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# Financial Flexibility: At What Cost?

Mark J. Garmaise and Gabriel Natividad*

## Abstract

Firms strategically borrow in different locations. Approximately one-quarter of Peruvian companies with operations in multiple areas source their financing from more than one province. Mining windfalls generate finance supply shocks, leading to the provision of more credit at lower average rates, and we show that firms exploit geographic financial flexibility by concentrating their borrowing in booming locations. Firms are less likely to initiate borrowing in new markets when their current borrowing provinces are thriving. The pursuit of flexibility in borrowing markets, however, degrades a firm's relationships with its existing lenders, thereby heightening its risk of future financial distress.

## I. Introduction

Achieving financial flexibility is a key policy goal for firms. Survey evidence (Graham and Harvey (2001)), theoretical models (e.g., Gamba and Triantis (2008)), and empirical studies (Denis (2011) provides an overview) have all emphasized the importance to corporations of having ready and inexpensive access to credit. In this article, we examine one aspect of optionality in financial choices: the ability of firms operating in multiple areas to strategically focus their borrowing in thriving local markets. We show that firms do indeed choose to borrow in their most prospering locales, where credit is plentiful and relatively inexpensive. We also find, however, that the pursuit of geographic financial flexibility can come at a cost. Firms that initiate borrowing in new, flourishing markets neglect their existing banking relationships and, as a result, experience higher risks of eventual financial distress. A firm's agility in accessing financing in different markets on attractive terms must therefore be understood to carry the consequence of degrading important connections to its current set of lenders.

*Garmaise (corresponding author), mark.garmaise@anderson.ucla.edu, UCLA Anderson School of Management; Natividad, gabriel.natividad@udep.edu.pe, Universidad de Piura. We thank Erik Gilje (the referee), Jarrad Harford (the editor), and audiences at New York University, Universidad de Montevideo, Universidad de Piura, and the Annual Conference of the Peruvian Central Reserve Bank for comments, and we thank Jharold Montoya, Guillermo Ramirez-Chiang, and Renzo Severino for valuable research assistance. We are grateful to the Superintendencia de Banca, Seguros y AFPs and the Ministerio de la Producción for access to the data.

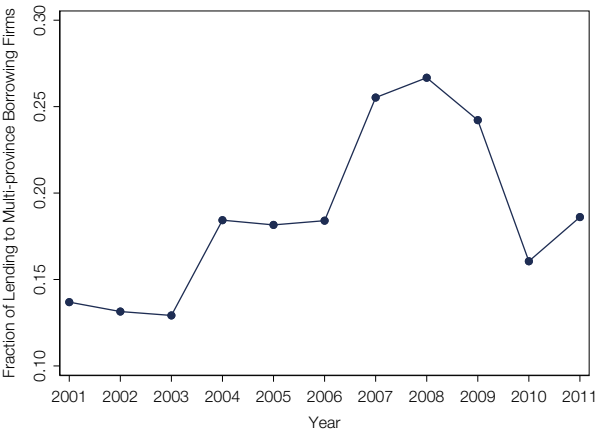
We study a sample of Peruvian firms over the period 2001–2012. These firms have business operations in multiple provinces. We first document that 25.5% of the firms borrow in more than one province at some point during our sample period. Specifically, these firms hold loans extended from bank branches located in different provinces. That is, we find that for many quite small firms (the median number of employees at multi-province borrowers is 8), seeking flexibility in the areas in which they borrow is an important aspect of their financial policy. Moreover, as displayed in Figure 1, total lending to multi-province borrowers accounts for roughly 15%–25% of all commercial lending nationally. For firms that engage in multi-location borrowing, only 50% of their financing comes from banks in the province where the firm headquarters is situated.

Multi-location borrowing is not simply a firm strategy to gain access to a wider set of banks. We find that more than 80% of multi-location borrowers take loans from a bank outside their headquarters region that does, in fact, have a branch within the firms' headquarters province. We also find no evidence that firms concentrate their most troubled debt in banks in nonheadquarters provinces.

Why, then, do firms borrow outside their headquarters regions? To better understand the attractiveness of borrowing in different provinces, we explore the impact of changes in commodity prices on the provision of credit. Peru is a natural-resource-driven country, and mining is a critical sector. For each province, we calculate local mining windfalls arising from international commodity price changes multiplied by the mining production of these commodities for all the mines located near the provincial centroid. We show that these mining windfalls stimulate local borrowing booms for both single- and multiple-location firms (across a variety of industries, not only in the mining sector), and we view them as generating plausibly exogenous supply shocks to local financing conditions. Mining windfalls lead to both a surge in the quantity of credit supplied and a reduction in the

FIGURE 1
Fraction of Total Lending That Is Made to Multi-Province Borrowers

Figure 1 describes the fraction of all lending in the Reporte Crediticio de Deudores (RCD) database in each year that is provided to firms that borrow in multiple provinces.




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average interest rate charged: A 1-standard-deviation increase in the windfall increases the quantity of finance supplied by 1.7% and reduces the interest rates on short-term debt by 24 basis points (bps).

We study the drivers of multi-location borrowing by analyzing how it is influenced by mining windfalls in different areas. We find that a 1-standard-deviation increase in the local mining windfall leads to a 5.4% increase in local borrowing, but a 1-standard-deviation increase in the mining windfall in other provinces generates a 4.3% decrease in local borrowing. Firms thus appear to flexibly source their financing by borrowing in relatively better-performing areas and reducing the credit they seek in distressed regions. This is evidence that firm borrowing in one area serves as a substitute for borrowing in other regions. We find that this substitution effect is concentrated in the firm's existing bank relationships: Mining windfalls in other provinces lead to reduced borrowing from existing local lenders.

We analyze how firms widen their geographic financing options by studying their decisions to initiate borrowing in new provinces in which they operate but do not currently receive credit. Under our real-options understanding of the role played by multi-location borrowing, we should expect firms to start borrowing in new locations when the provinces in which they are currently receiving financing are not prospering. In this view, the attractiveness of borrowing in a new market will be determined by the most positive windfall across a firm's current borrowing provinces. We compare firms operating in the same province that are currently unbanked in that province. We show that a 1-standard-deviation increase in the maximum windfall experienced by a firm across its existing borrowing provinces leads to a 0.06% decrease in the probability of borrowing in the unbanked province, relative to an average probability of 1.89% of initiating borrowing in a new province. The specification for this test makes use of province-month-year fixed effects to control for any local demand shocks. In other words, this result provides clear evidence that mining windfalls in a firm's borrowing provinces create finance supply shocks that have a strong influence on the firm's decision to initiate financing in a previously untapped area.

We document clear benefits of pursuing flexibility in the location of borrowing: A greater supply of credit at a lower average price. What are the offsetting costs? We examine this question by seeking a plausibly exogenous determinant of a firm's decision to initiate borrowing in a new area. We consider only the sample of firms that do not presently borrow in all their operating provinces; these are firms that could initiate borrowing in a new operating province. We argue that if a firm in this sample experiences a maximal monthly windfall over the previous year in every one of its operating provinces, then it will certainly experience a windfall in a province in which it did not previously borrow, and the firm is therefore more likely to initiate borrowing in a new province. We show that, controlling for headquarters province-year-month fixed effects and for the maximum and average windfalls to which a firm is exposed in its current borrowing provinces, it is indeed the case that firms that experienced windfalls in all their operating provinces in the previous year are more likely to subsequently initiate borrowing in a new province.

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We therefore propose that experiencing a windfall in each operating province can serve as an instrument for initiating borrowing in a new province. Using this instrument, we find that firms that expand the set of provinces in which they borrow later experience more severe loan delinquencies and are more likely to have loans become subject to judicial collection. In other words, a causal effect of expanded geographic financial flexibility is an increased risk of financial distress.

We confirm the soundness of these results by considering a set of different firms that do currently borrow in all their operating provinces. For these firms, experiencing a maximum windfall in each operating province cannot possibly expand their borrowing across operating provinces. We should therefore expect to see no relationship in this sample between our measures of financial distress and whether a firm experiences a maximum windfall in every operating province, and indeed, we find none when conducting this falsification test. That is, experiencing maximal windfalls across all operating provinces leads to higher risks of financial distress only for the set of firms for which it also leads to an expanded geographic scope of borrowing. This bolsters the claim that borrowing in new areas causally leads to a higher risk of distress.

These results suggest that the pursuit of financial flexibility can generate costs for firms, and we proceed to investigate the underlying mechanism. We consider the effect of borrowing in a new area on a firm's existing banking relationships, which have been shown to be important in many contexts (Cole (1998), Degryse and Van Cayseele (2000), Gopalan, Udell, and Yerramilli (2011), and Xu, Saunders, Xiao, and Li (2017)). In particular, lenders acquire information over time about borrowers in the course of a long-lived banking relationship, thereby reducing information asymmetries (Sharpe (1990), Petersen and Rajan (1995), and Dell'Ariccia (2001)). This can lead to easier access to capital (Petersen and Rajan (1994), Bharath, Dahiya, Saunders, and Srinivasan (2011)) and reduced demands for collateral (Berger and Udell (1995)).

This literature suggests that a financing mechanism may drive the delinquency outcomes we observe: When firms initiate borrowing in new provinces, they may harm their existing banking relationships, which can lead to harsher treatment from their lenders. In support of this argument, we show that firms are significantly less likely to obtain new loans from their previously largest lender in the 2 years following the initiation of borrowing in a new area. We hypothesize that the largest lender is the creditor that is most likely to supply emergency financing to a firm, and we link firms' increased risks of severe delinquency to their worsened relationships with their most important creditor. Firms that start borrowing in new areas are less likely to subsequently receive loans from any of their existing lenders, but the effect is most severe for the largest initial lender. The initiation of borrowing in a new province is also associated with a significantly higher risk of permanent relationship termination with both the main initial lender and any of the firm's existing creditors. Firms that achieve geographic borrowing flexibility attain access to financing opportunities in multiple areas, but we show that this comes at the cost of degraded relationships with their previous lenders and heightened risks of default.

We examine alternative mechanisms that may explain the link we find between borrowing in a new province and subsequent delinquency. First, we

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consider whether the future distress of firms that borrow in new areas is potentially linked to the exposure of their new lenders to cycles in the mining industry. Even when including fixed effects for the set of lenders from which a firm borrows over the next 24 months, however, we continue to find that borrowing in a new area leads to higher delinquency risk. This indicates that the composition of lenders does not drive our main results. Second, we also find that controlling for differences in the means and standard deviations of the windfalls experienced by firms does not affect our findings. This suggests that it is the specific mechanism of maximum windfalls realized in each operating province that leads to borrowing in a new province and future delinquency, not whether the firm experiences broadly positive or highly time-varying windfalls.

Third, we explore whether negative future outcomes may be driven by poor investment choices by firms that experience maximum windfalls in all their operating provinces. We find, however, that even when controlling for the future level of delinquency, a firm that initiates borrowing in a new area is more likely to be subjected to future judicial collection by its lenders. This is evidence of harsher treatment, conditional on performance, by lenders. Moreover, we also create comparison samples of firms that borrow in all their operating provinces and those that do not that are matched, firm by firm, in their set of operating provinces and overall debt levels. Even for these highly matched samples of firms that experience the same windfalls, we find that maximum windfalls in each province lead to worse future outcomes only for the firms that can initiate borrowing in a new province (i.e., those for which the financing mechanism is operative). For example, we find that initiating borrowing in a new region leads to a 6.2% increase in the probability of having debt enter judicial status. This may be compared to the 9% difference in the average frequency of judicial-status loans between the years with the lowest and highest gross domestic product (GDP) growth in our sample. These matched-sample tests show that our results do not arise from comparing firms that experience varying shocks that propel different investment strategies: The key driver of future delinquency is borrowing in a new area.

