest rate spreads. A proportion of raised funds stay in the firm's liquidity holdings for future lending without a need to worry about the funding costs because of higher interest rates in the inter-corporate loan markets. Certainly there are alternative explanations for the unusual co-movement other than re-lending activities. One is precautionary cash holdings:

Table 2
Summary statistics for the aggregate sample.

Panel A: Eastern European Nations

Variables	N	Mean	Median	Min	Max	Std. dev.
finassets	13,420	89.58261	1.82	0.001	21,654.3	652.4791
financial liabilities	9992	278.1042	7.74	0.001	55,240.2	1827.286
sales	14,326	745.0461	31.1	0.001	156,602.1	5171.219
PPE	14,054	681.1015	11.9	0.001	262,779.7	5998.575
fixinv	12,279	34.21815	−0.001	−106514.6	74510.4	1701.132
leverage	9991	0.202675	0.1316872	3.63E − 06	71.89655	0.9106103
tangi	14,054	0.4148869	0.4080458	0.0000142	3.510989	0.2668404
ROA	14,337	0.1462836	0.0497183	4.25E − 06	201.8421	2.136109
size	14,389	3.703083	3.663562	−6.907755	12.92132	2.60916
GDP-country	19,320	7896.295	6922.803	831.2053	20,988.24	2975.169
growth	12,057	−0.0660444	0.0294521	−235	0.9999741	3.341874

Panel B: China

Variables	N	Mean	Median	Min	Max	Std. dev.
finassets	27,417	614.5	194.4	0	118,365	2711
financial liabilities	27,417	1014	197	0	184,156	4802
sales	27,417	2870	675.9	−98.39	585,480	14,805
PPE	27,417	1398	326.5	−472.3	425,994	7900
fixinv	25,114	213.0	28.10	−42,683	166,356	1844
leverage	27,383	0.551	0.476	−0.195	1013	6.334
tangi	27,406	0.3674	0.4416	0	1.195	6.331
ROA	27,417	0.0608	0.0535	−64.82	64.75	0.573
size	27,402	7.175	7.100	−2.976	13.39	1.273
GDP-city	13,702	6566	4771	6.900	21,818	5398
growth	25,084	0.810	0.133	−1	4723	40.01

This table presents the summary statistics of firm-year observations in our sample. Panel A consists of 19,320 observations in 18 CEE countries, and Panel B consists of 27,417 observations in China. *Finassets* is the sum of cash holdings and short-term investments, *financial liabilities is* the sum of short-term and long-term debts, *fixinv* is the change in net Property, Plant and Equipment, *size* and *growth* are log ratio and growth rate of total assets. GDP-city in Panel B is in the unit of 100 million yuan.

Please cite this article as: Du, J., et al., A comparative study of shadow banking activities of non-financial firms in transition economies, *China Economic Review* (2016), http://dx.doi.org/10.1016/j.chieco.2016.09.001

Table 3
The correlation between financial assets and financial liabilities.

Dependent variable: *log (finassets_sales)*							
	18 Eastern European Nations			China			US
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
logfinlia_sales	0.0821***	0.123***	0.0460**	0.0478***	0.0481***	0.0245**	−0.0471***
	(0.0243)	(0.0340)	(0.0231)	(0.0105)	(0.0107)	(0.0097)	(0.0108)
Leverage		−0.639**	−0.452**		−0.00344***	1.013***	−0.00232***
		(0.2750)	(0.2130)		(0.0011)	(0.1740)	(0.0004)
ROA		0.076	0.0384		0.00152	0.146	0.0182***
		(0.0506)	(0.0458)		(0.1120)	(0.1170)	(0.0053)
Logsales			−0.430***			−0.220***	−0.434***
			(0.0543)			(0.0165)	(0.0211)
Tangi			−1.857***			0.0102***	−2.264***
			(0.3420)			(0.0017)	(0.1470)
Constant	−3.101***	−2.910***	−0.798***	−2.884***	−2.880***	−3.115***	−0.147
	(0.0808)	(0.1230)	(0.2800)	(0.3290)	(0.3300)	(0.3510)	(0.1260)
Observations	9860	9844	9774	24,183	24,174	24,174	49,900
R-squared	0.012	0.016	0.087	0.1	0.1	0.133	0.116
Number of firms	1707	1707	1696	2253	2253	2253	4233

This table presents estimated results based on the specification of strategy 1: $logfinassets\_sales_{it} = \beta_1(logfinlia\_sales_{it}) + \beta_2(firmlev_{it}) + \beta_3(ROA_{it}) + \beta_4(logsales$-$(logfinlia\_sales_{it}) + \beta_2(firmlev_{it}) + \beta_3(ROA_{it}) + \beta_4(logsales_{it}) + \beta_5(tangi_{it})\beta_{6t}(year_t) + + \beta_{7i}(firm_i) + u_{it}$, *where i stands for firm and t for year. Dependent variable log (finassets_sales) is log ratio of financial assets scaled by sales, where financial assets incorporate cash holdings and short-term investments. logfinlia_sales is the log ratio of the sum of short-term and long-term debts scaled by sales. Columns (1)–(3) present the results of CEE firms, columns (4)–(6) are for firms in China, and column (7) presents the results of U.S. firms. Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.*

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.

firms borrow in order to increase the liquidity holdings to prepare for unstable business in certain periods for precautionary purpose; this possibility will be excluded by the results in Table 4. The other is mismatching of borrowing and investments, thus part of the raised funds are left in the subject of cash holdings. We will also exclude this possibility by examining the correlation between financial assets and fixed investments in Section 4.1.2.

