Contents

1 Abstract

This study investigates the impact of exporting to an additional country on a firm's capital structure, with a specific focus on Russian firms. The study explores Russian firms' annual performance and trade transaction data. To establish a causal relationship, the analysis employs tariff changes in foreign countries as an exogenous source of variation. By exploring how firms adjust their financing decisions in response to export market diversification, this work contributes to the literature on international trade and corporate finance, providing insights into the financial implications of global market access.

2 Introduction

The purpose of this study is to examine how market diversification through the entry into new export markets influences the creditworthiness of firms, with a particular emphasis on Russian companies. Due to the absence of publicly accessible credit repayment data for Russian firms, this study assesses creditworthiness indirectly by investigating how export expansion, defined as an increase in the number of foreign markets served by a firm, impacts corporate leverage, which is the ratio of total debt to total assets. In economic literature, leverage is widely utilized as a proxy for a firm's capacity to service debt obligations. For instance, Beaver (1966), in his seminal work, demonstrated the predictive power of financial leverage concerning corporate bankruptcy probability.

This study leverages tariff changes as an exogenous source of variation to control for the demand-side factors affecting corporate capital structure, thereby providing a credible estimate of how lenders evaluate firms' creditworthiness. It is hypothesized that through diversification across multiple markets, firms can hedge against idiosyncratic market risks, thus enhancing their overall creditworthiness. Consequently, our central hypothesis is that firms entering additional markets experience reduced risks, thereby enabling increased leverage.

To clarify our hypothesis further, it is essential to discuss potential risks associated with entering new markets. Firstly, each market possesses idiosyncratic risks, including fluctuations in consumer demand, domestic inflation, political instability, as well as unique cultural and social factors. Secondly, firms face operational risks, primarily associated with the logistics of shipment. These operational risks can be categorized as external, related to international operations, and internal, connected with domestic activities such as shipment to customs or interaction with local trading agents. Thirdly, firms encounter exchange rate volatility risks. The diversification hypothesis suggests that exporting firms can mitigate these risks, leading to a reduction in cash flow volatility, which, according to Dudley and James (2015), can increase a firm's leverage, reflecting an improved assessment of creditworthiness by lenders.

Our research contributes to the existing literature in two significant ways. Primarily, it bridges the fields of international trade and corporate finance by continuing the line of inquiry initiated by Titman and Wessels (1988) and Harris and Raviv (1991), who explored how operational factors influence corporate capital structure. Researchers generally agree (Frank and Goyal, 2009) that reduced cash flow volatility is a principal driver of increased leverage because more stable cash flows decrease the risk of financial distress, thereby making debt financing more economically justified and attractive.

Secondly, this study enriches the understanding of the relationship between export activities and corporate debt. Prior research has typically examined this relationship from the perspective of financial constraints faced by exporters. For example, Kletzer and Bardhan (1987) argued that firms initiating export activities encounter credit market imperfections when securing financing for new market entry. This subject gained increased scholarly attention following the 2008 global financial crisis. Manova (2008) highlighted that in economies with restricted access to equity markets, firms experience diminished export performance. Feenstra et al. (2014) expanded this analysis at the firm level in China, demonstrating that financial institutions impose stricter repayment plans on exporters due to additional risks associated with shipments and currency exchanges, thereby preventing firms from achieving optimal revenue outcomes. This area of research is commonly referred to as the credit constraints literature.

Our study extends this research by posing a complementary question—not merely whether a firm exports, but how extensively it diversifies its exports across multiple markets, and whether this diversification improves its creditworthiness. Closely related paper written by Kuzmina and Volchkova (2021) found that export activity positively impacts firms' access to credit. We build upon this insight by focusing explicitly on market-level diversification as a risk mitigation mechanism enhancing financial stability.

This topic carries significant academic and practical relevance. From a policy and institutional perspective, our findings can inform financial institutions and credit evaluators, particularly in emerging markets, regarding firms' credit risk assessments. Understanding the impact of export market diversifica-

tion on leverage can also benefit firms themselves, especially those contemplating international expansion as a strategy to hedge against idiosyncratic market risks and improve financial flexibility.