If banking relationships are important for the information they provide to lenders, we should expect to see that the disruption of these relationships is more costly for informationally opaque firms. In particular, the effects should be more severe for firms that have low levels of tangible assets and for firms that are younger. This is indeed what we find: The link between initiating borrowing in a new province and future delinquency is strongest for firms with low assets-to-sales ratios and for firms that have relatively short histories in the formal financial sector.

Our findings describe the importance of expanding the geographic locus of borrowing as a central flexibility goal of financial policy for a wide class of firms, including some rather small businesses. Our work complements research that has emphasized the role of flexibility in determining firms' cash holdings (Faulkender and Wang (2006), Ang and Smedema (2011)), debt policies (Kahl, Shivdasani, and Wang (2008), DeAngelo, DeAngelo, and Whited (2011), Denis and McKeon (2012), and DeAngelo, Gonçalves, and Stulz (2018)), and equity payouts (Jagannathan, Stephens, and Weisbach (2000), Hoberg, Phillips, and Prabhala (2014), and Kumar and Vergara-Alert (2020)).

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Our study also relates to work depicting the strategic borrowing of multinational firms across a variety of countries, with the level of within-country borrowing dependent on features of the local financing environment (Desai, Foley, and Hines (2004), Jang (2017)). Our study, by contrast, considers multi-province borrowing by small and medium-sized firms active in only one country with a broadly uniform regulatory environment. Moreover, we introduce the idea that seeking geographic financial flexibility can damage existing banking relationships and lead to a higher risk of financial distress, a cost that has not been emphasized in previous work.

Previous work has considered a firm's choice between one or multiple sources of financing (e.g., Detragiache, Garella, and Guiso (2000)). Our emphasis, by contrast, is on studying where, rather than from whom, a firm borrows; we are interested in the influence of credit conditions in different areas on the locus of financing. Our results showing that multi-location firms borrow in healthier credit markets suggest that these firms may play a role in mitigating the impact of regional financial shocks (Samolyk (1994)) on other borrowers. Multi-location firms tend to seek less financing in markets that are struggling, thereby leaving the scarce capital in these areas for the single-location firms that operate there. Our results also point to the importance of regional credit competition by banks (Rice and Strahan (2010), Dou, Ryan, and Zou (2018)) to attract the borrowing of multi-location firms; money centers may have a negative impact on the financial development of nearby locales. These types of economic geographic analyses are not the focus of the literature on single versus multiple banking relationships.

Our work complements prior research describing the impact of local shocks on the lending activities of banks (Gilje, Loutskina, and Strahan (2016), Bustos, Garber, and Ponticelli (2016)). Unlike these articles, we focus on firms rather than banks. We document a different effect: The banking articles show that a positive local shock leads banks to lend more in other areas, whereas we find that these shocks lead multi-location firms to borrow less elsewhere. In some sense, these two forces are in tension and have opposing effects on the location of borrowing. The interplay of bank-lending and firm-borrowing decisions across different geographies can thus be rather complex.

Our results documenting and analyzing multi-location lending also have connections to the literature on internal capital markets. We examine geographic patterns in financing provided by banks, whereas internal capital markets research has largely concentrated on investment decisions (Ozbas and Scharfstein (2010)), the internal allocation of capital to divisions, and internal capital transfers within firms (Buchuk, Larrain, Muñoz, and Urzúa (2014)). The idea that internal capital markets allow firms to engage in winner-picking by investing in the most attractive division (Stein (1997), Matsusaka and Nanda (2002), and Ersahin, Irani, and Le (2016)) resonates with our argument that multi-location borrowing generates a real option to borrow in the most prosperous region. We study firms borrowing in different markets rather than borrowing by multiple business units or subsidiaries of large firms (Kolasinski (2009)). We differ from the internal capital markets literature in both our emphasis on the geographic real option in financing and in our study of the relationship costs of borrowing in multiple areas.

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Our findings contribute to the growing understanding that flexibility is a central objective of corporate financial policy. We emphasize, however, that flexibility is a multidimensional attribute. Firms that obtain greater geographic flexibility by borrowing in more local markets may, at the same time, degrade existing creditor relationships and thereby impair their ability to borrow in times of need.

## II. Data

We analyze monthly business bank loan data from Peru for the period Jan. 2001–June 2012. The data are obtained from Superintendencia de Banca, Seguros y AFPs (SBS) and are labeled the Reporte Crediticio de Deudores (RCD) database. For each Peruvian financial institution, the database includes the monthly loan balances of every business borrower regardless of its size. For our study, we exclude firms that are recorded by SBS as only receiving micro-credit throughout their whole history. The RCD includes information about the financial institution branch's province where the loan was granted. There are 196 provinces in Peru.

Table 1 provides an overview of firm borrowing in our data set. The average outstanding balance at the level of a firm-province-month is 400,089 Peruvian soles, and the average amount of annual new borrowing is 1,188,452 soles, indicating a fairly high level of ongoing debt turnover.[1] At the firm-month level, the average balance is 405,731 soles, and the average amount of new borrowing is 1,205,211 soles. These represent outstanding loan amounts, not lines of credit, and the data are drawn from all the financial institutions in the RCD.

The data cover both collateralized and uncollateralized credits. In Jan. 2001, the first month of our sample period, loan balances greater than 0 had collateral in 29.2% of the cases. In July 2012, right after the end of our sample period, loan balances greater than 0 had collateral in 52.1% of the cases.

TABLE 1
Debt, New Debt, and Windfall Summary

The observations in Table 1 are summarized at different levels of aggregation. DEBT and NEW_DEBT_OVER_NEXT_12M are expressed in soles. MINING_WINDFALL is defined as the monthly sum of MINE_SPECIFIC_WINDFALL for all mines within a radius of 100 miles from the centroid of the province where the firm obtains loans. MINE_SPECIFIC_WINDFALL is the difference in the average metal price for each metal this month $t$ minus the average metal price for that metal last month $t-1$ multiplied by last month's total production of that metal at the mine, and this difference is summed across all metals of the mine. MINING_WINDFALL is expressed in billions of U.S. dollars.

| Variables | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|
| *Panel A. Firm-Province-Month Level* | | | | | |
| DEBT | 400,089 | 80,715,100 | 0 | 6,908 | 185,404 |
| NEW_DEBT_OVER_NEXT_12M | 1,188,452 | 279,416,300 | 0 | 21 | 243,071 |
| *Panel B. Firm-Month Level* | | | | | |
| DEBT | 405,731 | 81,296,080 | 0 | 7,000 | 184,337 |
| NEW_DEBT_OVER_NEXT_12M | 1,205,211 | 281,446,200 | 0 | 23 | 241,662 |
| *Panel C. Province-Month Level* | | | | | |
| MINING_WINDFALL | 0.001 | 0.018 | −0.011 | 0.000 | 0.017 |

[1]The average exchange rate during the sample period was 3.16 soles per U.S. dollar.

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For firms in this loan database that have a tax ID number granted by the Superintendencia Nacional de Administración Tributaria (SUNAT), we obtain from the SUNAT website the address of all their establishments (including headquarters) within Peru. Firms with establishments in more than one province are labeled multi-province firms. Among these multi-province firms, some engage in borrowing in different provinces over their history in the bank registry. We label these firms "multi-province borrowers" during all periods after their first multi-province borrowing activity is observed until they terminate borrowing in a multi-province fashion. We also observe that some firms that are not multi-province according to SUNAT engage in multi-province borrowing during some periods; we exclude from the database those periods of those firms for clarity. Our final data set includes 427,301 firms, of which 5,985 are multi-province firms that engaged in some multi-province borrowing between 2001 and 2012 and 17,508 are multi-province firms that did not engage in multi-province borrowing. To describe the real activities of some (8,561) of the multi-province firms in our final data set, we match them with a cross-sectional census of firms available only for 2007, obtained from the Ministerio de la Producción.

We also employ information on the geocoded location and monthly production of mines in Peru. The Ministerio de Energía y Minas website supplies information on the production and location of all 918 mining concessions between 2001 and 2012 that produced the leading minerals of Peru (i.e., cadmium, copper, gold, iron, lead, molybdenum, silver, tin, tungsten, and zinc), which is enhanced with geocoding tools obtained from the Instituto Geológico, Minero y Metalúrgico. We employ that geocoded information to match the centroid of each province in Peru with all mines within a certain distance in miles, as we describe in Section III. Finally, international end-of-month prices on each mineral produced by Peruvian mines are obtained from Bloomberg.

## III. Empirical Specification

We begin our empirical analysis with an examination of the frequency of multi-province borrowing. We also provide a description of the financing patterns of multi-province borrowers, illustrating where they borrow and the types of lenders from which they receive credit.

We next turn to a causal analysis of the motivation for multi-province borrowing. We make use of price changes in natural resources to examine the impact of exogenous shocks on the borrowing behavior of our firms. Mining is a large and important sector in Peru (e.g., Sinnott, Nash, and de la Torre (2010)), and price changes in natural resources are likely to have broad economic effects. These price changes may also be regarded as plausibly exogenous for almost all firms because metal prices are determined at the international level.

For every mine $j$, we denote the month $t-1$ production of metal $k$ by that mine with $q_{j,k,t-1}$. The average price of metal $k$ in month $t-1$ is given by $p_{k,t-1}$. For each mine every month, we define

$$\text{MINE_SPECIFIC_WINDFALL}_{j,t} = \sum_{k} (p_{k,t} - p_{k,t-1}) q_{j,k,t-1}. \quad (1)$$

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That is, the mine-specific windfall describes the impact of metal price changes on the value of the entire production of the mine. We hold fixed the mine's production at the month $t-1$ level in order to capture only the effects of price changes, rather than the possibly endogenous quantity fluctuations.

We define mining windfalls at the provincial level by summing the monthly mine-specific windfalls of all mines within a radius of $x$ miles from the centroid of the province, where $x$ takes the value of 75 miles, 100 miles, or 125 miles in various specifications. That is, for province $u$

$$\text{MINING_WINDFALL}_{u,t,x} = \sum_{\text{all mines } j \text{ within } x \text{ miles of province } u \text{ centroid}} \text{MINE_SPECIFIC_WINDFALL}_{j,t}. \quad (2)$$

Table 1 provides summary statistics of the mining windfalls. We are interested in the impact of a mining windfall on the borrowing of local firms. For firm $i$ in province $u$, we will therefore estimate

$$\log\left(\frac{1+\text{NEW_BORROWING}_{i,u,t}}{1+\text{LOAN_BALANCE}_{i,u,t-1}}\right) = \alpha\text{MINING_WINDFALL}_{u,t,x} + \xi_i + \lambda_t + \delta_u + \text{CONTROLS} + \varepsilon_{i,t}, \quad (3)$$

where $\xi_i$, $\lambda_t$, and $\delta_u$ are fixed effects at the firm, year-month, and province levels, respectively. As described in equation (3), we scale the extent of new borrowing by the firm's previous loan balance in the province.

## IV. Results

### A. Which Multi-Province Firms Engage in Multi-Province Borrowing?

We begin with a general description of some of the differences between multi-province firms that engage in multi-province borrowing and those that do not. For this description we use the cross-sectional characteristics of only those firms covered by the 2007 census. In Panel A of Table 2, we provide summary statistics on both multi-province and single-province borrowers.

Two patterns stand out. First, the multi-province borrowing firms tend to be older and larger (in terms of sales, employees, fixed assets, and inventory) than multi-province firms that borrow only in a single province. (Overall, many of these firms are quite small; the untabulated median number of employees for multi-province borrowers is 8, and that for single-province borrowers is 6.) Thus, one potential argument is that multi-province borrowing is part of the development process of a firm as it ages and expands. There may be fixed costs of borrowing in multiple regions that firms are only willing to bear once they reach a certain minimum size. Second, multi-province borrowers are not more profitable, nor are their operating units more distant from each other. Panel B of Table 2 provides summary statistics of multi-province borrowing by sector using all firms on the loan registry. There is some variation across sectors in the frequency of multi-province borrowing, but it is not uncommon in any sector.