Columns (4) – (6) in Table 3 report the results for Chinese firms, which are qualitatively equivalent to those of CEE firms. The estimated coefficients of financial liabilities are significantly positive at the 1% level. The similar patterns observed for CEE and

Table 4
Financial assets and financial liabilities in subsamples of CEE and China.

Dependent variable: log (finassets_sales)								
	Eastern European Nations				China			
	Russia	Poland	Romania	Without Russia	Central SOE	Local SOE	PE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
logfinlia_sales	0.110**	0.0344	−0.110**	0.0234	0.169***	0.0644***	0.0156	0.0289
	(0.0445)	(0.0361)	(0.0452)	(0.0267)	(0.0276)	(0.0229)	(0.0159)	(0.0668)
leverage	−0.387	−0.426	0.648**	−0.513**	−1.588***	0.336	1.497***	0.0426
	(0.3880)	(0.2890)	(0.2930)	(0.2560)	(0.4680)	(0.3590)	(0.2950)	(0.8230)
ROA	−0.456	0.0327	0.592	0.0518	−0.539	−0.149	−0.0324	−0.918
	(0.4020)	(0.0534)	(0.6670)	(0.0487)	(0.4330)	(0.2120)	(0.1430)	(0.6450)
logsales	−0.346***	−0.612***	−0.336***	−0.458***	−0.203***	−0.289***	−0.128***	−0.335***
	(0.1150)	(0.0758)	(0.1080)	(0.0618)	(0.0430)	(0.0253)	(0.0273)	(0.0913)
tangi	−2.827***	−2.510***	−0.506	−1.510***	0.00339	0.00932***	0.0150***	0.00681
	(0.4950)	(0.4640)	(0.5720)	(0.4040)	(0.0042)	(0.0024)	(0.0030)	(0.0071)
Constant	0.23	−0.646**	−3.250***	−1.135***	0.291	−2.303***	−3.639***	−0.673
	(0.7220)	(0.3270)	(0.4850)	(0.3020)	(0.5920)	(0.5350)	(0.2890)	(0.8130)
Observations	2143	3563	1540	7631	3825	8576	9610	727
R-squared	0.132	0.168	0.045	0.085	0.257	0.191	0.142	0.202
Number of id	302	630	365	1394	287	581	1167	78

This table reports the results in the subsamples of CEE and China. Dependent variable *log(finassets_sales)* is the log ratio of financial assets scaled by sales, where financial assets incorporate cash holdings and short-term investments. *logfinlia_sales* is the log ratio of the sum of short-term and long-term debts scaled by sales. Columns (1) – (4) report regression results for the sample firms of Russia, Poland, Romania, and 17 CEE countries without Russia, respectively. Columns (5) – (8) report regression results of subsamples of central-government-owned firms, local-government-owned firms, private firms, and foreign firm. The ownership data is from Wind Database. Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.

Please cite this article as: Du, J., et al., A comparative study of shadow banking activities of non-financial firms in transition economies, *China Economic Review* (2016), http://dx.doi.org/10.1016/j.chieco.2016.09.001

China may be driven by some common factors in politics, economic structure, and the difficulties encountered in the process of economic transition. These countries are all featured with financial repression and underdevelopment, so that some firms are highly financially-constrained though they have promising projects. More importantly, Column (7) presents the benchmark results of U.S. firms and gives a sharp contrast to the pattern of firms in CEE and China. Indeed, U.S. firms produce an estimated coefficient of −0.04 at the 1% significance level, suggesting opposite directions of movements between liquidity holdings and debts, which conforms with the predictions of the pecking order theory. Non-financial firms in CEE and China exhibit distinctive features of re-lending activities. More evidences would be presented in Section 4.1.2.

It is well-known that SOEs and large firms in China have easy access to both bank loans and bond markets. Meanwhile, the prevalence of government ownership differs quite much across CEE countries. Bistrova and Lace (2010) show that government as a major holder of enterprises is well represented in Russia (42%) and Romania (32%), while other CEE governments are not so actively taking part in holding local companies (less than 25% companies in other CEE countries). The case of Russia is outstanding. Five out of the 10 largest firms in Russia are partially state-owned, and the state ownership is the strongest in the banking sector, accounting for around 64% of market capitalization (Sprenger, 2008). In contrast, some countries present a different image. Poland's banking sector is the biggest one in CEE, and more than 70% is owned by foreign investors in the privatization process according to Thomas White survey. In Hungary, most of the firms were rapidly privatized after the outset of transition, and only some firms in key industries, such as railway, post, etc., remain state-owned, but most do not go public (not included in our sample).

