Market Access and Urban Growth in the Former Soviet Union*

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Abstract

This paper studies how geopolitical fragmentation reshapes urban development by exploiting the sudden collapse of the Soviet Union in 1991. The dissolution transformed costless administrative borders into international boundaries while altering access to non-Soviet markets. Using difference-in-differences models for 1,235 cities (1970–2021), I find that European cities near newly hardened borders experienced persistent population declines of 0.35–0.55 percentage points annually, implying large cumulative contractions over three decades. In contrast, Central Asian cities near previously sealed external borders grew 1.4 percentage points faster annually as these frontiers opened. Nighttime lights corroborate these patterns. The results support a market access mechanism: border frictions severed dense industrial linkages in Europe while newly opened frontiers expanded trade opportunities in Central Asia.

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1 Introduction

In recent decades, numerous movements have sought to establish new sovereign states and redraw international borders—Kosovo in 2008, South Sudan in 2011—yet the economic consequences of such fragmentation in developing countries remain poorly understood. While new borders can sever previously integrated markets, they may also open access to formerly closed ones. This paper quantifies both effects by exploiting the collapse of the Soviet Union in 1991 as a natural experiment. Because the dissolution was sudden and largely unanticipated (Fukuyama, 1992), it generated sharp and plausibly exogenous changes to the spatial organization of economic activity.

In this paper, I leverage the simultaneous hardening of internal Soviet borders and restructuring of external borders as sources of variation,[1] providing empirical evidence on the causal role of market access in shaping urban development. Prior to 1991, internal borders within the Soviet Union functioned purely as administrative demarcations, posing no barriers to trade or migration (Djankov and Freund, 2002). After the collapse, these borders hardened into international boundaries, separating areas that had belonged to a single state since 1922 and significantly curtailing cross-border economic activity. Yet the consequences varied sharply by geography. While internal and external borders in post-Soviet Europe severed established linkages within the USSR and with the COMECON, respectively,[2] external borders in Central Asia opened access to Chinese and other markets that had been largely closed under Soviet rule (Brülhart et al., 2012, 2018).

The primary empirical approach involves a difference-in-differences (DiD) analysis to estimate the impact of changes in market access on population growth in post-Soviet cities within 75 km of internal and external borders, separately, relative to interior cities from 1970 to 2021.[3] The sample consists of 1083 cities in post-Soviet Europe and 152 cities in post-Soviet Asia.[4]

[1]External borders in Europe faced COMECON partners who reoriented trade westward, while Central Asian external borders opened to previously closed markets in China, Iran, and Afghanistan.

[2]The Council for Mutual Economic Assistance (COMECON) was an economic organization comprising the Soviet Union and its socialist allies, including Poland, Czechoslovakia, Hungary, Romania, and Bulgaria.

[3]A cut-off distance of 75 km is chosen following Redding and Sturm (2008). The results are robust to different distance thresholds.

[4]I group the 15 republics into Europe (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, Russia, and Ukraine) and Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan,

The main finding is that over a 30-year period from 1991, post-Soviet cities in Europe near internal and external borders see their populations decrease at annualized rates of about 0.35 and 0.55 percentage points respectively, compared to interior cities. This represents a cumulative decrease in the relative size of these border cities by approximately one-tenth and one-sixth, respectively. These effects persist into the 2010s. On the other hand, cities near Central Asia's external borders grew faster than those in the interior by about 1.4 percentage points per year. Cities near internal borders in Central Asia show a positive but statistically imprecise effect of approximately 0.4 percentage points, consistent with the limited inter-republican industrial linkages that existed prior to dissolution (Pomfret, 2021). By the end of the period, cities along external borders in the region had grown to be around 50% larger compared to interior cities on average. The positive Central Asian external border effects are largest and statistically significant in the immediate post-collapse decade, with a more variable trajectory thereafter as state controls and border enforcement tightened. The main event-study analysis uses population data spanning 1970–2021, which allows for pre-trend verification. As a supplementary exercise, I examine nighttime lights from 1992 to 2013 as an independent proxy for economic activity; these trends corroborate the population findings.

The central mechanism is that border cities lost access to nearby trading partners with whom they previously engaged in commerce at reduced transaction costs due to proximity, à la Redding and Sturm (2008). The magnitude of this shock varied by regional economic structure: the more industrialized economies of post-Soviet Europe, being tightly integrated through Soviet supply chains, experienced severe disruptions from both internal and external border hardening (Mubinzhon and Ricardo, 2021). The primarily agrarian economies of Central Asia, less integrated with the rest of the USSR, experienced a milder impact from internal borders—while their external borders opened access to Chinese and other markets that had been closed under Soviet rule.