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TABLE 2
Multi-Province Firms and Multi-Province Borrowing

Table 2 describes multi-province firms and whether these firms engage in multi-province borrowing. Panel A restricts the sample of the study described in Section II to only those multi-province firms with information available from the 2007 census of firms. Of these 8,561 multi-province firms, only a fraction engages in multi-province borrowing. For the description in Panel A, those multi-province firms that did no multi-province borrowing between 2001 and 2012 (totaling 5,624) are described in column 1. The 2,937 multi-province firms that engaged in some multi-province borrowing at any point between 2001 and 2012 are described in column 2. AGE_IN_YEARS describes the firm age in years, and NUMBER_EMPLOYEES is the number of employees employed by the firm. SALES, FIXED_ASSETS, PROFIT, and INVENTORY are given in soles. log(DISTANCE) (for which DISTANCE is measured in miles) is calculated only for the subsample of firms that operate in exactly two provinces. The *t*-statistic of the difference of means is reported in column 3. Panel B describes the industry composition of all multi-province firms that do any borrowing (either single province or multi-province) as recorded in the credit registry database. For this description, a multi-province firm is considered as engaging in multi-province borrowing if it has ever engaged in multi-province borrowing, regardless of the quantity or frequency of borrowing. Column i describes the fraction of all firms belonging to a given sector. Column ii indicates the fraction of firms in that sector that engage in multi-province borrowing.

*Panel A. Average 2007 Census Characteristics of Multi-Province Firms*

| | Multi-Province Borrowing? | | |
|---|---|---|---|
| | No | Yes | *t*-Statistic |
| Variables | 1 | 2 | 2 − 1 |
| AGE_IN_YEARS | 10.26 | 11.84 | 5.89 |
| NUMBER_EMPLOYEES | 64.05 | 100.02 | 4.76 |
| log(SALES) | 13.39 | 13.77 | 4.13 |
| log(FIXED_ASSETS) | 9.21 | 9.90 | 4.37 |
| PROFIT/SALES | 0.04 | 0.08 | 0.86 |
| log(INVENTORY) | 6.22 | 6.76 | 2.81 |
| log(DISTANCE) | 4.61 | 4.63 | 0.48 |

*Panel B. Industry Sectors of Multi-Province Firms on the Credit Registry*

| | Fraction of Firms in Sector | Fraction of Firms Doing Multi-Province Borrowing |
|---|---|---|
| Industrial Sectors | i | ii |
| Extractive | 0.10 | 0.24 |
| Manufacturing | 0.11 | 0.27 |
| Services | 0.69 | 0.26 |
| Information and public administration | 0.06 | 0.18 |
| Other | 0.04 | 0.19 |
| All multi-province firms | | 0.25 |

## B. Borrowing Patterns of Multi-Province Borrowing Firms

In Table 3 we describe the broad financing policies for the set of firms with any history of financing in multiple provinces using the credit registry. Many of these firms engage in multi-province borrowing on an ongoing basis: In any given month, there is a 57% probability of multi-province borrowing, most often in two provinces. We find that new borrowing is common in both headquarters (HQ) and non-HQ provinces and in both provinces with the largest outstanding loan balances for a firm and other borrowing provinces. In other words, for these firms, multi-province borrowing is frequent and found across a variety of jurisdictions.

Borrowing is not dramatically concentrated in HQ provinces: Firm borrowing in HQ provinces is on average only 50% of the firm total. The province in which a firm has its largest outstanding balance is responsible on average for 81% of total firm borrowing, and this is the HQ province in 52% of cases. Multi-province borrowing does not simply arise from spillovers across neighboring provinces: Considering the sample of multi-province borrowers borrowing across exactly two provinces, we find that in only 14% of these firms does the borrowing take place in adjacent provinces. For this group of firms, the average distance between the centroids of their provincial borrowing locations is 238 miles.

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TABLE 3

Borrowing Patterns of Multi-Province Borrowing Firms

Table 3 describes the 5,985 multi-province borrowing firms in the sample at different levels of analysis. The variable HQ (headquarters) is defined by the tax authority. HQ_SHARE_OF_DEBT and LARGEST_DEBT_SHARE_OF_DEBT are the shares of a firm's debt that it borrows in its HQ province and province of largest borrowing, respectively. DISTANCE_BETWEEN_PROVINCES (measured in miles) is only calculated for firms that borrow in two provinces. ADJACENT_PROVINCES is an indicator variable for firms that borrow in adjacent provinces and is only calculated for firms that borrow in two provinces. SOME_DEBT_DIFFERENT_PROVINCE_SAME_BANK is an indicator for whether the firm has some debt from one bank in different provinces. NON_HQ_DEBT_FROM_HQ_BANK is an indicator for whether the firm's non-HQ borrowing is provided by a bank that is present at the HQ location. NON_LARGEST_LOC_DEBT_FROM_LARGEST_LOC_BANK is an indicator for whether the firm's borrowing in its non-largest-borrowing province is provided by a bank that is present at the firm's province of largest borrowing. "Largest" is the province where the firm's borrowing was the largest historically. HQ_DEBT_TROUBLED is the share of HQ debt that is troubled. NON_HQ_DEBT_TROUBLED is the share of non-HQ debt that is troubled. LARGEST_DEBT_TROUBLED is the share of largest-province debt that is troubled. NON_LARGEST_DEBT_TROUBLED is the share of non-largest-province debt that is troubled.

*Whether Firm's Borrowing This Month Happens In:*

| | No. of Obs. | % |
|---|---|---|
| 1 province | 89,066 | 42.97 |
| 2 provinces | 106,700 | 51.48 |
| 3 or more provinces | 11,512 | 5.55 |
| Total | 207,278 | 100 |

*Whether Firm Received New Loan in This Province:*

| | Non-HQ | HQ | Total |
|---|---|---|---|
| No | 114,383 | 95,077 | 209,460 |
| Yes | 63,188 | 65,498 | 128,686 |
| Total | 177,571 | 160,575 | 338,146 |

*Whether Firm Received New Loan in This Province:*

| | Non-Largest | Largest | Total |
|---|---|---|---|
| No | 97,561 | 111,899 | 209,460 |
| Yes | 50,674 | 78,012 | 128,686 |
| Total | 148,235 | 189,911 | 338,146 |

*Other Descriptions of Multi-Province Firms*

| | No. of Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| HQ_SHARE_OF_DEBT | 5,985 | 0.50 | 0.36 | 0.00 | 0.51 | 0.99 |
| LARGEST_DEBT_SHARE_OF_DEBT | 5,985 | 0.81 | 0.17 | 0.55 | 0.85 | 1.00 |
| DISTANCE_BETWEEN_PROVINCES | 106,700 | 238 | 199 | 6 | 177 | 533 |
| ADJACENT_PROVINCES | 106,700 | 0.14 | | | 0.00 | |
| SOME_DEBT_DIFFERENT_PROVINCE_SAME_BANK | 207,278 | 0.01 | | | 0.00 | |
| NON_HQ_DEBT_FROM_HQ_BANK | 159,154 | 0.82 | | | 1.00 | |
| NON_LARGEST_LOC_DEBT_FROM_LARGEST_LOC_BANK | 138,783 | 0.82 | | | 1.00 | |
| HQ_DEBT_TROUBLED | 160,575 | 0.09 | 0.27 | 0.00 | 0.00 | 0.07 |
| NON_HQ_DEBT_TROUBLED | 177,571 | 0.09 | 0.29 | 0.00 | 0.00 | 0.24 |
| LARGEST_DEBT_TROUBLED | 189,911 | 0.08 | 0.27 | 0.00 | 0.00 | 0.07 |
| NON_LARGEST_DEBT_TROUBLED | 148,235 | 0.10 | 0.29 | 0.00 | 0.00 | 0.43 |

Firms rarely borrow from the same bank in multiple locations; only 1% of multi-province borrowers have same-bank and different-province debt in a given month. That is, firms are borrowing in multiple locations from different banks. This suggests the possibility that multi-province borrowing is motivated by a desire on the part of firms to get access to new lenders that are only present in other locations. This hypothesis, however, is not supported by the data: When firms borrow in non-HQ or non-largest-debt provinces, the banks providing these loans also do business in the HQ or largest-debt province 82% of the time.

Are banks perhaps concentrating their troubled (delinquent) loans in one province of the firm? We do not find much evidence for this. For both HQ and non-HQ debt, the share that is troubled is 9%. The largest borrowing province has a troubled share of 8.33% compared with 9.96% for the non-largest province.

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The latter difference is statistically significant at the 1% level but not large in magnitude.

The broad picture that emerges from these descriptive statistics is that multi-province borrowing is a common practice in our sample of firms that is used by these firms to borrow from multiple banks, even when they have access to the same set of banks in their HQ provinces.

### C. Mining Windfalls and the Quantity of Borrowing

To better understand the causal drivers of multi-province borrowing, we examine how this borrowing responds to local shocks to the supply of finance. As described in Section III, we estimate mining windfalls in different provinces and trace their impact on borrowing. We emphasize here that our sample consists of firms from a variety of industries, not just mining firms. In a resource-driven economy like Peru's, mining windfalls may be expected to affect a broad spectrum of firms.

The first question is whether mining windfalls have any impact on local borrowing. We begin with an analysis of the quantity of lending that is supplied. To provide evidence on this, we estimate equation (3) by regressing for each firm the log of 1 plus its new local borrowing, scaled by the log of 1 plus its previous total local loan balance, on the local mining windfall; firm, province, and year-month fixed effects; and a control for the province population in the previous year. We begin by considering the sample of all firms, regardless of whether they operate in one or multiple provinces, and we include in the windfall calculation all mines within 100 miles of each provincial centroid. For multi-province firms, we treat local borrowing in each province as a separate observation. We find, as shown in column 1 of Table 4, that the local mining windfall has a positive and significant impact on firm borrowing (coefficient = 1.156 and $t$-statistic = 2.41); we double cluster standard errors at both the province and year-month levels. A 1-standard-deviation increase of 0.014 in the mining windfall increases a firm's borrowing by 1.7%. For an average firm, this results in approximately 20,200 new soles in borrowing. This is evidence that increases in metal prices lead to greater local financing.

Our main focus is on multi-province borrowing firms, so we split the sample into single-province borrowers (firms that borrow in only one province throughout the sample period) and multi-province borrowers. In column 2 of Table 4, we show that single-province firms borrow more when subject to a positive mining windfall (coefficient = 1.085 and $t$-statistic = 2.13). In columns 3 and 4, we show that this conclusion is robust to including mines within 75 miles of provincial centroids, but the effects dampen with distance and become statistically insignificant when including mines within 125 miles of provincial centroids. In column 5, we show that multi-province firm borrowing is also sensitive to local mining windfalls (coefficient = 2.290 and $t$-statistic = 1.76). The results in columns 6 and 7 show that for multi-province borrowers as well, we find a positive effect on borrowing of windfalls affecting mines within 75 miles of provincial centroids and an insignificant effect of windfalls affecting mines with 125 miles of provincial centroids. Table 4 establishes that windfalls affecting nearby mines lead to an increased provision of financing to local firms.