Considering such big cross-section differences either in China or in CEE, it is reasonable to analyze the existence of re-lending activities across sub-samples. For China, we have sub-groups based on ownership nature: central-government-controlled firms (Central SOEs), local-government-controlled firms (Local SOEs), privately-controlled firms (PEs) and foreign-controlled firms (FEs). In the sample of CEE, we first examine three largest countries, i.e., Russia, Poland, and Romania, respectively. Considering the economy size and the control of government both in the real economy and banking sector in Russia, we also conduct analogous regressions using the CEE sample excluding Russia[10].

Table 4 reports the regression results of Strategy 1 in each sub-sample. Columns (1) – (4) present wide variations across CEE countries. Among the three largest countries, only Russia displays the abnormally significantly positive correlation between financial assets and financial liabilities. The estimated coefficient of financial liabilities of Poland's firms is positive but insignificant, and Romania even has results consistent with the U.S. benchmark, exhibiting a significantly negative coefficient. Moreover, if we exclude Russian firms from the CEE sample, the correlation between financial assets and financial liabilities loses statistical significance though it remains positive.

Combining the results together, we conjecture that firms in some CEE countries operate normally and corporate re-lending is not a very prevalent phenomenon. The results for CEE countries in Table 3 are mainly driven by the largest economy in the area, Russia. However, we cannot claim that firms in other CEE countries do not participate in re-lending business entirely, as the estimated coefficient of the key variable in the sample without Russian firms also has a positive sign, deviating from the predictions of the pecking order theory.

Columns (5) – (8) in Table 4 report the regression results of subsamples in China based on ownership nature. We observe that only SOEs produce significantly positive estimated coefficients, and the coefficient is much larger for Central SOEs than for local SOEs. A unit increase in the log ratio of scaled financial liabilities translates into a 0.17-point increase in the log ratio of scaled financial assets of central SOEs. In contrast, both privately-controlled firms (PEs) and foreign-controlled firms (FEs) produce insignificant estimated coefficients, suggesting that they are much less likely to engage in re-lending business.

It is noteworthy that the comparison of SOEs and PEs helps exclude the possibility that the positive correlation is due to firms' precautionary cash holdings. In China, SOEs could finance more than 30% of their investments from bank loans, while the ratio for PEs is less than 10% (Song et al., 2011), which suggests that SOEs need much fewer funds for precautionary holding purpose. Nevertheless, we find that the positive correlation is more prominent in SOEs, which is inconsistent with the hypothesis of precautionary liquidity holdings.

The comparison of results sheds light on the prevalence of re-lending activities in the corporate sector in China and Russia. The similarity in the prevalence of re-lending activities in firms in the two countries can probably be attributed to the dominance of state ownership in the banking sector and the big influence of state-controlled national champion companies in the real sector. The state control of the banking and real sectors contribute to the financial repression with ownership-based discriminatory credit policies, which promotes the development of private lending market.

In contrast, other CEE countries are characterized with a much larger presence of privately-controlled and foreign-owned banks and corporations. Private ownership and foreign ownership both impede the development of informal financial markets and decrease the distortions in formal financial markets, which is testified by the results of other CEE countries with considerable levels of privatization and foreign ownership, as well as by the distinct results of SOEs and PEs in China. The role of state ownership as a driving force of re-lending activities reinforces that the emergence of re-lending business is an outcome of financial repression and credit market discriminations across firms.

4.1.2. Supplementary evidences

In this sub-section we carry out Strategy 2 to provide more evidences to supplement the identification results.

[10] For better comparison, we should explore the differences between SOE and PE in CEE as well. Because of the data limitation, we only take Russia as a representation of strong state-ownership.

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In normal operations, an increase in business fixed investments should be accompanied with a decrease in cash holdings. Especially, in transition economies, financial repression leads to much higher funding costs for non-financial firms. Consequently, firms tend to carefully schedule the timing of borrowing and that of disbursement of business fixed investments so as to avoid high opportunity costs of spare funds. Even the circumstances of imperfect mismatch exist, in which a proportion of raised funds are left in the form of cash holdings waiting for better investment opportunities and thus liquidity holdings and financial liabilities exhibit a positive correlation, the internal funds would be used for future investments finally and the negative association between business investments and liquidity holdings would hold[11].

The case of re-lending business is different. If firms borrow in order to lend at much higher interest rates than the borrowing rates, the match of timing is unnecessary. The negative relationship between liquidity holdings and investments becomes loose, or even gets reversed, since the change in cash holding is not closely linked to business investments.