These magnitudes are comparable to the 0.75 percentage point annual decline that Redding and Sturm (2008) document for West German cities near the sealed East-West

and Uzbekistan). This classification follows standard institutional practice—the Caucasus republics are grouped with Europe in the EU's Eastern Partnership framework (Council of the European Union, 2009)—and reflects the distinct nature of their external borders. European borders faced NATO and COMECON countries, while Central Asian external borders faced China, Iran, and Afghanistan, markets largely closed during the Soviet era.

border—a striking finding given that post-Soviet borders, while hardened, remained more permeable than the militarized German frontier. The even larger positive effect for Central Asian external borders (+1.4 pp) suggests that opening a previously sealed frontier can generate gains exceeding the losses from border hardening, particularly where decades of enforced isolation had suppressed cross-border commerce.

These results are robust to a range of identification strategies: controlling for treatment along both types of borders, dropping countries one at a time, changing treatment distance thresholds, and including various fixed effects. The relative decline of border cities is not explained by military capital flight, differences in pre-1991 industrial structure, migration controls, city size, or pre-existing trends. Taken together, the evidence points to changes in access to nearby markets as the central mechanism.

This paper contributes to the literature on market access and regional development within the broader tradition of new economic geography (Krugman, 1991; Fujita et al., 2001).[5] A substantial body of work has examined how changes in economic connectivity—whether through border frictions (Redding and Sturm, 2008; Brülhart et al., 2012; Ahlfeldt et al., 2015; Behrens, 2024), transport infrastructure (Faber, 2014; Baum-Snow et al., 2017; Storeygard, 2016; Donaldson, 2018; Jedwab and Storeygard, 2022), or trade policy (Hanson, 2001; Topalova, 2010; Autor et al., 2013; Dix-Carneiro and Kovak, 2017)—reshape the spatial distribution of economic activity. A related literature has documented the remarkable persistence of city sizes even following large shocks (Davis and Weinstein, 2002; Brakman et al., 2004; Miguel and Roland, 2011), raising questions about when and why some disruptions leave lasting imprints while others do not.

This paper makes two contributions. First, I document that identical fragmentation produces opposite effects: European border cities declined while Central Asian cities near newly opened external borders grew—an asymmetry distinguishing these findings from prior work emphasizing unidirectional effects (Redding and Sturm, 2008; Brülhart et al., 2012). Second, the Soviet dissolution—with simultaneous shocks across thousands of cities and dozens of borders—permits comparisons across border types and regional contexts within a unified framework, extending evidence beyond Western Europe to multiple transition economies.

[5] For a comprehensive review, see Redding (2022).

This paper identifies market access effects through spatial quasi-experimental variation rather than direct observation of trade flows—a common approach given data limitations, even at a higher administrative level (Redding and Sturm, 2008; Brülhart et al., 2012). I combine difference-in-differences estimation with tests ruling out alternative channels. The monotonic attenuation with distance, asymmetry across regions, and robustness across specifications collectively support the market access mechanism.

The paper proceeds as follows. Section 2 provides the institutional background. Section 3 describes the data sources and the empirical methodology. Section 4 presents the main results, including complementary results with nighttime lights and alternative explanations using matched samples. Section 5 concludes.

2 Institutional Background

The dissolution of the Soviet Union in 1991 marked one of the most profound geopolitical transformations of the 20th century. Sparked by Mikhail Gorbachev's reforms, notably *glasnost* (openness) and *perestroika* (restructuring), the collapse reflected deep-rooted economic stagnation and mounting demands for political autonomy (Kramer and Smetana, 2013). Few anticipated the speed of the disintegration. For example, in a 1991 referendum, the majority of Soviet citizens who voted expressed support for preserving the Union (Smith and Smith, 1993). From a spatial economic perspective, the event creates a rare natural experiment: an integrated, centrally planned economy was suddenly fragmented into 15 independent states, generating varying levels of disruption to market access across thousands of cities.

2.1 Soviet Economic Integration

Since its founding in 1922, the USSR organized a vast and diverse population into 15 Soviet Socialist Republics through national-territorial delimitation (*razmezhevanie*).[6] Administrative borders between republics posed no barrier to internal trade or migration (Eichengreen, 1993; Denisenko and Chudinovskikh, 2017). Gosplan, the State Planning Commission, coordinated production through hierarchical negotiations, deliberately constructing vertically integrated industries that spanned republican boundaries.

[6] With the exception of the Baltics, which were annexed in 1940, these regions had been part of the Russian Empire.

Djankov and Freund (2002) estimate that intra- and inter-republic trade volumes were comparable, underscoring the highly coordinated nature of the Soviet economy. Using gravity model analysis, Suesse (2018) shows that Soviet republics' openness to internal trade compared favorably with EU member states of the time.