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TABLE 4

Mining Windfalls and Borrowing at the Firm-Province-Month Level

The observations in Table 4 are at the firm-province-month level for all non-micro firms in Peru in all provinces and all months between Jan. 2001 and June 2012. The dependent variable is the sum of all new debt of the firm obtained at all banks in the province during months $t+1$ through $t+12$, deflated by the existent corporate debt in the province at the beginning of month $t$. Logarithms of 1 plus the variable of interest are employed. MINING_WINDFALL is defined as the monthly sum of MINE_SPECIFIC_WINDFALL of mines within a radius of $x$ miles from the centroid of the province where the firm obtains loans, where $x$ takes the value of 100 miles, 75 miles, or 125 miles, alternatively. MINE_SPECIFIC_WINDFALL is the difference in the average metal price this month $t$ for each metal minus the average metal price last month $t-1$ for that metal multiplied by last month's total production of that metal at the mine, and this difference is summed across all metals of the mine. $t$-statistics based on standard errors double-clustered by year-month and by province are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Dependent Variable: Log of New Debt over the Next 12 Months Deflated by Log of Existing Debt | | | | | | |
|---|---|---|---|---|---|---|---|
| Firms' Borrowing Configuration: | All | Single-Province Borrowers | | | Multi-Province Borrowers | | |
| Radius of Mines around Province Centroid: | 100 mi. | 100 mi. | 75 mi. | 125 mi. | 100 mi. | 75 mi. | 125 mi. |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| MINING_WINDFALL | 1.156** | 1.085** | 1.229** | 0.624 | 2.290* | 4.047** | 1.544 |
| | (2.41) | (2.13) | (2.30) | (1.52) | (1.76) | (2.61) | (1.39) |
| Province population last year | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Province fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.49 | 0.50 | 0.50 | 0.50 | 0.23 | 0.23 | 0.23 |
| Sample size | 13.6M | 13.2M | 13.2M | 13.2M | 385k | 385k | 385k |
| No. of clusters 1 (year-month) | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| No. of clusters 2 (province) | 125 | 123 | 123 | 123 | 101 | 101 | 101 |

## D. Mining Windfalls and the Cost of Borrowing

In order to show that mining windfalls generate a finance supply shock, rather than simply stimulating the demand for borrowing by local firms, we now turn to an analysis of the cost of borrowing. Our data do not provide loan-level interest rates, but we do have access to average lending rates at the bank-currency-month level. (Currencies of originations are Peruvian soles and U.S. dollars.) For each bank every month, we find the weighted-average mining windfall that it experiences across all of its lending provinces, using as weights the amount of lending undertaken by the bank in each province. We regress a bank's current average lending rate over the subsequent 12 months on its weighted-average mining windfall, and we include as controls a currency dummy, bank fixed effects, and year-month fixed effects.

We begin by considering commercial interest rates on loans of maturity of 1 year or less. As shown in column 1 of Table 5, we find that a bank's weighted-average mining windfall has a negative and significant effect (coefficient $= -0.175$ and $t$-statistic $= -2.35$) on the average interest rates that it charges. Banks making loans in areas that benefit from positive mining windfalls tend to charge lower interest rates to their commercial customers over the next year. A 1-standard-deviation increase of 0.0139 in the weighted-average bank mining windfall is associated with a reduction of 0.24 percentage points (i.e., 24 bps) in the average interest rate. In column 2, we show that an increase in the weighted-average mining windfall also leads to a reduction in the average rate that a bank charges on its commercial loans with a maturity exceeding 1 year (coefficient $= -0.223$ and $t$-statistic $= -2.74$).

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TABLE 5
Mining Windfalls and Commercial Interest Rates

The observations in Table 5 are at the bank-currency-month level. W_AVG_MINING_WINDFALL is the weighted average of MINING_WINDFALL over all provinces of the bank each month, using the amount of lending of the branches of the bank in those provinces as the weight. Currencies of origination are soles and U.S. dollars. An interest rate of 20% is expressed as 0.20 for either currency. *t*-statistics based on standard errors clustered by bank are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Dependent Variables | |
|---|---|---|
| | Commercial Rates on Loans of 1 Year or Less Maturity Averaged over the Next 12 Months | Commercial Rates on Loans of More Than 1 Year Maturity Averaged over the Next 12 Months |
| Variables | 1 | 2 |
| W_AVG_MINING_WINDFALL | −0.175** | −0.223*** |
| | (−2.35) | (−2.74) |
| Currency dummy | Yes | Yes |
| Bank fixed effects | Yes | Yes |
| Year-month fixed effects | Yes | Yes |
| $R^2$ | 0.77 | 0.74 |
| Sample size | 8,020 | 7,812 |
| No. of clusters (bank) | 51 | 49 |

These results and those described in Table 4 show that mining windfalls lead to reduced local interest rates and an increase in local borrowing. These combined findings provide clear evidence that the primary effect of a mining windfall is to generate a positive shock to the supply of local finance.[2] We now explore how multi-province borrowers exploit the effects of windfalls on the financing environment.

## E. Multi-Province Borrowing

The results described in Tables 4 and 5 establish that mining windfalls lead to local finance supply shocks for both single- and multi-province borrowing firms. Our main interest is in the financing strategies of multi-province borrowers. In particular, what impact does a mining windfall affecting one province of a multi-province firm have on its borrowing in other provinces? There are two natural hypotheses. The first is that windfalls generate local financing surpluses, and these surpluses strengthen multi-province firms as a whole and enable them to borrow more in other regions as well. Under this hypothesis, windfalls in any area in which the multi-province firm operates and borrows should lead to greater financing in other provinces as well.

The second hypothesis is that firms have a relatively stable demand for financing and that they borrow strategically in different markets to fulfill that demand. If one province in which a firm is active receives a mining windfall generating a local financing surplus, then the firm will reduce its borrowing in other provinces.

We test these hypotheses by regressing for each multi-province borrowing firm the log of 1 plus its new local borrowing, scaled by the log of 1 plus its previous total local loan balance, on the local mining windfall, the average mining windfall in the other provinces in which the firm borrows, firm-year fixed effects,

[2]We provide further evidence in Section IV.F on the supply impact of mining windfalls on local borrowing.

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and the previous controls. The result, displayed in column 1 of Table 6, is that local borrowing increases in the local mining windfall (coefficient = 3.89 and $t$-statistic = 4.12) and decreases in the average windfall in the other provinces in which the firm borrows (coefficient = −2.58 and $t$-statistic = −1.93). Standard errors are clustered at the province and firm-month levels. A 1-standard-deviation increase in the local mining windfall leads to a 5.4% increase in local borrowing, and a 1-standard-deviation increase in the mining windfall in other provinces generates a 4.3% decrease in local borrowing.

The negative and significant coefficient on the average windfall in a firm's other provinces is clear support for the second hypothesis discussed earlier: When a firm experiences a local financing surplus in one province, it reduces its borrowing in other areas. Multi-province borrowing firms make use of flexibility in the location of their financing, borrowing opportunistically in the provinces subject to positive shocks.

How do firms exploit local financing surpluses? Specifically, do they proceed by expanding existing financing relationships or by initiating new relationships in areas experiencing windfalls? We split each firm's new financing into new financing received from banks with which the firm has a preexisting relationship and new financing received from banks from which the firm had not borrowed before. As displayed in columns 2 and 3 of Table 6, we find that new financing from existing relationships increases in the local windfall and decreases in the average windfall of other borrowing provinces, whereas new financing from new relationships increases in the local windfall but is not significantly related to

TABLE 6
Multi-Province Borrowing

The observations in Table 6 are at the firm-province-month level, and the sample is only multi-province borrowing firms. Relationships are defined at the firm-bank level. MINING_WINDFALL_OTH_PROV (the mining windfall of other provinces) is averaged using the firm's loan balance in each province last month as the weight for that province. Province fixed effects are for provinces of the focal province and for the province with the largest debt last month. $t$-statistics based on standard errors double-clustered by year-month and by province are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Dependent Variables | | |
|---|---|---|---|
| Variables | Log of New Debt from Any Bank over the Next 12 Months Deflated by Log of Existing Debt | Log of New Debt from Existing Relationships over the Next 12 Months Deflated by Log of Existing Debt | Log of New Debt from New Relationships over the Next 12 Months Deflated by Log of Existing Debt |
| | 1 | 2 | 3 |
| MINING_WINDFALL | 3.890*** | 3.558*** | 1.573** |
| | (4.12) | (3.89) | (2.01) |
| MINING_WINDFALL_OTH_PROV | −2.580* | −2.508** | −0.499 |
| | (−1.93) | (−2.01) | (−0.49) |
| Province population last year | Yes | Yes | Yes |
| Firm × year fixed effects | Yes | Yes | Yes |
| Province fixed effects | Yes | Yes | Yes |
| Province of other shock fixed effect | Yes | Yes | Yes |
| $R^2$ | 0.49 | 0.49 | 0.67 |
| Sample size | 255,493 | 255,493 | 255,493 |
| No. of clusters 1 (year-month) | 125 | 125 | 125 |
| No. of clusters 2 (province) | 100 | 100 | 100 |

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other province windfalls. The spillover effect on local borrowing of mining windfalls in other provinces is thus found exclusively for financing provided through the channel of existing relationships. We also find, as shown in Table A1 in the Supplementary Material that the strongest spillover effects of windfalls in other areas are exhibited in the province that currently supplies the largest share of a firm's overall debt. Substitution thus mainly occurs through the channel of existing relationships in areas in which the firm already has extensive borrowing.[3]

The overall picture that emerges from Table 6 is that multi-location firms borrow more in provinces subject to positive shocks and reduce their lending from existing relationships when the local shocks are negative and other provinces are prospering. Multi-location firms create flexibility in the geography of their financing through changes in the amounts borrowed from the firms' lenders in different areas. The pursuit of flexibility by multi-location firms may be beneficial to single-location companies. Ill-fated regions may be subjected to negative credit shocks that can hinder local development (Samolyk (1994)). We have shown that multi-location firms shift their borrowing from markets that are not performing well, which may thereby leave more of the limited capital in these floundering regions to single-location borrowers.

## F. Initiating Multi-Province Firms' Borrowing in Existing Operating Provinces

The results presented in Table 6 show that multi-province borrowing firms exploit geographic financial flexibility, borrowing more in the provinces that are subject to relatively positive shocks. This suggests that firms opportunistically seek out the best environments for borrowing. If that is true, then it will primarily be the areas with the most positive shocks for a firm that are the ones determining the changes in its financing strategy. In other words, a key determinant of a multi-province firm's borrowing practices should be the greatest mining windfall in all the provinces in which it borrows. In this section, we test this hypothesis by considering whether a multi-province firm's decision to initiate banking in a new province is influenced by its maximum windfall.

We consider the set of firms with operating branches in multiple provinces that are currently not borrowing in at least one of those provinces. For the set of unbanked firm locations, we ask whether the probability of initiating new borrowing in that province is related to the highest windfall experienced in the firm's existing set of borrowing provinces. We regress an indicator for initiating new borrowing in the unbanked province in the next 12 months on the maximum windfall in any of the firm's current borrowing provinces, and we include firm and province-year-month fixed effects as controls.

We find that a higher maximum windfall across banked provinces reduces (coefficient $= -0.039$ and $t$-statistic $= -3.99$) the probability of subsequently initiating borrowing in an unbanked province of the firm, as shown in column 1 of Table 7. A 1-standard-deviation increase in the maximum windfall leads to a

[3]In Table A1 in the Supplementary Material we show that the sensitivity of local borrowing to other province windfalls is not related to a province's banking density (defined as the total number of banks operating in a province divided by the total number of banks in the country).

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TABLE 7
Initiating Firms' Borrowing in an Existing Province

In Table 7, MAX_MINING_WINDFALL is the maximum windfall experienced by a firm across all its borrowing provinces. Observations are at the firm-province-month level for all firms operating in multiple provinces, including only those provinces where the firm has never borrowed before and where there is a bank present. *t*-statistics based on standard errors double-clustered by year-month and by province are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Dependent Variables: Firm Initiates Borrowing in This Province over the Next… | |
|---|---|---|
| | 12 Months | Month |
| Variables | 1 | 2 |
| MAX_MINING_WINDFALL | −0.039*** | −0.005*** |
| | (−3.99) | (−2.72) |
| Firm fixed effects | Yes | Yes |
| Province-year-month fixed effects | Yes | Yes |
| $R^2$ | 0.37 | 0.85 |
| Sample size | 3.88M | 3.88M |
| No. of clusters 1 (year-month) | 138 | 138 |
| No. of clusters 2 (province) | 149 | 149 |

0.06% decrease in the probability of borrowing in an unbanked province, relative to an average probability of 1.89% of initiating borrowing in a new province. Firms that have enjoyed favorable shocks in their current borrowing environments are less likely to seek out new locations in which to borrow.