Table 5 presents the results of Strategy 2. Without re-lending business, the more business fixed investments firms make, the fewer liquidity holdings firms have. As shown in Column (9), U.S. firms as a benchmark just follow this pattern: a one-unit increase in lagged business fixed investments is associated with a 6% decrease in financial assets.

Results of CEE countries are reported in columns (1) – (5). Similarly, besides the full sample, we also examine three largest countries, Russia, Poland and Romania, separately, as well as the CEE sample excluding Russian firms. We observe that business investments are positively correlated with financial assets at the 1% significance level in the full sample, contrary to the predictions of normal operations. However, this negative relationship is mainly driven by Russian firms because firms in Poland, Romania, and CEE excluding Russia all produce a normal pattern of negative estimated coefficients for business investments. It is notable that the estimated coefficients are yet positive if we exclude all the three largest countries[12], suggesting that some countries still behave in a way similar to that of Russia.

Columns (6) – (8) report the results of Chinese firms. Again SOEs and PEs are separately examined in Columns (7) and (8). The estimated coefficient of lagged business investments is significantly positive over the full sample, which reinforces our findings from Strategy 1. It is a little strange that both SOEs and PEs show positive and statistically significant estimated coefficients. Nonetheless, combining these results with the subsample results in Section 4.1.1, we can infer that the re-lending business is more prevalent in SOEs.

The results of Strategy 2 in both CEE and China are consistent with those of Strategy 1. Transition economies behave distinctively from countries with mature financial markets such as the U.S., and the scale of the re-lending business is considerable both in CEE and in China. Among all countries, Russia and China, as members of BRICS and characterized with state capitalism, have most similar patterns.

4.2. Country/Region and firm characteristics in re-lending activities

The previous literature on the role of non-financial firms as financial intermediaries is restricted to single-country studies (Du, Li, & Wang, 2016; Shin & Zhao, 2013). This paper extends country coverage to CEE as a whole, and thus facilitates the analysis of geographical heterogeneity of re-lending activities. We explore the cross-country variations within the CEE area and regional variations in China from three perspectives: financial development and openness, the quality of judicial system, and growth prospects. Our analysis is based on the baseline model of Strategy 1.

4.2.1. Central and Eastern European countries

Even though 18 CEE countries share a common socialist past and all of them are classified as transition economies, there are considerable differences in many aspects at present, e.g., political institutions, corporate governance mechanisms, financial systems, legal environment, etc. Some countries, like Russia, intervene in the economies a great deal and follow the path of state capitalism, while other countries, like Hungry or Slovakia, rely more on private enterprises, free markets, and economic openness. It is therefore natural to observe two types of transitional paths of CEE countries in recent years, and consequently different developments of financial markets.

Because of limited availability of data on conventional measures of financial development for many CEE countries, we choose the membership of European Union (EU) and European Monetary Union (EMU) as proxy indicators of financial development and financial openness. The accession to the EU has quite many preliminary requirements, including the achievements in rule of law, protection of minorities and human rights, a functioning market economy, and so on. Gaining membership of EMU is a further step, leading to a common currency and an access to a vast common financial market with abundant financial resources. Thus, we firstly examine whether the EU or EMU membership affects the informal lending across CEE countries.

Columns (1) and (2) in Table 6 present the estimated coefficients of scaled financial liabilities in the EU/EMU and non-EU/non-EMU subsamples, as well as the estimated coefficients of financial liabilities and the interaction term of financial liabilities with EU/EMU dummy in the full sample. The results clearly show that firms in EU countries, especially in EMU countries, are far less likely to engage in re-lending business. We observe that the estimated coefficients in the EMU subsample are significantly negative, the same pattern as the U.S. firms.

Behind the influence of the EU/EMU membership may be the variations in access to the common financial market in the EU and the quality of legal environment. Results in Columns (3)–(6) in Table 6 verify the hypothesis. The index of *rule of law* in

[11] Considering the mismatch cases, we use lagged value of business fixed investments in the analysis, and the results are robust if we use value of current period.
[12] For brevity, we don't tabulate the results, which are available upon request.

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Table 5
The correlation between business fixed investments and financial assets in CEE and China.