Furthermore, this research is timely and particularly pertinent given the evolving landscape of global trade and finance, influenced by recent geopolitical tensions and supply-chain disruptions. The results could provide valuable insights into how diversification might serve as a buffer against external economic shocks, highlighting the strategic importance of market diversification in corporate financial decision-making.

3 Data Description

To conduct this study, we draw upon multiple data sources spanning the period from 2005 through 2009 inclusive. Observations from 2010 onward are excluded, since, following Russia's accession to the Customs Union with Belarus and Kazakhstan, a large share of Russian exports—particularly those destined for the European Union—are rerouted through Belarusian customs, for which data are not publicly available.

Firm-level annual performance is measured using financial statements obtained from the SPARK corporate database and employment figures sourced from the Ruslana database. Each firm in the performance dataset is identified by its Taxpayer Identification Number (INN). From SPARK we also extract each firm's primary industry classification (OKVED), information that we later employ to construct instrumental variables. SPARK provides two types of financial statements: CUR (current) and NXT (revised). Our principal analysis relies on the current (CUR) statements, while the revised (NXT) statements, which owe to their smaller representation in the sample, are reserved for robustness checks.

Export activity data are derived from customs declarations that record transactional details of cross-border shipments. From these declarations we capture the filer's INN, the declaration date, the ten-digit Harmonized System product code (HS10), the destination country code, and the statistical value of the exported goods. We aggregate these data at the level of (INN, year) to compute the number of distinct trade partners, which are destination countries, served by each firm in a given year.

Tariff information is obtained from the World Integrated Trade Solution (WITS) database. These data comprise the Most Favored Nation (MFN) ad valorem tariff rates imposed by each foreign country on goods grouped by six-digit HS code (HS6) for each year.

The assembled dataset forms an unbalanced panel of 945,773 firm–year observations. To focus on bona fide enterprises and to exclude very small or atypical entities, we omit firms reporting fewer than five employees. We address outliers by trimming the bottom and top 1 percent of the distributions for raw

financial indicators used to calculate leverage and other control variables. Firms reporting non-positive total assets or leverage ratios outside the [0, 1] interval are also removed.

All data processing steps have been implemented in a series of Python scripts, which are orchestrated via the 'Makefile' in the GitHub repository. A schematic representation of the data workflow is presented in Appendix Diagram I.

4 Research Design

To empirically test our hypothesis that firms can improve their leverage by expanding into new export markets, we adopt a panel data regression framework. The baseline specification is as follows:

$$\text{Leverage}_{it} = \alpha_i + \delta_t + \beta \text{Expansion}_{it} + X'_{it}\gamma + \epsilon_{it}$$

where Leverage_{it} denotes the debt-to-assets ratio for firm i in year t, α_i are firm fixed effects, δ_t are time fixed effects, X'_{it} is a vector of control variables, and Expansion_{it} is a dummy variable equal to 1 if the firm increased the number of export destinations compared to the previous year.

We chose this specification not as an attempt to measure the overall level of diversification, but rather because it best isolates the moment of expansion as a relevant economic event. By focusing on discrete changes in market access, we are able to assess the marginal effects of diversification decisions on leverage outcomes. This approach aligns with our interest in measuring the effect of market diversification on firms' leverage outcomes.

Firm fixed effects control for time-invariant characteristics such as geographic location, initial productivity, and managerial quality. Year fixed effects capture macroeconomic shocks, including financial crises, exchange rate fluctuations, and global trade dynamics.

We control for a set of firm-specific factors that have been shown to influence leverage (Frank and Goyal, 2009), beginning with size proxies, we employ the logarithm of total assets and the total number of employees in order to account for scale effects. Profitability serves both as a proxy for productivity and as a key element of the pecking order theory (Myers, 1984), which posits that firms prefer internal financing and adjust capital structure based on retained earnings. Asset tangibility is also included, reflecting the finding that it was found to be one of the main factors of productivity and that intangible firms may scale export operations differently than tangible-intensive ones (Hur, Raj, Riyanto, 2006). Finally, we control for the logarithm of the number of export destinations to capture the direct effect of diversification scale on risk exposure

and leverage decisions.