The *propiska* system, a residency permit regime introduced in 1932, required citizens to register their place of residence and was intended to regulate internal migration by restricting access to certain cities. However, scholarly assessments reveal a more nuanced picture than simple immobility. Gang and Stuart (1999) find that restricted cities grew at rates 2.3 times slower than unrestricted cities—restrictions mattered but were not absolute. Multiple evasion mechanisms existed: marriage to residents of restricted areas, university education, organized labor recruitment (*orgnabor*), and enterprise housing programs. Critically, borders between republics never acted as barriers to migration, fulfilling only an administrative function (Light, 2012).[7]

The market access framework predicts that border effects should scale with pre-existing integration and attenuate with distance from borders (Redding and Sturm, 2008). The Soviet context offers sharp variation on both dimensions: European economies were tightly integrated across republican and COMECON boundaries, while Central Asian external borders were sealed until 1991.

2.2 Soviet Europe

Internal Borders

Soviet republics in Europe were deeply integrated through centrally planned supply chains and infrastructure networks. The European USSR contained the most industrialized economies of the Union—Russia, Ukraine, Belarus, and the Baltic states—with factories often relying on single suppliers located in other republics for critical inputs. Blanchard and Kremer (1997) demonstrate that when central planning's enforcement mechanism disappeared before market institutions emerged, bargaining broke down across these supply chains. Output fell farthest for goods with the most complex production processes, precisely because they depended on cross-republican coordination.

[7] Large urban centers, such as Moscow, Saint Petersburg, and Tashkent, were subject to especially strict propiska controls (Buckley, 1995). The results are robust to excluding these cities from the sample.

The post-Soviet transition transformed administrative lines into hard international borders. Transportation corridors were severed, production chains disrupted, and labor flows curtailed. Appendix Figure A2 illustrates the steep decline in exports to former Soviet partners between 1990 and 1996, particularly in the Baltics, Caucasus, and Russia. According to Goskomstat SSSR (1990), intra-Union trade constituted roughly 44 percent of republican output among European Soviet republics (excluding Russia), compared to about 38 percent in Central Asia (Suesse, 2018). There was also far denser industrial and commercial integration in the European region of the USSR than in Central Asia before dissolution (Pomfret, 2021).

External Borders

On the western frontier, Soviet external trade with Eastern Europe was organized through COMECON, which accounted for roughly half of Soviet foreign trade.[8] Founded in 1949, COMECON bound the Soviet Union to Eastern European satellites—Poland, Hungary, Czechoslovakia, Bulgaria, Romania, and East Germany—through bilateral clearing and a non-convertible "transferable ruble" that functioned as a bookkeeping unit rather than real currency. Prices followed administered formulas based on lagged world market averages, and Eastern European manufactures enjoyed guaranteed Soviet markets regardless of international competitiveness (Holzman, 1985).

COMECON effectively dissolved on January 1, 1991, when members shifted to hard currency transactions. The collapse reflected converging pressures: the 1989 revolutions removed the political rationale for Soviet-centered integration, and declining oil revenues eliminated Soviet capacity to sustain subsidies (Gaidar, 2010). Trade collapsed dramatically: according to Maurel and Cheikbossian (1998), intra-bloc trade dropped from 13 times gravity-predicted levels in 1990 to just 4 times by 1993. Poland's exports to former COMECON partners fell 75 percent; Rodrik (1992) calculated that the Soviet trade shock accounted for all of Hungary's GDP decline and approximately 60 percent of Czechoslovakia's.

[8] Trade with Türkiye and Iran remained minimal throughout the Cold War. The Armenian-Turkish border remained closed after 1991 due to the Nagorno-Karabakh conflict.

2.3 *Central Asia*

Internal Borders

Central Asian republics occupied a distinct position in the Soviet economy. Functioning primarily as suppliers of raw materials (cotton, natural gas, minerals) rather than participants in industrial supply chains, they were integrated with Russia through extractive north-south corridors but lacked the dense inter-republican linkages characteristic of European USSR (Pomfret, 2021). All roads, railways, and pipelines led north to Russia. This weaker pre-existing integration meant that the enforcement of internal borders after 1991 generated smaller disruptions than in Europe. Central Asian economies had fewer complex supply chain relationships to sever.

External Borders

Before 1991, Central Asian republics faced near-total isolation from neighboring non-Soviet states. The Sino-Soviet border was closed in 1962 and remained heavily militarized through the Cold War (Radchenko, 2009). A planned cross-border railway from eastern Kazakhstan to Xinjiang was discussed but never completed—the Kazakhstan-China rail line finished in 1990 was the first Central Asian link not routed through Russia (Pomfret, 2021). The Iran-Turkmenistan border saw minimal contact, with all external trade channeled through Moscow. The Afghanistan border became a war zone following the 1979 Soviet invasion.

The dissolution transformed these sealed frontiers into accessible borders. The crossing at Khorgos, used for Silk Road trade until the Soviets closed it in 1971, reopened in 1992; approximately 700,000 Kazakhstani citizens crossed to China that year for "shop tourism"—buying consumer goods for resale (Peyrouse, 2008). Bazaar economies emerged as the dominant institutional form, with shuttle traders (*chelnoki*) carrying goods across borders in suitcases Spector (2017). Turkmenistan moved to break Russia's energy transit monopoly: the Korpeje-Kurtkuyu pipeline to Iran, completed in 1997, was the first post-Soviet Caspian export route bypassing Russia. Iran was the second country, after Türkiye, to recognize independent Turkmenistan. These new connections meant that Central Asian border cities, long isolated, experienced market access gains rather than losses— nearly the mirror image of the European experience.