Dependent variable: *finassets*									
	Eastern European Nations					China			US
	Full sample	Russia	Poland	Romania	Without Russia	Full sample	SOE	PE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
fixinvestment_lag	0.0731***	0.0758***	−0.125***	−0.0735***	−0.0344**	0.129***	0.0707**	0.250**	−0.0626*
	(0.0172)	(0.0170)	(0.0484)	(0.0190)	(0.0163)	(0.0296)	(0.0307)	(0.0977)	(0.0346)
Leverage	4.701***	−36.44	−1.018	−3.236	1.241***	5.501***	44.5	3.494***	2.392*
	(1.2130)	(82.5300)	(1.4090)	(2.8380)	(0.3760)	(1.39)	(76.41)	(0.4930)	(1.2450)
ROA	0.482	66.38	7.316	2.907	0.172	7.107	516.1***	31.60***	0.686
	(0.3220)	(75.2800)	(5.2700)	(2.7990)	(0.1340)	(27.13)	(131.70)	(5.0710)	(1.4990)
Size	77.39***	274.4***	16.28***	2.369**	22.13***	474.6***	602.3***	363.6***	636.5***
	(18.27)	(77.85)	(4.20)	(1.12)	(7.07)	(28.97)	(40.93)	(31.03)	(51.08)
Constant	−227.9**	−1573***	−19.97	2.372	37.81	−2708***	−3641***	−1975***	−2881***
	(88.46)	(544.10)	(12.98)	(4.49)	(60.23)	(188.10)	(287.10)	(185.60)	(288.70)
Observations	7494	1624	2685	1298	5870	22,805	11,787	9017	49,137
R-squared	0.094	0.126	0.058	0.323	0.023	0.363	0.38	0.395	0.013
Number of id	1572	289	589	343	1283	2303	870	1207	3973

This table reports regression results estimated by the specification of strategy 2: $finassets_{it} = \beta_1(fixinvestment_{lag_{it}}) + \beta_2(size_{it}) + \beta_3(firmlev_{it}) + \beta_4(ROA_{it}) + \beta_{5t}(year$-$fixinvestmentlag_{it}) + \beta 2(sizeit) + \beta 3(firmlevit) + \beta 4(ROAit) + \beta 5t(yeart) + + \beta 6i(firmi) + uit$. *Dependent variable is financial assets, incorporating cash holdings and short-term investments. fixinvestment_lag is 1-year lagged value of change in net Property, Plant and Equipment. Columns (1) – (5) are results for CEE sample firms, among which column (1) reports the results of full sample, column (2) is for Russian firms, column (3) for Poland, column (4) for Romania, and column (5) for all excluding Russian firms. Columns (6) – (8) report regression results of Chinese firms, among which column (6) for all firms, column (7) and column (8) are for state-controlled firms and private-controlled firms, respectively. The results of U.S. firms are summarized in Column (9). Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.*

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.

column (3) constructed by the World Bank ranges between −2.5 and 2.5 and a lower value indicates a lower quality legal system. We observe that the association between financial assets and financial liabilities only remains significantly positive in the countries with below median scores in the index of rule of law, which suggests that better rule of law and stronger judicial institutions partly impede firms to participate in an informal lending business.

Considering that better access to financial resources in other member countries should relax some financial constraints of firms in CEE countries, we select three widely used measures of financial openness and integration, i.e., Chinn and Ito's index, Schindler's KA index and KOF index, to explore whether re-lending behavior is affected by the financial market openness and development. Chinn–Ito index used in Column (4) is the first measure of standardized principal component of the *AREAER* (IMF's Annual Report on Exchange Arrangements and Exchange Restrictions) table variables, where a higher value suggests greater openness. Schindler' KA index is a *de jure* indicator based on the text of *AREAER* and considers restrictions on cross-border

Table 6
The effects of national and firm-level factors on re-lending business in CEE.

The coefficients of financial liabilities and its interaction terms								
	EU membership	EMU membership	rule of law	Chinn-Ito index (KAOPEN)	Schindler KA index	KOF index (Economic globalization)	Lagged ROA	Growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Yes/above median subsample	0.0111	−0.108***	0.0418	0.0112	−0.00678	0.0279	0.0799*	0.0890**
	(0.0280)	(0.0357)	(0.0313)	(0.0256)	(0.0281)	(0.0291)	(0.0462)	(0.0419)
No/below median subsample	0.108***	0.0480**	0.0611*	0.0354	0.106***	0.0684**	0.0942**	0.0771*
	(0.0380)	(0.0236)	(0.0325)	(0.0321)	(0.0303)	(0.0319)	(0.0402)	(0.0433)
Full sample	0.0786**	0.0493**	0.0485**	0.118**	−0.0492	0.265**	0.0830**	0.0895**
	(0.0330)	(0.0234)	(0.0231)	(0.0500)	(0.0413)	(0.1220)	(0.0331)	(0.0349)
Full sample interaction term	−0.0472	−0.130***	−0.027	−0.122*	−0.199**	−0.00332*	0.0790**	−0.0104
	(0.0366)	(0.0421)	(0.0291)	(0.0666)	(0.0842)	(0.0017)	(0.0308)	(0.0213)

This table reports the coefficients of key variables in the specification of strategy 1. The dependent variable is log ratio of financial assets scaled by sales, where financial assets equals the sum of cash holdings and short-term investments. The key independent variable is the log ratio of the sum of short-term and long-term debts scaled by sales (*logfinlia_sales*). Rows 1–3 present the estimated coefficients of *logfinlia_sales* in the corresponding samples, and row 4 presents the estimated coefficients of the interaction terms of each factor with financial liabilities. Estimated results of other regressors, including *ROA*, *leverage*, *logsales* and *tangi*, are not tabulated for brevity. Rows 1 and 2 in column (1) represent EU and non-EU sample; rows 1 and 2 in column (2) represent EMU and non-EMU subsample; rows 1 and 2 in columns (3)–(8) all represent the above-median subsamples and the below-median subsamples based on the value of each determinant. Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.