Despite the inclusion of these controls and the measure of diversification scale, the vanilla design suffers from endogeneity for several reasons. First of all, as Melitz (2003) argues that more productive firms are both more likely to expand into new markets and have greater capacity to optimize their capital structure; profitability, while included as a productivity proxy, does not fully capture true productivity. Second, credit constraints may simultaneously limit both export expansion and leverage, potentially leading to an underestimation of the expansion effect. Third, and most importantly, leverage reflects the interaction of firm-side demand for debt and lender-side supply of credit: firms may make strategically make capital-structure decisions, which confounds causal effect. Moreover, observable controls alone are insufficient to capture all relevant factors. For example, research and development expenditures can influence both the propensity to enter new markets and capital structure levels, underscoring the need for an exogenous source of variation.

To overcome these issues, we employ an instrumental variable (IV) approach based on tariff changes across destination countries. These tariffs are imposed externally and are thus exogenous to individual firm behavior. They affect export behavior by altering the relative attractiveness of foreign markets. Because tariffs influence leverage only through their effect on export opportunities, they allow us to isolate the supply-side credit assessment channel.

This identification strategy enables us to measure lenders' responses to changes in firm-level exposure to international markets, while holding constant endogenous demand for capital. In doing so, we are able to examine the financial evaluation of export diversification, not merely firms' intentions or constraints.

A detailed discussion of the construction of the instrument and the validity assumptions supporting its use follows in the next section.

5 Implementation of Identification Strategy

We employ changes in foreign-country tariffs as an exogenous source of variation, treating them as plausibly independent of any individual Russian firm's financing or export decisions. Tariffs, being set unilaterally by partner governments, lie outside the strategic influence of our sample firms; moreover, they are recognised in the gravity-model literature as one of the principal determinants of bilateral trade flows (Anderson and van Wincoop 2003). Consequently, if tariffs affect a firm's leverage at all, they can do so only through the channel of export propensity, a condition that satisfies the exclusion restriction required for a valid instrument.

A methodological complication arises for firms that do not export in a given year, because for them a country–specific tariff is undefined. To address this issue, we partition firms into industry cells defined at the four-digit OKVED level and construct an industry–year tariff index:

$$Z_{st} = \sum_{jc} w_{sjc} \text{Tariff}_{jct}$$

where s indexes industries, represented by OKVED, j denotes six-digit HS products, and c identifies destination countries. Following Kuzmina and Volchkova (2021), the weights w_{sjc} are derived from base-year (2005) customs declarations: we aggregate the 2005 export value of industry s for product j shipped to country c, normalizing the totals by the formula:

$$w_{sjc} = \frac{\text{TotalExport}_{sjc0}}{\sum_{jc} \text{TotalExport}_{sjc0}} \cdot \text{Tariff}_{jct}$$

Using a single pre-sample year for the construction of weights eliminates the possibility that time-varying, firm-level export choices contaminate the instrument, thereby preserving its exogeneity.

Because the resulting index exhibits relatively modest cross-industry variation, we refine the weighting scheme along the lines of Autor, Dorn and Hanson (2013), premultiplying each weight by the initial breadth of an industry's export

portfolio:

$$\tilde{w}_{sjc} = \text{num\_cty}_{s0} \cdot w_{sjc}$$

where num_cty_{s0} is the number of distinct destination countries served by industry s in 2005. This transformation magnifies between-industry variation, strengthening the first-stage relationship and enhancing statistical power.

The commonality of the instrument within an industry–year cell necessitates a two-way clustering of standard errors by firm identifier and by the "industry × year" dimension. As argued by Abadie, Athey, Imbens and Wooldridge (2017), failure to accommodate such intra-cluster correlation produces underestimated standard errors and overstates statistical significance. Indeed, industry-specific unobservables, such as technological shocks, regulatory changes or shifts in the competitive environment, may influence simultaneously the propensity to expand abroad and the optimal capital structure, rendering cluster-robust inference essential. Furthermore, Hovakimian, Opler and Titman (2001) demonstrate that firms partially adjust leverage toward industry norms, implying correlated residuals within industries over time. Consequently, clustering at the "OKVED × year" level, combined with firm-level clustering, delivers conservative and asymptotically valid inference for both stages of the IV estimation.