2.4 *Migration*

The Soviet collapse triggered significant migration, particularly among ethnic minorities. Roughly a million ethnic Germans and Jews emigrated to Germany, while ethnic Russians returned to Russia from other republics, driven by economic instability, political uncertainty, and social pressures (Becker et al., 2012; Heleniak, 2004). Kazakhstan alone accounted for over half of ethnic German migrants to Germany; most Jewish emigrants originated from Ukraine and Russia (Dietz, 2000).

A potential concern is that population decline in border cities could reflect selective outmigration rather than market access effects. However, several patterns argue against this interpretation. Ethnic Germans, Jews, and Russians were dispersed across both interior and border regions, and emigrant populations were disproportionately concentrated in major interior metropolises rather than border areas (Mukhina, 2007; Heleniak, 2004). Moreover, the estimated treatment effects are strongest in cities closest to borders and attenuate monotonically with distance—a spatial gradient consistent with rising trade costs rather than ethnic sorting. If anything, emigration from interior urban centers would bias against finding border effects, making the estimates conservative.[9]

3 Data and Empirical Methodology

Population Census

The main variable of interest is population size. The dataset includes a panel of 1235 cities in the former Soviet Union, encompassing the period from 1970 to 2021. It covers the populations of cities that had over 10,000 residents in 1970. This selection criterion ensures that the sample includes all cities whose demographic composition was unlikely to be affected dramatically by the dissolution. City population data with coordinates was collected from Brinkhoff (2021), while data from 1970 and later years, if missing, was gathered from Demoscope Weekly, an electronic database of the Russian Institute of Demography.[10] City population data from before 1991 come from the

[9] Soviet censuses collected data on ethnic composition, but publicly available digitized data at the city level remains largely inaccessible. Published statistical yearbooks reported ethnic breakdowns primarily at the republic level, while subnational tabulations were often restricted or never digitized. This data limitation is common in research on post-Soviet demographic change.

[10] Available at citypopulation.de and demoscope.ru, respectively.

Soviet-wide censuses conducted in 1970, 1979, and 1989. For the post-1991 sample, data were compiled for three distinct periods, with similar intervals for each country. A breakdown of the census data by country is presented in Appendix A, Table A1.

I use the annualized growth rate of population following Redding and Sturm (2008), as it allows comparing growth rates consistently across different census periods, adjusting for length variations in those periods.[11] For each city, I measure the great circle distance in kilometers to internal and external borders using ArcGIS. I also ascertain to which country the closest border belongs and construct border pair labels.

Night lights

Sub-national GDP data is not available across the FSU. Instead, I use high-resolution nighttime lights data from the Defense Meteorological Satellite Program (DMSP), spanning 1992 to 2013, as an indicator of city-level economic activity. Henderson et al. (2012) provide a detailed explanation of this dataset and recommend the use of nighttime lights as a proxy for economic activity, particularly in developing countries with poor subnational income data. They show that the growth of nighttime lights closely mirrors GDP growth in low- and middle-income countries, suggesting that lights are a consistent and reliable alternative for measuring city GDP where such data is not directly available.[12]

Other datasets

I have also collected various other city characteristics for the sample of post-Soviet cities in European continent. Firstly, for 1989, I have total employment, turnover, and manufacturing in the civilian industry at the city level, generously provided by Kofanov and Mikhailova (2015). I also have the SIC codes of the factories that operated in the cities. I also use data on the number and workforce size of Soviet defense factories and research and design establishments that stopped work between 1989 and

[11]It can be computed in city c as

$$y_{ct} = \frac{ln(P_{ct}) - ln(P_{c,t-L_{ct}})}{L_{ct}}, \tag{1}$$

where P_{ct} is the population statistic at time t, and L_{ct} is the number of years between t and the prior census. It is the rate at which a population grows on average per year over a specific period, measured in log differences.

[12]The data cleaning procedure is discussed in detail in Appendix A1

1991, as documented by Dexter and Rodionov (2024). Their extensive dataset includes information on the locations, names, primary defense specializations, operational periods, and size categories of military enterprises throughout the Soviet Union.

Table A2 in Appendix A provides the summary statistics for the key variables by treatment and control groups separately for Europe and Central Asia. Table A3 provides summary statistics of the treatment variables by region.