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flow of several categories of assets. Results in Column (5) are built on the overall inflow restrictions index (*KAI*)[13]. In Column (6) we choose the KOF index of economic globalization dimension, incorporating the information of actual flows of FDI, trade, and portfolio investments and restrictions on tariff and capital accounts.

Two patterns emerge from Columns (4)–(6). Firstly, all the estimated coefficients of interaction terms between financial liabilities and financial openness indices are significantly negative, suggesting that greater financial openness reduces the intensity of engagement in re-lending activities. Secondly, all the estimated coefficients of scaled financial liabilities are insignificant in the subsamples with higher scores of financial openness. Hence, better financial development and openness decrease the prevalence of informal lending. The mean scores of financial openness in EU/EMU countries are significantly higher than the scores in non-EU/non-EMU countries[14], verifying that the EU/EMU membership matters for corporate re-lending activities partly due to financial market integration.

Lastly, we turn to firm attributes, and focus on firms' profitability and expansion. We conjecture that firms participate less in re-lending business if firms operate well and expand quickly in their business line. Two measures, one-year lagged ROA and the growth rate of total assets, are used, and the estimated results are summarized in Columns (7) and (8), respectively. Unexpectedly, both subsamples produce significantly positive estimated coefficients of financial liabilities, and the estimated coefficient of the interaction term of lagged ROA is positive. Thus, it is likely that the firm attributes generate a negligible effect on firms' re-lending behavior in CEE countries.

4.2.2. China

China is characterized with uneven economic development across cities and provinces. The cross-region variation is, to some degree, a mirror of cross-country differences in CEE countries. We focus on the variation at the provincial/city-level where the headquarters of the listed firms are located. Obviously, the available financial resources and the growth of relevant industries in the regions where firms are located should be important in shaping the re-lending activities of the firms. Similarly, we examine the potential factors from the angles of financial development, the quality of judicial system, and growth prospects.

The measure of legal environment comes from the influential report on the marketization progress in China prepared by Fan et al. (2011), incorporating the development of legal institutions, protection of producers' legitimate rights, and protection of property rights. Column (1) in Table 7 presents the effect of judicial system on re-lending activities. Subsamples with both above-median scores and below-median scores of legal environment exhibit a significantly positive association between financial assets and financial liabilities, but the estimated coefficient of the below-median subsample is a bit larger. Meanwhile, the significantly negative estimated coefficient of the interaction term in the full sample suggests that better judicial system enhances the progress of formal financial markets and deter firms from engaging in the illegal re-lending business.

Two indices in Fan et al. (2011) are quoted to measure the level of marketization across provinces: total marketization index and financial marketization index. The former one includes the assessment of the relationship between government and market, the development of non-state-owned economy, product markets, factor markets, and intermediary market; the latter one measures the competition of financial markets and marketization of credit allocation. Results in Columns (2)–(3) show that both subsamples exhibit symptoms of re-lending activities, and there is no significant difference in the estimated coefficients between the two subsamples. But the significantly negative estimated coefficients of the interaction term of marketization indices with financial liabilities imply that firms located in regions with greater progress in financial marketization and whole marketization participate relatively less in re-lending business.

To step further, we use the data of household savings provided by the National Bureau of Statistics of China to measure the liquidity of financial market at the city level. Household deposits are an important source of social financing. Higher deposit balances provide more financial resources to non-financial firms either through personal investments or bank intermediation. As expected, firms operating in cities with lower deposit balances are more likely to participate in re-lending business, manifested by the significantly positive coefficient of financial liabilities in the below-median subsample but insignificant one in the above-median subsample, as well as a significantly negative interaction term in Column (4).

Likewise, we examine whether the main business line performance and business expansion prospects of firms themselves discourage them from participating in re-lending business. The results based on lagged ROA and growth rate of total assets are reported in Columns (6)–(7) of Table 7. The pattern is very different from that of CEE countries. We find that only firms with below-median profitability and investment expansion display a significantly positive correlation between financial assets and financial liabilities, and thus symptoms of re-lending activities. At the same time, the interaction terms of both lagged ROA and asset growth with financial liabilities produce negative estimated coefficients which are statistically significant at the 1% level. All of these results lend support to the claim that firm profitability and growth opportunities would deter firms from engaging in re-lending activities.

Moreover, the economic vitality and growth prospects of the cities in which the firms are located can also matter for the variations in the prevalence of re-lending activities. We employ the gross outputs of high-technology industries to signal the growth prospects and the development stage of the corresponding cities. If a city has plenty of promising investment opportunities,

[13] Schindler provides overall restriction index, overall inflow restriction index and overall outflow restriction index. Here we use the inflow index since we hypothesize that inflows of financial resources matter more for the re-lending behavior and the results are nearly the same if we use overall index or overall outflow index. Higher scores of KA index indicate higher restrictions of financial openness, so we use negative value of original index to maintain consistency with other two measures.

