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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 817,295 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 performed using Stata software, specifically utilizing the xtivreg2 and ivreghdfe packages. Our primary empirical results are presented in Table II, demonstrating both Ordinary Least Squares (OLS) and Instrumental Variable Two-Stage Least Squares (IV-2SLS) estimates of the coefficient of interest across various model specifications. Standard errors were clustered along two dimensions, firm id and the interaction of industry classification (okved4) with year, due to our assumption of intra-cluster correlation of residuals.

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, when either firm or time fixed effects are introduced separately, the coefficient of interest appears significantly positive. However, when both fixed effects are included concurrently, although the instrumental variable remains robust and strong, the magnitude of the coefficient associated with market expansion substantially diminishes, becoming statistically insignificant. We conducted additional robustness analyses employing alternative data sets drawn from the nxt financial reporting form, as well as alternative model specifications, where the export status itself was employed as the key explanatory variable (see Table III). Furthermore, we utilized the logit transformation of leverage as an alternative dependent variable specification (refer to Table IV). Consistently, results across all these alternative estimations mirrored our main findings. Additionally, a puzzling feature emerges from the first-stage regression, wherein the instrument's coefficient unexpectedly displays a positive sign.

Upon closer inspection of the descriptive statistics, it becomes evident that short-term obligations (short debt) surpass long-term debt by several orders of magnitude. The substantial difference arises due to a technical oversight in the data extraction procedure, whereby instead of specifically capturing short-term borrowings and related obligations, the data set inadvertently included all forms of short-term liabilities to various stakeholders. Such a composition significantly diverges from the initially intended analysis and may par-

tially explain the observed results.

How, then, might we rationalize the empirical patterns observed in our results? If we assume that the overall effect on financial leverage stemming from market diversification is indeed positive, it logically follows that operational liabilities would decrease correspondingly. Such a reduction could plausibly be explained by improved cash flow stability resulting from market diversification, thereby shortening the cash flow conversion cycle, enhancing firms' capability to expedite turnover of operational liabilities. Yet, why then do we observe statistically significant effects exclusively in the presence of firm fixed effects but without corresponding temporal fixed effects? One potential explanation could relate to the economic environment captured by our data, partially encompassing the global financial crisis of 2008. Specifically, the Russian economy experienced substantial effects of this crisis predominantly from 2009 onwards, marking the endpoint of our observation period. Prior to the crisis onset, exchange rate volatility remained relatively low, thus stabilizing exporters' revenue streams and enabling a reduction in the cash flow conversion cycle.

Conversely, if we hypothesize that the diversification effect is nonexistent or minimal, this would imply a counterbalancing effect whereby reductions in certain risks due to diversification are offset by increases in other categories of operational and foreign exchange risks. Indeed, prior research examining credit constraints (e.g., Feenstra et al., 2014) emphasizes the potential escalation of operational risks faced by exporting firms, primarily arising from the complexities inherent to international trade. Such increased complexities might amplify cash flow volatility rather than stabilize it. Moreover, it is critical to recognize that international shipments are not independent events. For instance, exporting goods to Germany necessarily involves domestic logistical operations and associated operational risks, including navigating Russian customs, followed by transit through intermediary countries such as Belarus and Poland. Thus, the assumption of independence regarding operational risks appears quite restrictive and could potentially increase with each additional trading partner incorporated into a firm's international market portfolio.

Additionally, it is worth noting the relatively stronger observed effect of explicit market expansion (Table II) compared to merely the presence of export

activities (Table IV). We hypothesize that this discrepancy arises because the binary indicator of export presence does not fully capture the nuanced dimension of market diversification. Export activity per se does not inherently guarantee extensive geographic market presence. In contrast, our measure of market expansion explicitly accounts for firms entering new markets and increasing the number of countries to which goods are exported, thereby providing a more precise characterization of true market diversification effects.