6 Discussion

The empirical analysis was conducted using Stata software, specifically employing the 'xtivreg2' and 'ivreghdfe' packages. Our primary results are summarized in Table II, where both Ordinary Least Squares (OLS) and Instrumental Variable Two-Stage Least Squares (IV-2SLS) estimations of the coefficient of interest are presented across several model specifications. To account for potential intra-cluster correlation of residuals, standard errors were two-way clustered by firm identifier and by the interaction between industry classification (OKVED4) and year.

The results obtained are somewhat contradictory, especially when comparing specifications individually incorporating firm fixed effects and time fixed effects versus the specification that simultaneously includes both. Specifically, the coefficient of interest is significantly positive when either firm or time fixed effects are included in isolation. However, when both are introduced concurrently, the coefficient associated with market expansion, although remaining in the same direction, declines in magnitude and loses statistical significance, despite the instrument retaining strength and relevance. Additional robustness checks were conducted using alternative datasets derived from the NXT financial reporting form (see Table V), as well as different model specifications in which export status was used directly as the key explanatory variable (Table III). We also re-estimated the models with a logit transformation of the leverage ratio as an alternative dependent variable specification (Table IV). Across all these specifications, our findings consistently suggest that, if the hypothesized effect exists, it is likely to be weak.

An additional and somewhat unexpected result emerged from the first-stage regressions: the coefficient on the instrument displays a positive sign, contrary to prior expectations. However, this can be rationalized by examining the structure of the instrument itself. The variation generated by tariffs appears relatively limited when compared to the variation stemming from the number of trade partners within an industry. The number of industry-level trade partners has a documented positive effect on a firm's propensity to export, as noted in prior literature (Clerides, Lach, and Tybout, 1998). This is

because a higher number of exporters within an industry reduces the fixed costs associated with entering foreign markets, thereby increasing the likelihood of market participation for individual firms. This mechanism plausibly accounts for the seemingly paradoxical sign observed in the first-stage regression.

There are two main reasons why we may be unable to detect a significant effect in our data. First, the panel is relatively short and highly unbalanced. Although the dataset spans four years, the average panel length after excluding approximately 150,000 singleton observations is only 2.78 years, which is quite limited. This sparsity largely reflects the nature of the SPARK financial reporting database. Second, the instrumental variable itself is highly aggregated. It spans only 474 industry categories, providing limited variation. Moreover, the structure of the instrument necessitates clustering standard errors by industry-year, which further inflates the confidence intervals. Therefore, to more precisely identify the effect, a richer panel and a more granular instrument would be required. It is also worth acknowledging the possibility that, due to the complexity and heterogeneity of the data sources, some degree of data construction error may have occurred, potentially affecting the reliability of the results.

The use of alternative modeling approaches, such as random effects, is problematic in this context. First, we posit the existence of unobserved time-invariant firm characteristics, such as initial productivity, location, and managerial quality that jointly influence both leverage and the propensity to expand into foreign markets. Second, omitting time fixed effects is also not viable, given the presence of macroeconomic shocks and time-varying conditions, such as exchange rate volatility and financial crises, that likely impact both the decision to export and capital structure outcomes. For instance, the exclusion of time fixed effects may lead to an upward bias in the estimated coefficient if low exchange rate volatility simultaneously encourages market entry (Dixit, 1989) and increases leverage.

If one hypothesizes that the diversification effect is nonexistent or negligible, this would imply that idiosyncratic market risk is minor relative to other types of risk. It would also suggest the presence of offsetting dynamics, whereby risk reductions associated with diversification are counterbalanced by increases in operational or foreign exchange risk. Prior literature on credit constraints

(Feenstra et al., 2014) underscores the elevated operational risk faced by exporting firms, which stems from the complexity of international transactions. Rather than reducing cash flow volatility, such complexity may in fact exacerbate it. Furthermore, it is important to recognize that international shipments are not independent events. For example, exporting goods to Germany requires not only domestic logistical coordination and the risks associated with customs procedures in Russia, but also transit through intermediary countries such as Belarus and Poland. The assumption that operational risks are independent is thus overly restrictive and may underestimate the extent to which risk exposure increases with the number of export destinations.