The inclusion of province-year-month fixed effects in this regression allows us to control for any local finance demand shocks in the operating province of interest. We are essentially comparing two branches of different firms in the same province that are exposed to varying mining windfalls in their other operating provinces. This finding isolates the impact of windfall-driven supply shocks in a firm's other areas of operation and shows that positive shocks in other provinces reduce a firm's interest in borrowing locally.

In column 2 of Table 7, we detail the results from regressing an indicator for initiating borrowing in an unbanked province in the next month on the maximum windfall and firm and province-month-year fixed effects. Again, we find a negative and significant effect (coefficient $= -0.005$ and $t$-statistic $= -2.72$), indicating that the maximum windfall reduces the probability of borrowing in new regions over both the short and medium terms.

The findings in Table 7 show that at both the 1- and 12-month horizons, higher maximum shocks in a firm's existing borrowing regions discourage the firm from seeking out flexibility by borrowing in new markets. The conditions in a firm's most favorable borrowing market have a large impact on its willingness to borrow elsewhere; a firm's ability to borrow in its best financing market grants it crucial flexibility and is a central determinant of its overall borrowing strategy, independent of any local demand effect.

These results also indicate that lenders in different regions engage in competition with each other for the business of multi-location firms. The threat of entry by outside banks has been shown to affect the pricing of finance (Rice and Strahan (2010)) and banks' loan-loss provisions (Dou et al. (2018)). Our findings complement this work by suggesting that the presence of a large and successful money center with plentiful capital to lend can discourage the development of

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borrowing markets in other areas because multi-location firms will likely concentrate their borrowing in the money center. Only when previously thriving credit markets stumble will banks in other locales be able to secure the business of multi-location companies.

## G. The Costs of Financial Flexibility

The results in Tables 4 and 5 describe the benefits of financial flexibility: Firms that borrow in hot markets receive more financing, and the average rates charged in these markets are lower. Table 6 shows that firms do indeed borrow in their most strongly performing markets, and Table 7 demonstrates that firms expand their borrowing to new markets when their current best-performing market is not experiencing great success. Tables 4 and 6 thus make clear that firms do exploit geographic flexibility in financing, but Table 7 suggests that firms are judicious in pursuing this flexibility. Why would firms ever refrain from pursuing geographic flexibility in borrowing? In this section, we analyze the potential costs of this form of financial flexibility.

### 1. Firms That Do Not Currently Borrow in All Their Operating Provinces

We begin by considering again the set of firms that do not borrow in all their operating provinces. These are firms that could potentially pursue additional flexibility by initiating borrowing in an existing operating province. For this set of firms, we study the determinants of whether the firm will initiate borrowing in a new province, conducting the analysis at the firm-month level. The results in Tables 4, 6, and 7 indicate that a province is likely to be most attractive as a borrowing location to a firm when that province experiences the greatest windfall of all the firm's provinces. As a result, we would expect that a firm that experiences its greatest monthly windfall over the past year in each of its operating provinces would be more likely to borrow in all its operating provinces, and hence more likely to initiate borrowing in a new province, relative to a firm that does not experience a maximum windfall in all its operating provinces.

For each firm every month, we calculate the maximum windfall across all of the firm's operating provinces. We propose that an indicator for whether a firm experienced a maximum windfall in each of its operating provinces in the last year (ALL_OPER_PROV_MAX_LAST_12M) may serve as a potential instrument for whether the firm initiates a banking relationship in a new province over the subsequent year (INIT_BORROWING_NEW_PROV_NEXT_12M). Formally, we estimate the following first-stage equation:

$$\begin{aligned}(4)\qquad \text{INIT_BORROWING_NEW_PROV_NEXT_12M}_{i,t} \quad &= \\ \gamma\,\text{ALL_OPER_PROV_MAX_LAST_12M}_{i,t} \\ +\xi_i + \upsilon_{ut} + \text{CONTROLS} + \varepsilon_{i,t},\end{aligned}$$

where $\xi_i$ and $\upsilon_{ut}$ are fixed effects at the level of the firm $i$ and HQ province $u$ and year-month $t$, respectively. We consider second-stage equations examining the impact of initiating borrowing on firm delinquency outcomes over the subsequent 24 months of the following form:

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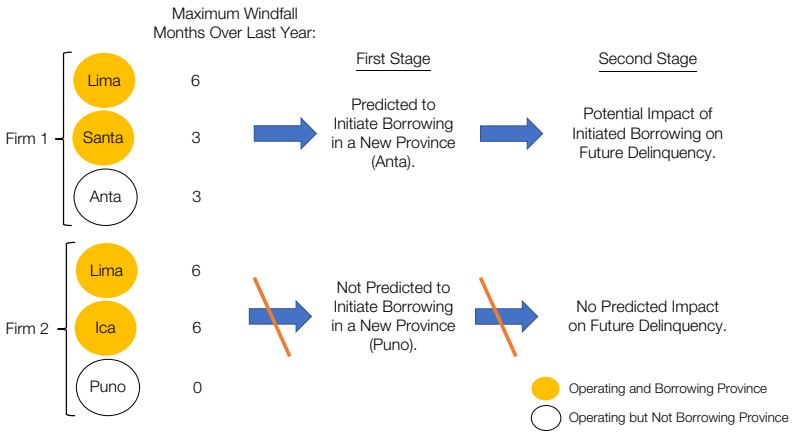
$$(5)\quad \text{FIRM_DELINQUENCY_OUTCOMES_OVER_NEXT_24M}_{i,t} = \nu\text{INIT_BORROWING_NEW_PROV_NEXT_12M}_{i,t} + \xi_i + \upsilon_{ut} + \text{CONTROLS} + \varepsilon_{i,t}.$$

An illustration of the identification strategy is provided in Figure 2. As described in the figure, we are contrasting two firms with headquarters in the same province (which is Lima in this example). Both firms have an operating province in which they do not currently borrow (Anta for Firm 1 and Puno for Firm 2). Firm 1 experiences a maximum monthly windfall in each of its operating provinces, whereas Firm 2 does not. The first-stage (equation (4)) prediction is that Firm 1 will initiate borrowing in a new province (Anta), whereas Firm 2 will not initiate borrowing in a new province (Puno). In the second stage (equation (5)), we explore the implications of the initiation of borrowing in a new province by contrasting delinquency outcomes for Firms 1 and 2. Although it is not illustrated in Figure 2, our approach also controls for both the maximum and average windfalls in all of a firm's borrowing provinces and firm fixed effects.

The exclusion restriction for this proposed instrument requires that delinquency outcomes for Firms 1 and 2 be unrelated to their cross-province patterns of maximum monthly windfalls other than through the mechanism of the initiation of borrowing in a new province. From the standpoint of general plausibility, given that we are controlling for the overall maximum windfall and the average windfall across all borrowing provinces (and firm and HQ province-year-month fixed effects), there is not a clear reason why experiencing a maximum shock in each operating province should have a direct effect on firm performance; we are

FIGURE 2
The Instrument

Figure 2 graphically outlines the empirical strategy used in our instrumental-variables approach described in Section IV.G.1. The formal presentation of this strategy is provided in equations (4) and (5). In the first stage, firms that experience a maximum windfall in a province in which they operate but do not borrow are predicted to be more likely to initiate borrowing in a new province than firms that do not experience a maximum windfall in a province in which they operate but do not borrow. In the second stage, we consider the effect of initiating borrowing in a new province on future delinquency outcomes.




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already controlling for the largest and average shocks. In other words, given that Firms 1 and 2 have the same maximum and average windfalls, the exclusion restriction requires that their delinquency patterns should differ only due to Firm 1's likely initiation of borrowing in a new province. We provide more evidence on this question in Section IV.G.2 in our analysis of firms that already borrow in all their operating provinces.

As a preliminary matter, we consider whether firms display different financing characteristics just before periods in which they experience a windfall maximum in all their operating provinces. That is, we analyze whether firms exhibit shifts in their financial conditions just prior to being affected by the proposed instrument. We consider some key financial variables: the fraction of the firm's debt that has entered judicial status,[4] the fraction of the firm's debt that is troubled, the delinquency classification of the firm's loans,[5] and the firm's overall debt balance.

The analysis of firm-demeaned 12-month lagged averages of these financial variables is provided in Panel A of Table 8. (We consider firm-demeaned variables in light of our inclusion of firm fixed effects in equations (4) and (5).) We find that the fraction of judicial debt, the fraction of troubled debt, and the debt balances are not statistically different between firms that experienced a maximum windfall in all their operating provinces over the last 12 months and those that did not. Firms that experienced a windfall in all their operating provinces did have higher weighted classifications ($t$-statistic = 1.65), but the magnitude of the difference is 0.002, which is very small relative to the classification scale of 0 to 4 and the mean classification of 0.55. These results suggest that the preexisting characteristics of firms affected by the proposed instrument are quite similar to those that were unaffected, which helps to allay concerns that unobserved variables may influence both the instrument and the future delinquency outcomes we study.

We test for the instrument first stage (equation (4)) by regressing the indicator for initiating borrowing in a new province on an indicator for whether the firm experienced maximum windfalls in each of its operating provinces and including controls for the level of the maximum windfall in its borrowing provinces over the last year and the average windfall across all the firm's borrowing provinces. We also include firm fixed effects and province-year-month fixed effects for the firm's HQ province to control for firm and local demand shocks. We show in Panel B of Table 8 that the coefficient on the indicator for experiencing a maximum windfall in all operating provinces is positive and significant (coefficient = 0.023 and $t$-statistic = 5.27). It is indeed the case that having maximum windfalls in each operating province leads to borrowing in a new province for this set of firms that did not previously borrow in all their operating provinces.

The results in Panel B of Table 8 show that the instrument of maximum windfalls experienced in each operating province leads to the initiation of borrowing in a new province in the subsequent year. For our second-stage analysis

[4] Judicial-status debt is subject to collection through the legal system.

[5] Each borrower in Peru is assigned a classification score by its lender, from 0 to 4, based on its delinquency status: Borrowers with current loans are given a score of 0, whereas borrowers with written-off loans are assigned a score of 4. Greater delinquency is thus associated with higher scores. We calculate a weighted-average loan classification by weighting by loan balances across different lenders.

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TABLE 8
Instrument Description and First Stage

The results in Table 8 are based on the sample of observations at the firm-month level for all firms operating in multiple provinces with at least one operating province that had no borrowing. Panel A describes financial variables for this sample, comparing observations depending on whether all of a firm's operating provinces had a maximum over the last 12 months. FRAC_JUDICIAL is the fraction of a firm's debt in judicial status, FRAC_TROUBLED is the fraction of a firm's debt that is troubled, WGT_CLASS is the weighted classification of a firm's debt, and DEBT_BAL is a firm's debt balance. Panel B reports regressions at the firm-month level. ALL_OPER_PROV_MAX_LAST_12M is an indicator for whether all of a firm's operating provinces achieved a maximum over the last 12 months. AVG_MINING_WINDFALL is the average mining windfall across a firm's borrowing provinces. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Firm-Demeaned 12-Month Lagged Mean Values of Financial Variables*

| | All Operating Provinces Had a Maximum over the Last 12 Months? | | |
|---|---|---|---|
| | No | Yes | *t*-Statistic |
| Variables | 1 | 2 | 2−1 |
| FRAC_JUDICIAL | 0.000 | 0.000 | 0.61 |
| FRAC_TROUBLED | 0.000 | 0.000 | 1.25 |
| WGT_CLASS | −0.001 | 0.001 | 1.65 |
| DEBT_BAL | −7535 | 5700 | 0.02 |

*Panel B. First Stage*

| Variables | Dependent Variable: Firm Initiates Borrowing over the Next 12 Months |
|---|---|
| ALL_OPER_PROV_MAX_LAST_12M | 0.023*** |
| | (5.27) |
| MAX_MINING_WINDFALL | −3.976*** |
| | (−14.27) |
| AVG_MINING_WINDFALL | 3.360*** |
| | (13.21) |
| Firm fixed effects | Yes |
| Province of HQ × year-month fixed effects | Yes |
| $R^2$ | 0.42 |
| Sample size | 478,476 |
| No. of clusters 1 (firm) | 12,554 |
| No. of clusters 2 (province of HQ) | 72 |

(equation (5)), we consider the impact of this borrowing in a new area on loan delinquency. It would likely require some time for the initiation of borrowing to have an effect on delinquency. We therefore analyze, over the subsequent 24-month period, a firm's change in weighted classification and an indicator for whether the firm has a loan that enters judicial status.