Identification and Estimation Strategy

The identification strategy leverages the plausibly exogenous and unexpected enforcement of internal Soviet borders and the fall of the Iron Curtain in 1991.[13] Cities near borders had been deeply integrated into the Soviet economy since the borders were drawn, with centralized planning ensuring extensive trade, labor mobility, and industrial linkages across regions. The difference-in-differences (DiD) approach used here does not require borders to have been randomly assigned but assumes that, absent the sudden dissolution, trends in the outcome variable would have been parallel between border and non-border cities (Roth et al., 2023; Meyer, 1995). This assumption is tested using pre-treatment data from 1970 to 1990, demonstrating similar economic trajectories before the Soviet collapse. By leveraging this setup, the analysis isolates the effect of the dissolution and resulting border changes on post-1991 economic outcomes, strengthening causal interpretation of the results.

Although all cities were affected by the dissolution, border cities faced disproportionate disruptions. Therefore, intensity of treatment is especially salient in border regions. Internally, cities close to new borders lost trading partners they previously interacted with at lower costs, especially in post-Soviet Europe. Cities farther from the borders were less impacted because they already faced higher transaction costs. Externally, areas near borders with countries that the Soviet Union had significant trade relations with before its dissolution are expected to experience similar economic disruptions, with opposite effects expected at previously sealed borderlines.

To validate the parallel trends assumption and examine dynamic effects over time, I employ an event-study framework. This approach allows for the assessment of pre-treatment differences, potential anticipation effects, and heterogeneous impacts across

[13]By Iron Curtain, I refer specifically to the external borders of the USSR rather than those of the broader Communist bloc.

different post-dissolution periods. I examine how treatment effects evolve over time and detect any potential pre-trends with the help of the following specification:

$$y_{ct} = \alpha_c + d_t + \sum_{k=T_0}^{-2} \delta_{1,k} [IB_c \times D_k] + \sum_{k=0}^{T_1} \delta_{1,k} [IB_c \times D_k] + \sum_{k=T_0}^{-2} \delta_{2,k} [EB_c \times D_k] + \sum_{k=0}^{T_1} \delta_{2,k} [EB_c \times D_k] + \epsilon_{ct} \tag{2}$$

where y_{ct} is the annualized growth rate of population in city c in census year t,[14] IB_c takes a value of one for cities within 75 km of an internal border and zero otherwise,[15] EB_c takes a value of one for cities within 75 km of an external border and zero otherwise, and D_k is an indicator equal to one when the observation falls in event-time period k relative to the Soviet dissolution (with $k = 0$ denoting the first post-collapse census period) and zero otherwise.

Under this approach, the treatment effects are defined over an event-time window $k \in [T_0, T_1]$, which I fix to $[-2, +2]$. These effects are estimated relative to the excluded period immediately preceding the observed event (i.e. $k = -1$). For $k < -1$, the coefficients $\delta_{1,k}$ and $\delta_{2,k}$ capture potential pre-trend dynamics. Conversely, for $k \geq 0$, they measure the evolution of treatment impacts following the enforcement of new borders and the dismantling of the Iron Curtain, respectively.

City fixed effects α_c absorb time-invariant observable and unobservable characteristics such as geographical location, historical infrastructure, and long-standing ethnic/cultural elements unique to each city, including any pre-division differences. Year fixed effects d_t control for time-varying shocks that are uniform across all cities, like economic shocks and secular trends in the growth rate of populations. To account for heteroscedasticity and autocorrelation, the standard errors are clustered at the city level.

DiD Estimation

The event-study estimates can be summarized using a generalized two-way fixed effects (TWFE) DiD specification, which provides a consistent estimation of the average

[14] It covers the intercensal periods 1970-1979, 1979-1989, 1989-1999, 1999-2009, and 2009-2019, with slight variations after the collapse depending on specific country census dates.

[15] I also check the robustness of the results to different distance thresholds.

treatment effect on the treated (ATT):

$$y_{ct} = \alpha_c + d_t + \delta_1(IB_c \times Division_t) + \delta_2(EB_c \times Division_t) + \epsilon_{ct}, \tag{3}$$

where $Division_t$ takes a value of one in the event of the dissolution of the Soviet Union after 1991 and zero otherwise. The coefficients of interest are δ_1 and δ_2, which capture average differences in population growth between internal border and interior cities, as well as external border and interior cities, respectively, relative to such differences in the period before the Soviet dissolution. Assuming parallel trends and no time-varying confounding factors, these coefficients capture the causal effects of changes in market access following the collapse of the Soviet Union.

Two assumptions must hold for δ to be interpreted as causal. First, the enforcement of newly established borders and the dismantling of the Iron Curtain should be exogenous to city-level factors—that is, no time-varying confounders should simultaneously drive both border proximity and urban outcomes. This assumption is plausible given the sudden and largely unanticipated nature of the Soviet collapse; internal borders had been purely administrative since 1922, and their transformation into international boundaries was not a response to differential economic trajectories across cities. Second, there should be no systematic difference in pre-trends between border and interior cities. I test this assumption directly using pre-1991 census data, finding no evidence of divergent growth trajectories prior to dissolution.