7 Appendix

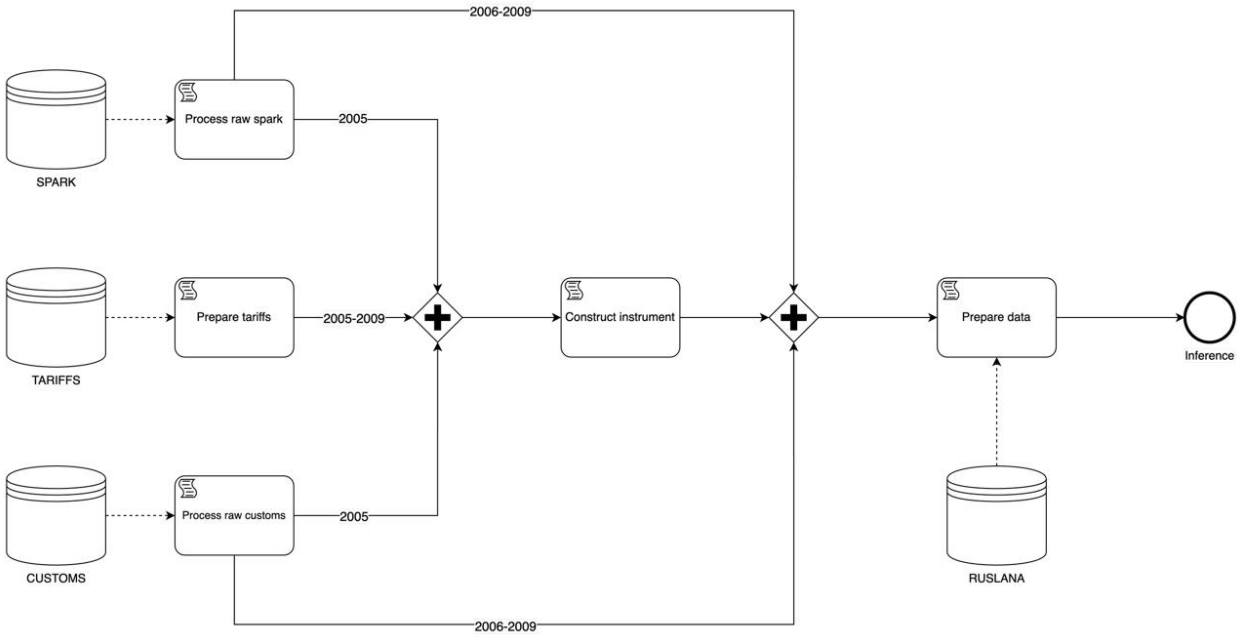

Figure 1: Data Flow Diagram

Notes: Data processing was carried out in several stages. Data from all sources (except Ruslana) were standardized into a common format, each assembled into a single table, and filtered for missing values. In the next stage, data from the Spark, Customs, and Tariffs sources were used to aggregate the 2005 customs data by OKVED4, and the instrument was constructed following the methodology described in Implementation of Identification Strategy. In the final stage, all tables were joined, outliers were filtered, and the final dataset was prepared for analysis.

Table 1: Descriptive Statistics

Variable	Mean	Std. deviation
Firm specific factors:		
Assets (RUB mln)	34.68	86.784
Employment	57.207	122.689
Profitability	0.137	0.613
Tangibility	0.735	0.275
Exporting:		
Instrument	1.433	1.204
Export	0.033	0.178
Expansion	0.014	0.118
Number of countries	0.079	0.657
Leverage:		
Total Leverage	0.131	0.231
Short-term leverage	0.089	0.189
Long-term leverage	0.042	0.142

The final dataset comprises 945,773 observations. For outlier handling, we excluded firms with fewer than 5 employees and trimmed 1% from the left and 1% from the right tails of the distributions for the variables log_assets, short_debt, profitability, and tangibility.