Using the 2-stage least-squares (2SLS) approach detailed previously, we regress the change in a firm's weighted loan classification on an (instrumented) indicator for initiating borrowing in a new province and the previously described set of controls. As displayed in column 1 of Panel A in Table 9, we find that firms that initiate borrowing in a new province experience a significant increase (coefficient = 1.38 and *t*-statistic = 6.13) in their average weighted loan classification. That is, these firms become significantly more delinquent.

To provide a sense of the magnitude and importance of the 1.38 increase in the weighted classification, we provide some summary statistics in Table A2 in the Supplementary Material. The standard deviation of the weighted classification is 1.26, and the average weighted classification ranges from 0.35 in the sample year with the highest GDP growth to 0.80 in the year with the lowest GDP growth. An increase of 1.38 is thus quite large in magnitude. In a descriptive regression in

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TABLE 9

Impacts of Initiating Borrowing and Falsification Tests

The observations in Table 9 are at the firm-month level for firms operating in multiple provinces. Panel A focuses exclusively on the sample of firms with at least one operating province that had no borrowing. INIT_BORROWING_NEW_PROV_NEXT_12M is an indicator for whether a firm initiates borrowing over the next 12 months in a new province. CHG_WGT_CLASS is the change experienced by the firm in its weighted classification over the next 24 months. Panel B focuses exclusively on the sample of firms that had borrowing in all their operating provinces. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Multi-Province Firms That Have Some Provinces with No Borrowing*

| | Dependent Variables (Second Stage) | | |
|---|---|---|---|
| | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months | |
| Variables | 1 | 2 | 3 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 1.382*** | 0.276*** | 0.199** |
| | (6.13) | (2.81) | (2.43) |
| MAX_MINING_WINDFALL | 8.749*** | 1.142*** | 0.724** |
| | (11.73) | (3.25) | (2.48) |
| AVG_MINING_WINDFALL | −7.572*** | −0.924*** | −0.570** |
| | (−10.79) | (−3.40) | (−2.45) |
| CHG_WGT_CLASS | | | 0.057*** |
| | | | (32.96) |
| Firm fixed effects | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes |
| $R^2$ | 0.42 | 0.60 | 0.64 |
| Sample size | 478,476 | 434,060 | 434,019 |
| No. of clusters 1 (firm) | 12,554 | 12,047 | 12,047 |
| No. of clusters 2 (province of HQ) | 72 | 72 | 72 |

*Panel B. Multi-Province Firms with Borrowing in All Operating Provinces*

| | Dependent Variables | | |
|---|---|---|---|
| | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months | |
| Variables | 4 | 5 | 6 |
| ALL_OPER_PROV_MAX_LAST_12M | −0.044 | −0.001 | 0.000 |
| | (−1.31) | (−0.10) | (0.01) |
| MAX_MINING_WINDFALL | 1.677*** | 0.230** | 0.134 |
| | (3.10) | (2.21) | (1.50) |
| AVG_MINING_WINDFALL | −0.545 | −0.132 | −0.090 |
| | (−0.67) | (−1.13) | (−1.13) |
| CHG_WGT_CLASS | | | 0.081*** |
| | | | (12.61) |
| Firm fixed effects | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes |
| $R^2$ | 0.58 | 0.67 | 0.72 |
| Sample size | 74,632 | 70,824 | 70,820 |
| No. of clusters 1 (firm) | 2,513 | 2,438 | 2,438 |
| No. of clusters 2 (province of HQ) | 68 | 68 | 68 |

Table A2 in the Supplementary Material, we show that firms with higher weighted classifications are much less likely to receive new loans over the subsequent 12 months.

We also regress an indicator for having a loan enter judicial status in the subsequent 2 years on an (instrumented) indicator for initiating borrowing in a new province and the previous controls, and we find a positive and significant

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effect (coefficient = 0.28 and $t$-statistic = 2.81), as shown in column 2 of Panel A in Table 9. We provide some context on the magnitude of this effect in Table A2 in the Supplementary Material we show that judicial status ranges from 0.06 in the year with the highest GDP growth to 0.15 in the year with the lowest GDP growth and that firms in judicial status are substantially less likely to receive new loans.

We have shown that initiating banking in a new province leads to a higher probability of delinquency; this effect may arise from a financing mechanism, such as a hardening of existing lender attitudes and a refusal on their part to supply necessary credit, or from an investment mechanism, such as poorer project choices by the firm. Either of these mechanisms could lead to the firm not making payments on time. Forcing a delinquent loan into judicial status, however, is a decision made by lenders, not by the firm. To provide evidence distinguishing the roles of the financing and investment mechanisms, we consider the impact of initiating banking in a new province on entry into judicial collection, controlling for the change in the average weighted classification of a firm's loans (i.e., the dependent variable from the regression described in column 1 of Panel A in Table 9).

We find, as shown in column 3 of Panel A in Table 9, that initiating borrowing in a new region leads to an increase in the probability of entry into judicial status even when controlling for the change in the weighted classification. We acknowledge that a regression such as this one that includes a dependent outcome as an explanatory variable must be interpreted with caution. Nonetheless, keeping this caveat in mind, we argue that the result provides evidence of the importance of the financing mechanism because it indicates that after the firm initiates borrowing in a new province, lenders' treatment of the firm's delinquent debts is tougher: For a given change in loan delinquency, lenders are more likely to demand judicial collection. Delinquency may be driven by either the investment or financing mechanisms. The higher probability of transition into judicial status, controlling for changes in delinquency, however, clearly displays the importance of the financing mechanism.

Overall, the results on debt classifications and entry into judicial status indicate that when firms initiate borrowing in new provinces for exogenous reasons, they tend to experience worsened performance of their loans. Financial flexibility, which, from a positive perspective, offers access to increased borrowing at cheaper rates in more markets, also comes at the cost of a greater risk of serious default.

### 2. Firms That Currently Borrow in All Their Operating Provinces: Falsification Sample

The previous analysis of the causal impact on firm performance of initiating a banking relationship in a new province requires the validity of the proposed instrument, an indicator for whether the firm experienced a maximum windfall in each of its operating provinces. We contended earlier that, controlling for the maximum shock and the average shock, the instrument should not plausibly be expected to influence firm performance other than through its effect on whether a firm initiates borrowing in a province. To provide more evidence to support this argument, we now turn to a set of firms that currently borrow in all their operating

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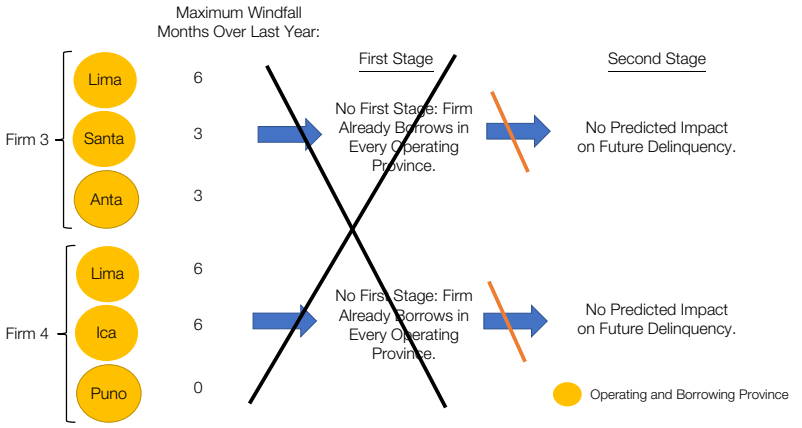
provinces. According to the rules we used to construct our data set, these firms cannot, by definition, expand their lending to a new province. As a result, whether these firms experienced a maximum windfall in the past year in all their operating provinces will have no impact on their set of borrowing provinces.

We use this sample of firms to design a falsification test, as illustrated in Figure 3. Firms 3 and 4 in this figure operate in the same provinces as Firms 1 and 2, respectively, from Figure 2. Firms 3 and 4, however, already borrow in each of their operating provinces, so mining windfall shocks to their operating provinces cannot lead to the initiation of borrowing in new provinces. As a result, there can be no first stage for these firms. We consider, however, whether there are any differences in delinquency outcomes for Firms 3 and 4. Evidence of differential outcomes for these two firms would indicate that the pattern of maximal windfalls across provinces does have a direct effect on delinquency independent of its impact on initiating borrowing in a new province; that is, it would suggest that the exclusion restriction does not hold. Such a result would undermine the causal interpretation of our 2-stage design, and in that manner, this specification serves as a falsification test.

For the sample of firms that already borrow in all their operating provinces, we regress our measures of firm performance on an indicator for whether they experienced a maximum windfall in all provinces, the maximum windfall across provinces, the average windfall, and firm and time fixed effects. That is, we conduct reduced-form regressions of the 2SLS specifications we described in Section IV.G.1. The results, at leads of 2 years for both changes in firm classifications and entry into judicial status, are described in Panel B of Table 9. We find no significant effect of the indicator for experiencing a maximal windfall in every province. This supports the argument that experiencing a maximal windfall in each province

FIGURE 3
The Falsification Sample

Figure 3 outlines the strategy we use in our falsification sample tests described in Section IV.G.2. Firms that already borrow in all their operating provinces will not initiate borrowing in a new province irrespective of the pattern of windfalls they experience, so there can be no first stage. There is therefore no predicted impact on delinquency in the second stage.




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has an effect on firm performance only through its influence on the banking relationships of a firm.

## H. Flexibility and Damaged Relationships: The Financing Mechanism

The results in Table 9 present the costs of pursuing flexibility: Although borrowing in multiple markets allows firms to exploit local financing supply shocks, it also leads to worse performance over the subsequent 2 years. In this section, we explore the mechanisms of this decline in performance.

One potential mechanism is the financing mechanism described previously. Firms that initiate borrowing in new regions may neglect their existing relationships. This neglect may harm the firm's ability to manage its debt because new potential lenders will know less about a firm than its prior banks (Sharpe (1990), Petersen and Rajan (1995), and Dell'Ariccia (2001)). Information considerations may therefore restrict a firm's ability to borrow when it is dealing with lenders with which it does not have a prior relationship (Petersen and Rajan (1994), Berger and Udell (1995)). Bharath et al. (2011) find that banking relationships lead to less expensive financing, particularly for borrowers subject to more severe informational asymmetries, and facilitate the provision of larger loans.

We first consider the impact of initiating borrowing in a new province on the connection between a firm and its largest lender. Using the same 2SLS specification as in Table 9, we regress an indicator for whether a firm's current largest lender (in terms of aggregate loan size) extends a new loan to the firm in the subsequent 2 years on an (instrumented) indicator for whether the firm initiates borrowing in a new province and the previous controls. We find, as displayed in column 1 of Panel A in Table 10, a strong negative effect (coefficient = −0.73 and $t$-statistic = −4.25). Initiating borrowing in a new province significantly reduces a firm's likelihood of subsequently borrowing from its initial largest lender.