To strengthen causal interpretation, I conduct several robustness checks: varying the distance threshold for border proximity, excluding major cities subject to *propiska* restrictions, dropping countries one at a time, and including country-year and border-pair fixed effects. I also rule out alternative explanations—including pre-1991 industrial composition, industrial employment size, military capital flight, and city size—using nearest-neighbor matching, demonstrating that the results are not driven by observable differences between border and interior cities.

4 Results

Graphical Evidence

I begin by presenting graphical evidence on the effects of border changes. Figure 1 and Figure 2 show population trajectories for cities near internal and external borders, respectively, compared to interior cities, with separate panels for Europe and Central Asia. Each figure indexes total city population to 1970 levels and plots the difference between border and interior indices as a simple graphical difference-in-differences.

For internal borders (Figure 1), European border cities experienced a sharp and sustained decline relative to interior cities after 1991, reflecting the disruption of integrated economic networks. The gap widened continuously over three decades—a persistence comparable to Redding and Sturm (2008)'s finding that German division effects expanded for four decades. Central Asian internal border cities, by contrast, grew faster than interior cities after 1991, likely because weaker pre-existing interdependencies limited disruption. For external borders (Figure 2), the pattern is starker: European border cities declined sharply as former COMECON partners reoriented trade toward Western Europe, while Central Asian border cities gained from newly opened access to Chinese and other markets previously closed under Soviet rule.

Event-Study Estimates

Figure 3 presents event-study estimates from equation 2, with $k = -1$ as the omitted reference period. Panel A shows results for Europe, Panel B for Central Asia. Black circles denote internal border effects; red crosses denote external border effects.

In Europe, the pre-collapse coefficient at $k = -2$ is close to zero for both border types, supporting the parallel trends assumption. After dissolution, both internal and external border cities experience sharp and persistent declines in population growth relative to interior cities. The external border effect peaks at $k = 1$, a full decade after collapse. This timing aligns with the progressive reorientation of former COMECON partners toward Western Europe: Poland, Hungary, and Czechoslovakia signed Europe Agreements in December 1991, with interim trade provisions taking effect by March 1992, and EU accession followed in May 2004. Soviet border cities thus lost access not only to internal Soviet markets but also to former COMECON partners, who increasingly traded preferentially with the EU. Internal border effects follow a similar trajectory, consistent with Blanchard and Kremer (1997)'s account of cascading supply chain failures: as cross-republican coordination collapsed, the costs compounded over time as firms failed to find alternative suppliers and production networks unraveled.

In Central Asia, the pattern reverses. Internal border effects remain small and statistically insignificant, consistent with limited inter-republican trade to disrupt—Central Asian republics functioned primarily as raw material providers with transport oriented toward Russia (Pomfret, 2010). External border cities show a more complex trajectory. The large positive effect at $k = 0$ reflects explosive growth of informal cross-border commerce as shuttle traders exploited newly opened access to Chinese goods (Kaminski and Mitra, 2012). The effect turns negative (though insignificant) at $k = 1$, coinciding with increased state control and tighter border enforcement. By $k = 2$, the coefficient turns positive again ($p = 0.11$), potentially reflecting formalization of trade corridors.

DiD Estimates

The event-study results can be summarized using the DiD framework specified in equation 3. Table 1 presents results separately for Europe (Panel A) and Central Asia (Panel B), with columns progressively adding controls and exploring heterogeneity by city size. In Europe, Column (1) reports results restricting the treatment sample to cities near internal borders only. The key interaction term capturing the effect of newly formed internal borders after the Soviet collapse indicates a highly significant drop of 0.415 percentage points (pp) in the annualized growth rate of cities located near these borders, compared to interior cities ($p = 0.01$). Column (2) examines external borders exclusively, revealing an even larger and statistically significant negative effect of -0.668 pp relative to interior cities ($p = 0.01$). When both border types are included simultaneously in Column (3), the estimates remain robust: internal border cities experienced a -0.317 pp decline ($p = 0.01$) and external border cities a -0.518 pp decline ($p = 0.05$). Column (4) confirms these results are robust to replacing city fixed effects with country and border pair fixed effects, though the estimates are slightly attenuated. Notably, the un-interacted IB and EB coefficients in this specification are small and statistically insignificant, indicating no systematic average pre-treatment differences in growth rates between border and interior cities.

Panel B reveals a starkly different trajectory for Central Asia. When examining border types separately in Columns (1)–(2), internal border cities show a positive but statistically insignificant effect of 0.470 pp, while cities near external borders exhibit a substantial and highly significant increase of 1.507 pp ($p = 0.05$). The combined specification in Column (3) confirms these patterns: external border cities grew 1.347 pp faster annually than interior cities ($p = 0.05$), while internal border effects remain positive but insignificant at 0.398 pp. Over the same 30-year period, the relative cumulative population increase for Central Asian cities along external borders is approximately 50 percent.