Table 2: Effect of Expansion on Leverage

Variable	OLS	IV2SLS		IV2SLS		IV2SLS		IV2SLS	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Expansion	-0.0013 (0.0018)		4.989*** (0.848)		5.086*** (0.884)		1.133*** (0.377)		0.247 (0.657)
Instrument		0.0029*** (0.0004)		0.0028*** (0.0004)		0.0147*** (0.0029)		0.0093*** (0.0022)	
Log Assets	0.0106*** (0.0017)	0.0027*** (0.0002)	0.0027 (0.0022)	0.0028*** (0.0002)	0.0021 (0.0023)	0.0013*** (0.0003)	0.0061*** (0.0016)	0.0028*** (0.0003)	0.0099*** (0.0025)
Profitability	0.0099*** (0.0008)	0.0019*** (0.0002)	-0.0219*** (0.0021)	0.0019*** (0.0002)	-0.0218*** (0.0021)	0.0011*** (0.0002)	0.0086*** (0.0009)	0.0011*** (0.0002)	0.0096*** (0.0011)
Tangibility	-0.0764*** (0.0039)	0.0058*** (0.0011)	-0.1222*** (0.0115)	0.0062*** (0.0011)	-0.1239*** (0.0119)	-0.0003 (0.0011)	-0.0771*** (0.0041)	0.0001 (0.0011)	-0.0764*** (0.0039)
Employees	-0.00002 (0.00001)	0.00003*** (0.000004)	-0.00025*** (0.00004)	0.00003*** (0.000004)	-0.00025*** (0.00004)	0.00005* (0.00003)	-0.00011* (0.00006)	0.00007* (0.00004)	-0.00004 (0.00005)
Log Countries	-0.0026 (0.0024)	0.1351*** (0.0025)	-0.6556*** (0.1155)	0.1349*** (0.0025)	-0.6683*** (0.1208)	-0.4858*** (0.0116)	0.5489*** (0.1838)	-0.4860*** (0.0116)	0.1181 (0.3193)
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	False	False	True	True	False	False	True	True
Observations	807,730	945,773	945,773	945,773	945,773	807,730	807,730	807,730	807,730

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Expansion" is instrumented in the 1st stage. First-stage columns report coefficients from the regression of expansion on the instrument and controls. OLS does not include a first stage as it does not use instruments.

Table 3: Effect of Expansion on Leverage (Alternative Data)

Variable	OLS	IV2SLS		IV2SLS		IV2SLS		IV2SLS	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Expansion	-0.0003 (0.0021)		3.6338*** (0.8436)		3.6551*** (0.8523))		1.7020 (1.4107)		-1.1691 (1.8246)
Instrument		0.0033*** (0.0006)		0.0032*** (0.0006)		0.0039** (0.0018)		0.0035 (0.0021)	
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	False	False	True	True	False	False	True	True
Observations	451,616	575,375	575,375	575,375	575,375	451,616	451,616	451,616	451,616

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Expansion" instrumented in 1st stage. OLS does not include a first stage as it does not use instruments.

Table 4: Effect of Exporting on Leverage

Variable	OLS	IV2SLS		IV2SLS		IV2SLS		IV2SLS	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Export	0.0007 (0.0018)		4.4068*** (0.7760)		4.4766*** (0.8078)		1.1214*** (0.3726)		0.2616 (0.6919)
Instrument		0.0033*** (0.0005)		0.0032*** (0.0005)		0.0149*** (0.0031)		0.0088*** (0.0023)	
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	False	False	True	True	False	False	True	True
Observations	807,730	945,773	945,773	945,773	945,773	807,730	807,730	807,730	807,730

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Export" is instrumented in 1st stage. OLS does not include a first stage as it does not use instruments.

Table 5: Effect of Expansion on Logit Leverage

Variable	OLS	IV2SLS		IV2SLS		IV2SLS		IV2SLS	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Expansion	-0.0136 (0.0221)		38.009*** (8.288)		39.339*** (8.768)		3.372 (4.105)		1.993 (6.088)
Instrument		0.0033*** (0.0006)		0.0031*** (0.0006)		0.0197*** (0.0053)		0.0139*** (0.0040)	
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	False	False	True	True	False	False	True	True
Observations	324,828	424,968	424,968	424,968	424,968	324,828	324,828	324,828	324,828

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Expansion" instrumented in 1st stage. Leverage was logit-transformed. OLS does not include a first stage as it does not use instruments.

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