[14] The results of comparison are not tabulated here for brevity. For example, the mean scores of Chinn-Ito index in EMU and non-EMU are 0.65 and 0.81, significantly different at 1% level.

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Table 7
The effects of regional and firm level factors on re-lending business in China.

The coefficients of financial liabilities and its interaction terms							
	Institutions and law	Financial marketization	Total marketization	Household savings	High-tech outputs	Lagged ROA	Growth of total assets
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Above median subsample	0.0522***	0.0795***	0.0700***	0.00517	−0.0113	−0.012	0.146***
	(0.0180)	(0.0222)	(0.0186)	(0.0157)	(0.0190)	(0.0183)	(0.0243)
Below median subsample	0.0717***	0.0665***	0.0636***	0.0362**	0.0551***	0.0940***	0.0607***
	(0.0232)	(0.0223)	(0.0241)	(0.0176)	(0.0197)	(0.0162)	(0.0150)
Full sample	0.119***	0.197***	0.170***	0.0539***	0.0783***	0.0273**	0.0245**
	(0.0217)	(0.0329)	(0.0379)	(0.0156)	(0.0190)	(0.0115)	(0.0111)
Full sample interaction term	−0.00865***	−0.0172***	−0.0156***	−6.28e−06***	−3.98e−09***	−0.0323***	−0.000133***
	(0.0022)	(0.0035)	(0.0047)	(0.0000)	(0.0000)	(0.0122)	(0.0000)

This table reports the coefficients of key variables in the specification of strategy 1. The dependent variable is the log ratio of financial assets scaled by sales, where financial assets equals the sum of cash holdings and short-term investments. The key independent variable is the log ratio of the sum of short-term and long-term debts scaled by sales (*logfinlia_sales*). Rows 1–2 present the estimated coefficients of *logfinlia_sales* in the subsamples with above median values and below median values of corresponding factors, row 3 summarizes the estimated coefficients of *logfinlia_sales* in the full sample, and row 4 presents the estimated coefficients of the interaction terms of each factor with financial liabilities in the full sample. Estimated results of other regressors, including *ROA*, *leverage*, *logsales* and *tangi*, are not tabulated for brevity. Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.

*** Denotes statistical significance at the 1% level.

** Denotes statistical significance at the 5% level.

* Denotes statistical significance at the 10% level.

especially in high-technology industries, firms will be encouraged to embark on these profitable investments, and considerable upfront costs of high-tech firms would allow few available funds to be used in informal lending business.

The results in Column (5) of Table 7 are consistent with our hypothesis: the involvement in re-lending business is much more prominent in the cities with below-median high-technology industry development, and the negative sign of the estimated coefficient of the interaction term in the full sample regression also lends support to a negative effect of the growth of high-tech industry on the inter-corporate loan markets.

If we look at the list of cities, we find that cities in which firms engaged relatively more intensively in re-lending business include Qingdao, Ningbo, Jinan, Fuzhou, Nanchang, Lanzhou, Guiyang, Taiyuan, etc. This finding is largely in accord with our observation of the rapid growth of private lending market in Southeast China.

Overall, better financial system development, stronger financial openness and more favorable legal environment would restrain the enlargement of re-lending business both in CEE and in China, but the growth prospects and profitability cast a negative effect only on the re-lending among Chinese firms.

4.3. Global financial crisis

The 2008 global financial crisis wreaked havoc on the world economy, and directly affected financial markets across countries. Not only did it shed light on the size of the shadow banking system, but also initiated the creation of new regulations (Gorton, Metrick, Shleifer, & Tarullo, 2010). During the crisis period, market liquidity shrank in many countries, and thus the crisis might have crippling effects on re-lending as re-lending relies on lending firms having adequate funds.

We define the crisis episode as 2008–2010, and include the crisis dummy and its interaction term with financial liabilities in the specification of Strategy 1. The crisis had certain signs at the beginning of 2008, burst by the bankruptcy of Lehman Brothers in the U.S. in the second half of 2008 (Wiggins, Piontek, & Metrick, 2014), and a full-blown crisis reached Eastern Europe in 2009 and continued in 2010. We also intend to study whether firms in Russia and in other CEE countries behaved differently in the crisis period and whether the behavioral patterns of SOEs and PEs in China were affected differently.

Panels A and B in Table 8 report the results of CEE and China, respectively. Obviously, the positive correlation between financial assets and financial liabilities is weakened by the attack of the global financial crisis both in CEE and in China. Among the CEE firms, the weakening effects are particularly strong for Russian firms, which are represented by a large proportion of state ownership. Among the Chinese companies, the state-controlled ones are adversely affected to a larger extent in the crisis episode. This finding may be due to the relatively active participation of SOEs in China and Russian firms in re-lending business on a whole, and consequently they were hit fiercely by the sudden liquidity drought brought about by the crisis.