7 Appendix

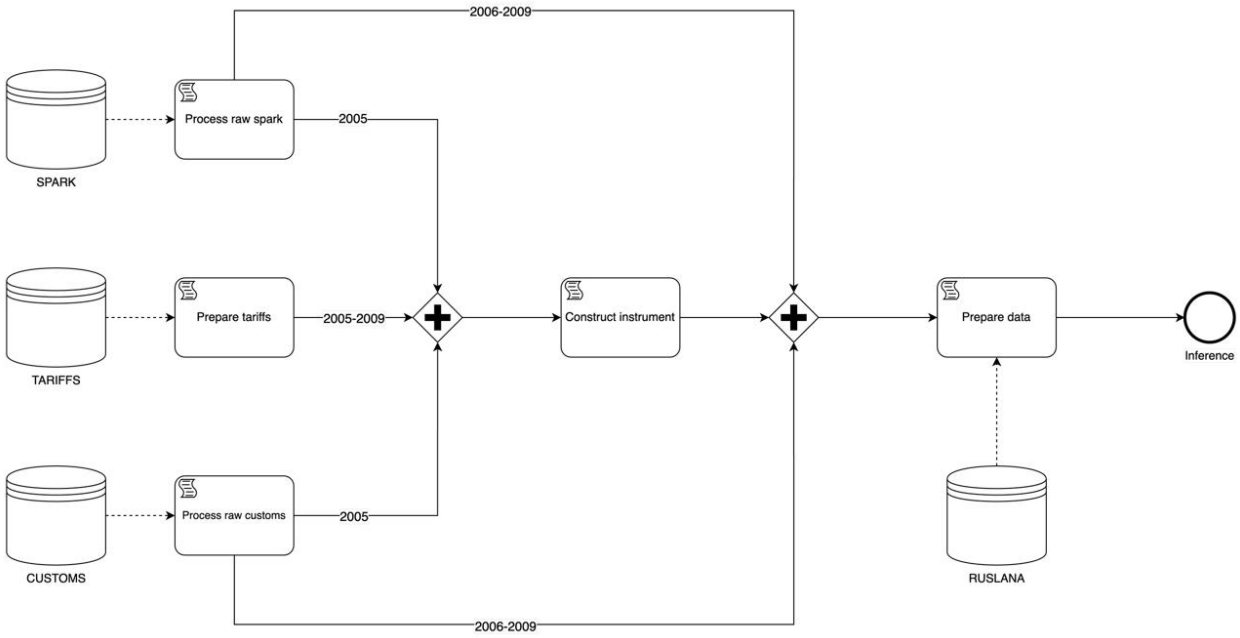

Figure 1: Data Flow Diagram

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)	43.175	109.087
Employment	62.513	136.476
Profitability	0.152	0.561
Tangibility	0.729	0.277
Exporting:		
Instrument	1.431	1.201
Export	0.035	0.183
Expansion	0.015	0.122
Number of countries	0.090	0.741
Leverage:		
Total Leverage	0.583	0.321
Short-term leverage	0.532	0.327
Long-term leverage	0.050	0.149

The final dataset comprises 817,295 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	-0.0021 (0.0019)		7.4323*** (1.1991)		7.5868*** (1.2359)		4.5421*** (0.8242)		0.1786 (0.6790)
Instrument		0.0030*** (0.0005)		0.0029*** (0.0004)		0.0144*** (0.0030)		0.0092*** (0.0023)	
Log Assets	0.0855*** (0.0022)	0.0030*** (0.0002)	0.0036 (0.0036)	0.0031*** (0.0002)	0.0026 (0.0038)	0.0013*** (0.0004)	0.0621*** (0.0027)	0.0030*** (0.0004)	0.0850*** (0.0027)
Profitability	0.0533*** (0.0015)	0.0024*** (0.0003)	-0.0700*** (0.0038)	0.0022*** (0.0003)	-0.0699*** (0.0038)	0.0015*** (0.0003)	0.0467*** (0.0025)	0.0013*** (0.0003)	0.0531*** (0.0017)
Tangibility	0.1300*** (0.0088)	0.0063*** (0.0012)	0.3108*** (0.0132)	0.0068*** (0.0012)	0.3076*** (0.0130)	0.0003 (0.0013)	0.1233*** (0.0102)	0.0007 (0.0013)	0.1298*** (0.0088)
Employees	-0.000035** (0.000015)	0.00003*** (0.000004)	-0.00035*** (0.00006)	0.00003*** (0.000004)	-0.00035*** (0.00006)	0.00010** (0.00004)	-0.00075*** (0.00022)	0.00013*** (0.00005)	-0.000058 (0.000089)
Log Countries	-0.0063*** (0.0024)	0.1350*** (0.0025)	-1.0159*** (0.1643)	0.1348*** (0.0025)	-1.0362*** (0.1698)	-0.4883*** (0.0120)	2.2150*** (0.4053)	-0.4885*** (0.0120)	0.0820 (0.3316)
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	True	False	True	True	False	False	True	True
Observations	691,044	817,295	817,295	817,295	817,295	691,044	691,044	691,044	691,044

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.

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	-0.0065*** (0.0019)		5.5986*** (1.0045)		5.5592*** (0.9942)		13.5532* (7.5643)		-0.4789 (2.5799)
Instrument		0.0035*** (0.0006)		0.0034*** (0.0005)		0.0039* (0.0021)		0.0037 (0.0025)	
Firm FE	True	False	False	False	False	True	True	True	True
Time FE	True	False	False	True	True	False	False	True	True
Observations	395,233	505,088	505,088	505,088	505,088	395,233	395,233	395,233	395,233

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Expansion" instrumented in 1st stage.

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	-0.0021 (0.0019)		6.5078*** (0.9640)		6.6157*** (0.9851)		4.9753*** (0.8836)		0.2084 (0.7918)
Instrument		0.0034*** (0.0005)		0.0033*** (0.0005)		0.0131*** (0.0028)		0.0079*** (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	691,044	817,295	817,295	817,295	817,295	691,044	691,044	691,044	691,044

Notes: Standard errors are in parentheses and clustered. Significance: *** p<0.01, ** p<0.05, * p<0.1. "Export" is instrumented in 1st stage.

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	-0.0145 (0.0125)		54.1205*** (9.1740)		39.9698*** (6.9632)		54.9671*** (9.5061)		4.9927 (4.7931)
Instrument		0.0030*** (0.0005)		0.0144*** (0.0030)		0.0029*** (0.0005)		0.0092*** (0.0023)	
Firm FE	True	False	False	True	True	False	False	True	True
Time FE	True	False	False	False	False	True	True	True	True
Observations	690,080	816,132	816,132	690,080	690,080	816,132	816,132	690,080	690,080

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.

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