Firms may be expected to have close relationships with their largest lenders. As a result, a firm's largest lender is a potential source of emergency funding necessary to refinance seriously delinquent loans extended by other creditors. It may be argued, therefore, that firms that initiate borrowing in new provinces, and perhaps degrade their relationships with their largest lenders, may find it more difficult to access the financing required to save dangerously underperforming loans. A damaged relationship with its largest lender arising from a firm's pursuit of geographic financial flexibility may therefore lead to the more severe delinquency described in Table 9.

Borrowing in new markets can have an impact on a firm's relationships with other existing lenders as well. We regress an indicator for whether any of the firm's initial creditors extend a new loan in the subsequent 2 years on an (instrumented) indicator for whether the firm initiates borrowing in a new province and the standard controls. We find, as displayed in column 2 of Panel A in Table 10, a negative and significant effect (coefficient = −0.30 and $t$-statistic = −3.42). Overall, borrowing in new areas leads to a reduced probability of subsequent financing from existing lenders, and the effect on the largest lender is especially strong.

It may be argued that perhaps the new financing in a previously unexploited province simply substitutes for lending from existing creditors for a certain period

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TABLE 10
Mechanism and Falsification Tests

The observations in Table 10 are at the firm-month level for firms operating in multiple provinces. Panel A focuses exclusively on the sample of firms with at least one operating province that had no borrowing. Panel B focuses exclusively on the sample of firms that had borrowing in all their operating provinces. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Multi-Province Firms That Have Some Provinces with No Borrowing*

| | Dependent Variables (Second Stage) | | | |
|---|---|---|---|---|
| Variables | Main Initial Bank Extends New Loan over Next 24 Months | Any Initial Bank Extends New Loan over Next 24 Months | Main Initial Bank Ends Relationship over Next 24 Months | Log 1 + Number of Terminated Initial Relationships over Next 24 Months |
| | 1 | 2 | 3 | 4 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | −0.727*** | −0.303*** | 0.868*** | 0.733*** |
| | (−4.25) | (−3.42) | (3.13) | (3.44) |
| Control variables | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes |
| $R^2$ | 0.56 | 0.58 | 0.66 | 0.58 |
| Sample size | 541,122 | 627,738 | 906,775 | 966,210 |
| No. of clusters 1 (firm) | 14,396 | 15,522 | 18,838 | 20,225 |
| No. of clusters 2 (province of HQ) | 79 | 82 | 84 | 84 |

*Panel B. Multi-Province Firms with Borrowing in All Operating Provinces*

| | Dependent Variables | | | |
|---|---|---|---|---|
| Variables | Main Initial Bank Extends New Loan over Next 24 Months | Any Initial Bank Extends New Loan over Next 24 Months | Main Initial Bank Ends Relationship over Next 24 Months | Log 1 + Number of Terminated Initial Relationships over Next 24 Months |
| | 5 | 6 | 7 | 8 |
| ALL_OPER_PROV_MAX_LAST_12M | −0.012 | 0.002 | −0.004 | 0.020 |
| | (−0.89) | (0.20) | (−0.24) | (0.96) |
| Control variables | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes |
| $R^2$ | 0.54 | 0.57 | 0.74 | 0.72 |
| Sample size | 67,828 | 81,353 | 115,307 | 119,553 |
| No. of clusters 1 (firm) | 2,485 | 2,725 | 3,483 | 3,576 |
| No. of clusters 2 (province of HQ) | 69 | 72 | 74 | 75 |

of time. In other words, perhaps the firm does not need new loans from its existing creditors for a couple of years because it is now acquiring financing in a new market. We show, however, in column 3 of Panel A in Table 10, that the causal impact of initiating borrowing in a new province is to increase the probability (coefficient = 0.87 and *t*-statistic = 3.13) that the firm experiences a permanent termination of its relationship with its initial largest lender (i.e., the firm never borrows again from its initial largest lender during our sample period). In fact, as shown in column 4 of Panel A, initiating borrowing in a new province leads to a significant increase (coefficient = 0.73 and *t*-statistic = 3.44) in the log of 1 plus the number of terminations in relationships with all initial lenders. Borrowing in a new province does not lead merely to a temporary disruption in a firm's relationships with its existing lenders: It leads to permanent relationship dissolutions.

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These results in support of the financing mechanism fit well with those described in earlier sections. In Table 6, we show that higher windfalls in other regions lead to less borrowing in the focal province, with the effect concentrated on existing borrowing relationships. In Table 8, we show that maximum windfalls realized across all of a firm's operating provinces (and, in particular, realized in operating provinces without any current financing) make it more likely that a firm will initiate borrowing in a new province. Taken together, the results in Tables 6 and 8 suggest that high windfalls in current nonborrowing provinces are associated with both diminished borrowing from existing lenders and increased borrowing in new areas. The results in Table 10 establish that the initiation of borrowing in new provinces leads to relationship termination with previous borrowers, not merely a reduction in the provision of financing.

Even though lenders in a new province may supply financing that had previously been provided by existing creditors, the delinquency and default results in Panel A of Table 9 make clear that a firm that borrows in new areas does experience worse outcomes. Damaged relationships with a firm's current set of lenders cannot easily be replaced because of the information considerations discussed previously.

We are not arguing that borrowing in thriving, previously untapped markets is an error. Firms, in general, do receive more credit in these markets, and average interest rates are lower. It is useful for firms to be able to borrow in prospering areas. Some firms experience the good fortune of having already initiated borrowing in markets that later experience positive windfalls. These firms are able to borrow in successful markets without expanding the geographic scope of their financing. Other firms are less fortunate and can only receive loans in flourishing markets by initiating borrowing in new areas. We find that for this latter group of firms, exercising flexibility by seeking credit in unexploited regions does have offsetting costs; it results in erosion of the firms' current set of banking relationships, which leads to increased risk of severe financial distress.

In order to further examine the plausibility of the financing mechanism, we consider the same set of future lending outcomes for the sample of firms that currently borrow in all their operating provinces (the sample used for the falsification tests in Section IV.G.2). If the initiation of new relationships leads to deterioration in future lending outcomes, then these effects should not be observed for this sample. In Panel B of Table 10, we display results from the reduced form of our 2SLS specification showing that is indeed true: For firms that currently borrow in all their operating provinces, achieving a maximum windfall in each of these provinces has no impact on future lending or relationship terminations with their current roster of lenders.

## I. Alternative Mechanisms

We have interpreted the results in Tables 9 and 10 to show that initiating borrowing in a new province damages existing banking relationships and leads to financial distress through this financing mechanism. In this section, we consider some alternative mechanisms that might explain the connection between experiencing mining windfalls in all operating provinces and subsequent distress.

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One possibility is that firms that experience windfalls in all their operating provinces come to borrow from a different set of lenders than firms that do not. For example, it may be that the former set of firms borrows from banks with exposure to mining areas. Perhaps subsequent mining busts then lead these lenders to contract their supply of financing, thereby causing harm to their borrowers.

We examine this mechanism by replicating the tests in Panel A of both Tables 9 and 10 while including an additional level of fixed effects: an indicator identifying the full set of lenders from which a firm borrows over the subsequent 24 months. By including these fixed effects, we are essentially comparing two firms that borrowed from precisely the same group of lenders over the next 2 years, one of which previously experienced windfalls in all of its operating provinces and one of which did not. Given that these firms borrowed from the same lenders, any differences in subsequent outcomes cannot be attributed to different characteristics of their lenders.

The results are displayed in Panel A of Table 11. We find that in the presence of future-lender fixed effects, our instrumented measure of initiating borrowing in a new province continues to be associated with a worsening debt classification, a higher probability of entry into judicial status, and a disruption of existing borrowing relationships with the firm's main initial bank and all initial banks (the one exception is an insignificant impact on the termination of existing relationships with initial banks). Overall, the evidence is clear that even controlling for the composition of a firm's future lenders, initiating borrowing in a new province leads to worse subsequent delinquent measures.

A second possibility is that future delinquency is driven by the pattern of mining windfalls in a manner that is unrelated to the initiation of borrowing in a new province. In Panel B of Table 11, we display results from including fixed effects for the quartiles of both the average windfall and the standard deviation of the windfall experienced by a firm in the last 12 months. All the results in Tables 9 and 10 continue to hold in this specification, suggesting that it is specifically the experience of having a windfall in each operating province and thereafter initiating borrowing in a new province that leads to future delinquency, not a factor arising from the general pattern of windfalls.

The instrument and falsification tests depicted in Table 9 provide clear evidence in support of the argument that the key effect driving default is the initiation of borrowing in a province. Might it be the case, however, that there are other differences between firms that borrow in all their operating provinces and those that do not? In Panel A of Table 12, we show that firms that have some operating provinces without borrowing have significantly more total firm debt than firms that borrow in all their operating provinces. Perhaps this difference may drive the differential responses of the two samples of firms to receiving maximum windfalls in all their provinces. We address this concern by dropping from consideration the largest-loan-balance firms that have some provinces with no borrowing in order to create a sample that has the same mean loan balance as the sample of firms that borrow in all their operating provinces. As shown in Panel B of Table 12, we replicate the results in Panel A of Table 9 for this sample of firms with lower loan balances in specifications in which we both include (columns 1 and 2) and exclude (columns 3 and 4) fixed effects for the level of firm debt rounded to the nearest

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TABLE 11

Outcomes and Mechanism Controlling for Lender Combinations and Prior Shocks

The observations in Table 11 are at the firm-month level for all firms operating in multiple provinces that had at least one operating province that had no borrowing. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Including Set of Lenders over the Next 24 Months Fixed Effects*

| | Dependent Variables (Second Stage) | | | | | |
|---|---|---|---|---|---|---|
| Variables | Change in Weighted Classification over Next 24 Months<br>1 | Enters Judicial over Next 24 Months<br>2 | Main Initial Bank Extends New Loan over Next 24 Months<br>3 | Any Initial Bank Extends New Loan over Next 24 Months<br>4 | Main Initial Bank Ends Relationship over Next 24 Months<br>5 | Log 1 + Number of Terminated Initial Relationships over Next 24 Months<br>6 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 1.453***<br>(4.66) | 0.267**<br>(2.13) | −0.969*<br>(−1.93) | −0.372**<br>(−2.06) | 0.824**<br>(1.97) | 0.394<br>(1.10) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Set of lenders over next 24 months fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.53 | 0.71 | 0.63 | 0.68 | 0.74 | 0.74 |
| Sample size | 477,187 | 432,924 | 539,747 | 626,326 | 905,264 | 964,701 |
| No. of clusters 1 (firm) | 12,542 | 12,034 | 14,385 | 15,513 | 18,832 | 20,219 |
| No. of clusters 2 (province of HQ) | 72 | 72 | 79 | 82 | 84 | 84 |

*Panel B. Including Mean Shock Quartile and Standard Deviation Shock Quartile over the Last 12 Months Fixed Effects*

| | Dependent Variables (Second Stage) | | | | | |
|---|---|---|---|---|---|---|
| Variables | Change in Weighted Classification over Next 24 months<br>7 | Enters Judicial over Next 24 months<br>8 | Main Initial Bank Extends New Loan over Next 24 months<br>9 | Any Initial Bank Extends New Loan over Next 24 months<br>10 | Main Initial Bank Ends Relationship over Next 24 months<br>11 | Log 1 + Number of Terminated Initial Relationships over next 24 months<br>12 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 1.392***<br>(5.78) | 0.280**<br>(2.69) | −0.595***<br>(−4.19) | −0.221**<br>(−2.48) | 0.875***<br>(6.27) | 0.612***<br>(5.04) |
| Control variables | No | No | No | No | No | No |
| Average shock quartile over the last 12 months fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Std. dev. shock quartile over the last 12 months fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.41 | 0.60 | 0.54 | 0.54 | 0.65 | 0.57 |
| Sample size | 478,915 | 434,479 | 577,451 | 797,234 | 964,476 | 1,221,138 |
| No. of clusters 1 (firm) | 12,564 | 12,058 | 15,630 | 16,578 | 20,478 | 21,521 |
| No. of clusters 2 (province of HQ) | 72 | 72 | 80 | 82 | 84 | 85 |

million soles. These findings indicate that even when adjusting for a firm's debt level, we continue to find that experiencing a maximal windfall in each province leads to future delinquency.