5. Conclusions

China and CEE countries experienced centrally planned economies in the past and have some similarities in the process of transition. Surprisingly few attempts have been made to compare their financial markets, and especially shadow banking activities in these two regions. In this study, we focus on one special form of shadow banking activities, “re-lending business” performed by non-financial firms, in transitional markets based on the experience of corporate China and corporate CEE.

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Table 8
The effect of crisis in CEE and China.

Dependent variable: *log (finassets_sales)*					
Panel A: CEE					
	Full sample	Full sample	Russia	Without Russia	Full sample
	(1)	(2)	(3)	(4)	(5)
logfinlia_sales	0.0460**	0.0620***	0.146***	0.0363	0.0635***
	(0.0231)	(0.0239)	(0.0499)	(0.0273)	(0.0138)
Crisis	0.441***	0.331***	0.392*	0.277***	0.331***
	(0.0806)	(0.0921)	(0.2030)	(0.1020)	(0.0705)
logfinlia × crisis		−0.0504**	−0.0901**	−0.0447**	−0.0424***
		(0.0201)	(0.0437)	(0.0224)	(0.0153)
logfinlia × crisis × Russia					−0.0386*
					(0.0222)
Panel B: China					
	Full sample	Full sample	SOE	PE	Full sample
	(1)	(2)	(3)	(4)	(5)
logfinlia_sales	0.0245**	0.0355***	0.0865***	0.0288*	0.0363***
	(0.0097)	(0.0103)	(0.0231)	(0.0171)	(0.0103)
Crisis	2.413***	2.354***	2.470***	1.779***	2.356***
	(0.3030)	(0.3000)	(0.4100)	(0.1230)	(0.2980)
logfinlia × crisis		−0.0484***	−0.0425***	−0.0388***	−0.0318**
		(0.0105)	(0.0124)	(0.0190)	(0.0137)
logfinlia × crisis × soe					−0.0325**
					(0.0135)

The dependent variable is the log ratio of financial assets scaled by sales, where financial assets incorporate cash holdings and short-term investments. *logfinlia_sales* is the log ratio of the sum of short-term and long-term debts scaled by sales; *crisis* is a dummy variable that equals 1 for years 2008–2010; *Russia* is a dummy that equals 1 if firms are located in Russia; *soe* dummy is equal to 1 for state-controlled firms in China. Columns (1) – (2) report results of full sample in both Panel A and Panel B. Columns (3) – (4) in Panel A are for Russian firms and the sample excluding Russian firms; Columns (3) – (4) in Panel B are for state-owned firms and private firms. Column (5) also tabulates the results of full sample but includes the triple interaction terms of financial liabilities, *crisis* and *Russia* dummy in CEE or *soe* dummy in China. Estimated coefficients of other regressors, including *ROA*, *leverage*, *logsales* and *tangi*, are not tabulated for brevity. Year and firm fixed effects are included in all regressions. Robust standard errors are in parentheses.

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.

We first identify the prevailing re-lending business in China and CEE, especially in Russia, through two strategies based on the predicted patterns of pecking order theory and the carry trade experience of Japanese firms in the 1980s. The engagement in re-lending business leads to a simultaneous increase in financial assets and financial liabilities as firms behave as financial intermediaries. The non-negative correlation between liquid financial assets and lagged business fixed investments suggests that the changes in liquidity holdings are less linked to the schedule of real investments, further supporting the existence of re-lending business. We also find that state-owned firms in China and the Russian corporate sector featured with dominant state ownership in the CEE sample participate in re-lending more actively, which reinforces our conjecture that the emergence of re-lending business is an outcome of financial repression and discriminations across firms in financial markets. Moreover, variations in national/regional factors and firm characteristics, including financial development and financial openness, quality of judicial system, and growth opportunities, affect the engagement of corporations in re-lending business.

The development of re-lending business might be a double-edged sword. On the one hand, it could promote the growth of private businesses by re-allocating financial resources to them, which helps move emerging markets toward the goal of inclusive finance. It also constitutes an experiment for testing interest rate liberalization in emerging economies. On the other hand, it may increase systemic risk and financial instability by introducing an informal and unregulated system, which can have important implications, as shown in the recent Global Financial Crisis.

Our findings also provide some policy implications. Fixing the problems of financial repressions and credit market discrimination is the fundamental solution to the unregulated re-lending market. Meanwhile, government supports to the growth of individual firms by promoting emerging industries may help to cool down the over-heated shadow banking sector. In this sense, informal inter-corporate loan market is a transitory phenomenon in the process of moving toward a mature financial system following economic development and legal institution building. Yet we still need to remain cautious about this private lending market because the prevalence of private lending channel outside the formal banking sector may influence the transmission of monetary policies and exaggerate the volatility of the economy, which is left for future research.

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