Columns (5)–(6) explore heterogeneity by city size, dividing the sample at the median 1970 population, and reveal a remarkably consistent pattern across both regions. In Europe, small cities near internal and external borders experienced annualized growth reductions of -0.476 pp ($p = 0.05$) and -0.613 pp ($p = 0.10$), respectively, while large cities show no significant effects. In Central Asia, the mirror image holds: small cities near external borders grew 2.3 pp faster annually ($p = 0.05$), while large cities again show no significant response. This symmetry, where border proximity matters for small cities but not large ones, regardless of whether the shock is positive or negative, strongly supports the market access mechanism. Smaller cities, more dependent on proximate cross-border markets and less able to substitute toward distant trading partners, experience larger disruptions when borders harden and larger gains when previously closed borders open. Large cities, by contrast, benefit from agglomeration advantages, diversified industries, deeper labor markets, and access to national and international networks, that buffer them against localized border shocks (Redding and Sturm, 2008; Brülhart et al., 2012).

Robustness

The main results remain robust across a battery of sensitivity checks reported in Table A4. Column (1) excludes major cities above 500,000 population in 1970, where *propiska* restrictions were most stringent; results align closely with the baseline, suggesting minimal confounding from Soviet-era migration controls. Column (2) drops cities exposed to conflict-affected border pairs (e.g., Armenia-Azerbaijan, Russia-Ukraine), yet the negative European effects and positive Central Asian effects persist.

Column (3) excludes the turbulent 1989–1999 period; this strengthens the external border estimate for Europe while slightly attenuating the internal border effect, and reduces precision for Central Asia, likely reflecting delayed integration with Asian markets.

Column (4) addresses potential mechanical confounding by excluding cities simultaneously within 75 km of both internal and external borders. The internal border effect in Europe and both border effects in Central Asia remain stable in magnitude and significance. The external border effect in Europe retains a similar magnitude but loses precision, though it remains marginally significant at the 11% level. Column (5) implements two-way clustering by city and census year for Europe; the core findings hold.[16] Column (6) excludes countries that joined the WTO by 2000, isolating the border effect from early trade liberalization. The persistence of effects among non-WTO countries, where national-level integration with global markets was limited, reinforces that the operative mechanism is localized market access change at borders rather than differential exposure to global trade policy.

Table A5 explores how treatment effects vary with proximity to borders. Columns (1)–(3) vary the treatment threshold from 25 km to 100 km; effects are strongest for cities closest to borders and attenuate with distance, consistent with the market access framework where trade costs increase continuously with geography (e.g., (Hanson, 2005)). Columns (4)–(6) progressively narrow the control group by excluding remote interior cities. For Europe, narrowing from 2000 km to 1000 km strengthens estimates as the comparison group becomes more comparable; for Central Asia, similar patterns emerge with 250 km increments. The monotonic spatial gradient distinguishes market access from alternative mechanisms, such as (ethnic) migration flows, that would not necessarily produce distance-dependent effects.

Figure A3 presents leave-one-out analysis for ten European countries. Both internal and external border effects remain negative and significant across all exclusions, though precision decreases when dropping Russia due to its large sample share. Figure A3 replicates this for Central Asia; external border effects remain consistently positive except when excluding Kazakhstan, where results stay positive but become marginally significant. These patterns confirm that no single country drives the core findings.

[16] For Central Asia, two-way clustering is unreliable with only 5 census periods, so standard errors remain clustered at the city-year level in this specification.

Finally, Figure C1 examines whether population results manifest in nighttime lights, a proxy for economic activity available from 1992. European border cities experienced sustained relative declines in light intensity through the 1990s, while Central Asian external border cities display the opposite pattern. These trends corroborate the population findings using an independent outcome measure. A more detailed analysis is provided in Appendix C.

Potential Mechanisms

The market access mechanism predicts that the magnitude of border shocks should vary systematically with a city's pre-existing exposure to cross-border trade. Cities whose economies depended heavily on inputs, customers, or supply chain relationships spanning soon-to-be-international boundaries should experience larger disruptions when those boundaries harden—and, symmetrically, should benefit less when borders open to markets their economic structure is not oriented to serve. Manufacturing, with its reliance on intermediate inputs and vertically integrated production networks, offers a direct test: Soviet industry was organized around cross-republican specialization, with factories often dependent on single-source suppliers in neighboring republics (Blanchard and Kremer, 1997). Agriculture and mining, by contrast, involve more localized production or serve broader markets less dependent on proximate cross-border linkages. Table 2 exploits this sectoral variation by interacting border proximity with 1989 employment shares.[17]

In Europe, the results confirm that the post-1991 border shock is systematically more damaging for manufacturing-intensive cities. The triple interaction coefficient is negative (-2.303, $p < 0.01$ for internal borders; -2.253, not significant for external borders), indicating that the treatment effect becomes more negative as a city's manufacturing share rises. Because the specification controls for the direct interaction between sectoral shares and the post-1991 indicator, this heterogeneity identifies an additional penalty specific to border cities rather than an economy-wide manufacturing decline. Note that the positive coefficient on the uninteracted border term represents the effect at zero manufacturing share, a value virtually absent in the European sample where the mean manufacturing share is approximately 0.83; this coefficient should therefore be

[17] Summary statistics for 1989 sectoral employment shares are reported in Table **??**.

interpreted as an extrapolated intercept rather than a substantively meaningful quantity. Evaluated at mean manufacturing shares, the implied border effects are approximately -0.39 for internal and -0.57 for external borders.