As a final test of alternative mechanisms, we create matched samples of firms that borrow in all their operating provinces and those that do not. For every firm X that borrows in all of its operating provinces, we identify the group of firms that share precisely the same operating provinces but that do not borrow in one of those provinces, and we select as a match the firm from this group that has a debt level that is closest to that of firm X and that has future delinquency data available. If there is no matching firm, then we exclude firm X from the sample. We then rerun the tests of Table 9 on these two matched samples. The firms in these two samples are thus matched precisely in their set of operating provinces and have

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TABLE 12

## Addressing the Firm Debt-Size Difference between Testing Sample and Falsification Sample

The observations in Table 12 are at the firm-month level for all firms operating in multiple provinces. The models reported in columns 1–6 use samples based on firms with at least one operating province that had no borrowing. The models reported in columns 7 and 8 use samples based on firms that had borrowing in all their operating provinces. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Firm Debt-Size Comparison*

| | Mean for Sample | | |
|---|---|---|---|
| Variable | Some Provinces with No Borrowing | Borrowing in All Provinces | *t*-Statistic of Difference |
| DEBT | 4,690,916 | 1,353,253 | 34.05 |

*Panel B. Firm Debt Fixed Effects and Mean-Size-Matched Set of Firms*

| | Dependent Variables (Second Stage) | | | |
|---|---|---|---|---|
| | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months |
| Variables | 1 | 2 | 3 | 4 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 1.437*** (6.30) | 0.272** (2.74) | 1.361*** (5.91) | 0.274** (2.54) |
| Control variables | Yes | Yes | Yes | Yes |
| Firm debt in rounded millions fixed effects | Yes | Yes | No | No |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes |
| $R^2$ | 0.42 | 0.60 | 0.42 | 0.60 |
| Sample size | 478,307 | 433,890 | 462,332 | 418,825 |
| No. of clusters 1 (firm) | 12,554 | 12,047 | 12,511 | 12,002 |
| No. of clusters 2 (province of HQ) | 72 | 72 | 72 | 72 |

*Panel C. Operating-Province-Size-Matched Set of Firms*

| | Dependent Variables (Second Stage) | | Dependent Variables | |
|---|---|---|---|---|
| | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months | Change in Weighted Classification over Next 24 Months | Enters Judicial Status over Next 24 Months |
| | Sample | | | |
| | Firm-Size-Matched Firms with Some Provinces with No Borrowing | | Firm-Size-Matched Firms Borrowing in All Provinces | |
| Variables | 5 | 6 | 7 | 8 |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 1.052*** (8.13) | 0.062*** (3.35) | | |
| ALL_OPER_PROV_MAX_LAST_12M | | | −0.018 (−0.46) | 0.007 (1.59) |
| Control variables | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Province of HQ × year-month fixed effects | Yes | Yes | Yes | Yes |
| $R^2$ | 0.58 | 0.70 | 0.57 | 0.67 |
| Sample size | 72,911 | 65,251 | 73,187 | 69,450 |
| No. of clusters 1 (firm) | 4,800 | 4,499 | 2,467 | 2,397 |
| No. of clusters 2 (province of HQ) | 55 | 55 | 68 | 68 |

similar debt levels. In effect, they are analogous to the firms in Figures 2 and 3, in which Firms 1 and 3 and Firms 2 and 4 operate in exactly the same provinces.

Under the investment mechanism, the pattern of windfalls across provinces may lead a firm to make investment choices that lead to bad outcomes. For example, firms may borrow in boom areas, invest in those areas, and then suffer in

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subsequent busts.[6] In this matched-sample test, we are considering firms subject to identical patterns of mining windfalls, some of which can initiate borrowing in new provinces (the instrument sample) and some of which cannot (the falsification sample). We show in Panel C of Table 12 that experiencing a maximum windfall in each province leads to worse delinquency outcomes for firms in the instrument sample that do not currently borrow in all their operating provinces (and that can therefore initiate borrowing in a new province). Initiating borrowing in a new province leads to a 6.2% increase in the probability of entering judicial status, which is similar in magnitude to the 9% difference between the average rates of judicial status in the years with the lowest and highest GDP growth over 2001–2012. A maximum windfall in each province, however, has no impact on firms in the falsification sample that do currently borrow in all their operating provinces. These two contrasting sets of findings indicate that our main results are not likely driven by the effects of windfall patterns on investments because we are considering two groups of firms that experience the same windfalls. Only the firms that initiate borrowing in a new area (i.e., the firms subject to the financing mechanism) exhibit negative future delinquency outcomes.

## J. Asset Tangibility and Age

The results in Tables 9 and 10 establish a link between disrupted banking relationships and future firm financial distress. Replacing ruptured relationships with connections to new lenders may be difficult due to information asymmetries. These informational issues are likely to be the most severe for firms with few tangible assets (Harris and Raviv (1991), Bester (1985)) and for young firms (Petersen and Rajan (1994), Berger and Udell (1995), and Kysucky and Norden (2015)).

We test whether asymmetric-information considerations help to drive our results by conducting two sets of split-sample tests. In the first set of tests, we make use of data from the 2007 economic census to split firms into high- and low-asset-tangibility samples by comparing their assets-to-sales ratios to the sample median. In Panel A of Table 13, we show the results from running the tests in Panel A of Tables 9 and 10 separately in the two samples. We find generally stronger results in the low-tangibility sample: The coefficients are significant and match the expected sign in four of the tests compared to two for the high-tangibility sample; the coefficients are also larger in magnitude in the low-tangibility sample.

In the second set of tests, we split the sample into new and old firms, where age is measured by the number of years that the firm has participated in the formal financial system, and the median is used as the dividing point. As shown in Panel B of Table 13, we find significant results of the expected sign in four of the tests for the sample of new firms, in contrast to no significant results in the sample of old firms. Overall, we find evidence that the disruption of existing banking relationships is more severe and has a more serious impact on future delinquency for firms with relatively low asset tangibility and for young firms.

Taken together, the results in Table 13 support the argument that the mechanism linking broken lending relationships to subsequent financial difficulties is

[6] We thank the referee for this point.

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TABLE 13
Outcomes and Mechanisms by Asset Tangibility and Age

The observations in Table 13 are at the firm-month level for firms operating in multiple provinces with at least one operating province that had no borrowing. Panel A restricts the sample to those firms that were found in the Dec. 2007 census and splits the sample into high and low tangibility using the 2007 values of assets over sales. ENT_JUD is an indicator for a firm's entering judicial status in the subsequent 24 months. MAIN_NEW is an indicator for whether the firm receives a new loan in the subsequent 24 months from its main initial lender. ANY_NEW is an indicator for whether the firm receives a new loan in the subsequent 24 months from any initial lender. MAIN_END is an indicator for whether the firm terminates its relationship with its main initial lender over the subsequent 24 months. TERM_REL is the log of 1 plus the number of initial relationships the firm terminates over the subsequent 24 months. Panel B uses all observations comparing old and new firms using age in the financial system. *t*-statistics based on standard errors double-clustered by firm and by province of headquarters (HQ) are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Variables | CHG_WGT_CLASS | ENT_JUD | MAIN_NEW | ANY_NEW | MAIN_END | TERM_REL |
|---|---|---|---|---|---|---|
| *Panel A. High versus Low Tangibility Measured as 2007 Ratio of Assets over Sales* | | | | | | |
| *High Tangibility* | | | | | | |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 0.076 | 0.255** | −0.690* | −0.216 | 0.158 | −0.774* |
| | (0.17) | (2.44) | (−1.77) | (−1.11) | (0.35) | (−1.79) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.31 | 0.46 | 0.42 | 0.44 | 0.67 | 0.59 |
| Sample size | 177,367 | 173,398 | 188,644 | 215,744 | 273,229 | 285,428 |
| No. of clusters 1 (firm) | 3,050 | 3,032 | 3,347 | 3,472 | 3,637 | 3,740 |
| No. of clusters 2 (province HQ) | 49 | 48 | 59 | 59 | 60 | 60 |
| *Low Tangibility* | | | | | | |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 3.387** | 0.295* | −1.064** | −0.821** | 2.204 | 2.678 |
| | (2.10) | (1.73) | (−2.38) | (−2.24) | (1.16) | (1.57) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.44 | 0.56 | 0.44 | 0.46 | 0.72 | 0.63 |
| Sample size | 110,729 | 109,061 | 126,841 | 145,977 | 200,261 | 211,890 |
| No. of clusters 1 (firm) | 2,715 | 2,705 | 3,178 | 3,337 | 3,562 | 3,693 |
| No. of clusters 2 (province HQ) | 57 | 57 | 63 | 64 | 65 | 66 |
| *Panel B. Old versus New Firm-Month Observations Based on Age in the Financial System* | | | | | | |
| *Old* | | | | | | |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | −6.202 | −1.181 | 8.555 | 4.149 | −1.752 | 5.994 |
| | (−0.66) | (−0.91) | (0.91) | (1.07) | (−0.92) | (1.21) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.47 | 0.66 | 0.66 | 0.72 | 0.76 | 0.65 |
| Sample size | 200,215 | 179,301 | 231,753 | 261,331 | 438,391 | 459,368 |
| No. of clusters 1 (firm) | 6,093 | 5,600 | 7,206 | 7,592 | 10,684 | 11,160 |
| No. of clusters 2 (province HQ) | 60 | 59 | 72 | 73 | 77 | 78 |
| *New* | | | | | | |
| INIT_BORROWING_NEW_PROV_NEXT_12M (instr.) | 0.375* | 0.073** | −0.072 | 0.021 | 0.500** | 0.493*** |
| | (1.77) | (2.09) | (−0.92) | (0.28) | (2.12) | (3.94) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Province HQ × year-month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.53 | 0.72 | 0.64 | 0.65 | 0.67 | 0.64 |
| Sample size | 277,049 | 253,572 | 308,211 | 365,315 | 466,906 | 505,336 |
| No. of clusters 1 (firm) | 11,534 | 11,063 | 13,467 | 14,696 | 17,585 | 19,121 |
| No. of clusters 2 (province HQ) | 66 | 66 | 77 | 79 | 81 | 81 |

mediated through the effects of asymmetric information. Firms for which information considerations are salient suffer the greatest costs when they expand their financial flexibility by borrowing in new areas and, by doing so, weaken their connections to their existing lenders.

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## V. Conclusion

We examine a group of firms operating in multiple locations in Peru and document that approximately one-quarter of them borrow from banks in different provinces. For these multiple-province borrowers, only about half of their borrowing occurs in the province where their headquarters is located. We use variation in commodities prices to estimate the extent of local mining windfalls in different provinces, and we show that these windfalls generate finance supply shocks resulting in the provision of more credit at lower average interest rates. We demonstrate that multi-province firms exploit a geographic real option in financing by concentrating their borrowing in prospering areas. We find that firms are less likely to expand their borrowing into new provinces when their current borrowing provinces are enjoying positive windfalls. We also show that increased geographic financial flexibility comes at the cost to firms of degrading their existing borrowing relationships. As a result, firms that begin to borrow in new areas face a heightened risk of financial distress.

Our results highlight both the promise and risks of the pursuit by firms of flexible access to credit in multiple markets. Financial flexibility is multifaceted, and firm policies that increase the set of potential borrowing options today may jeopardize future access to credit in the face of darkening prospects.

## Supplementary Material

Supplementary Material for this article is available at https://doi.org/10.1017/S0022109020000010.

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