In Central Asia, the pattern inverts as the market access framework predicts. If manufacturing dependence amplifies losses from border hardening, it should attenuate gains from border opening when newly accessible markets offer opportunities that manufacturing-oriented cities cannot exploit. The main effect of external border proximity is strongly positive (5.544, $p < 0.01$), but the negative triple interaction with manufacturing (-6.067, $p < 0.05$) shows these gains are sharply attenuated as manufacturing intensity rises. The benefits accrued disproportionately to cities with lower manufacturing shares—places less tethered to north-south supply chains and better positioned for the bazaar economies that dominated early cross-border commerce with China (Kaminski and Mitra, 2012). That manufacturing dependence amplifies losses where borders hardened and attenuates gains where borders opened provides mutually reinforcing support for the market access channel.

The preceding results could still reflect pre-existing differences if border cities systematically differed from interior cities in ways correlated with post-1991 trajectories. To address this, I combine difference-in-differences with nearest-neighbor matching. Table A7 reports results for Europe from a set of separate matching exercises, each pairing border cities with control cities based on a single pre-1991 characteristic: 1970 population, 1989 industrial employment, turnover, sectoral composition (SIC codes), and military-industrial presence.[18] Across all matching variables—population, employment, turnover, manufacturing output, and industrial classification—border cities still experience significantly slower growth, suggesting neither initial city size nor scale or structure of pre-transition industry explains the decline.

Column (6) addresses military divestment as a distinct alternative mechanism. The Soviet defense sector employed at least one in five adults, and budgets collapsed by over 90 percent between 1988 and 1998. If cities with defense concentrations declined regardless of border proximity, this could confound estimates. Matching on defense enterprise closures between 1989–1991, the negative border effects persist, indicating

[18] Descriptive statistics confirming covariate balance in the matched samples are reported in Tables A9 and A10.

that military capital flight does not account for the relative decline of border cities.[19] Across all specifications, the evidence points to newly imposed borders rather than inherited economic characteristics as the driver of post-Soviet urban divergence.

5 Conclusion

How countries navigate the economic consequences of geopolitical fragmentation remains a pressing question for development policy, yet rigorous evidence from outside Western Europe is scarce. This paper exploits the sudden and largely unanticipated collapse of the Soviet Union in 1991, which simultaneously hardened internal borders and opened external frontiers across 15 newly independent states, to provide the first comprehensive evidence on how market access shocks reshape urban growth in transition and developing economies. The setting offers unique analytical leverage: identical institutional rupture producing opposite effects across regions with different pre-existing economic geographies, a scale encompassing over 1,200 cities and dozens of border pairs, and a three-decade horizon permitting assessment of both immediate disruptions and long-run spatial reallocation.

The central finding is that identical geopolitical fragmentation produced opposite effects depending on pre-existing economic geography. In post-Soviet Europe, cities near newly enforced internal and external borders experienced persistent population declines relative to interior citiess. In post-Soviet Asia, cities near previously sealed external borders grew faster. A key limitation of this study is the absence of granular trade flow data that would allow direct observation of the market access channel. I address this through multiple indirect tests: effects attenuate monotonically with distance from borders, losses are amplified in manufacturing-intensive cities while gains are attenuated, and results persist after matching on pre-1991 industrial composition and military divestment. If the spatial gradient follows the pattern market access predicts, the sectoral heterogeneity aligns with differential trade exposure, and alternative mechanisms fail to explain the results, the operative channel is most parsimoniously interpreted as market access.

[19] Results for Central Asia appear in Table A8. External border effects remain positive but sample sizes after matching are small.

These findings carry implications beyond the post-Soviet context. As movements for regional autonomy and border realignment continue globally, this paper provides evidence that the economic consequences of fragmentation depend critically on what lies on the other side of newly drawn boundaries. Where borders sever integrated production networks, persistent decline follows; where they open access to previously closed markets, growth can accelerate. Understanding this asymmetry is essential for anticipating the spatial economic consequences of geopolitical change. Finally, understanding how informal cross-border trade, largely unmeasured in official statistics, mediates market access shocks in developing economies and whether targeted border facilitation programs can mitigate the costs of fragmentation offer a productive agenda for future work.

Figures & Tables

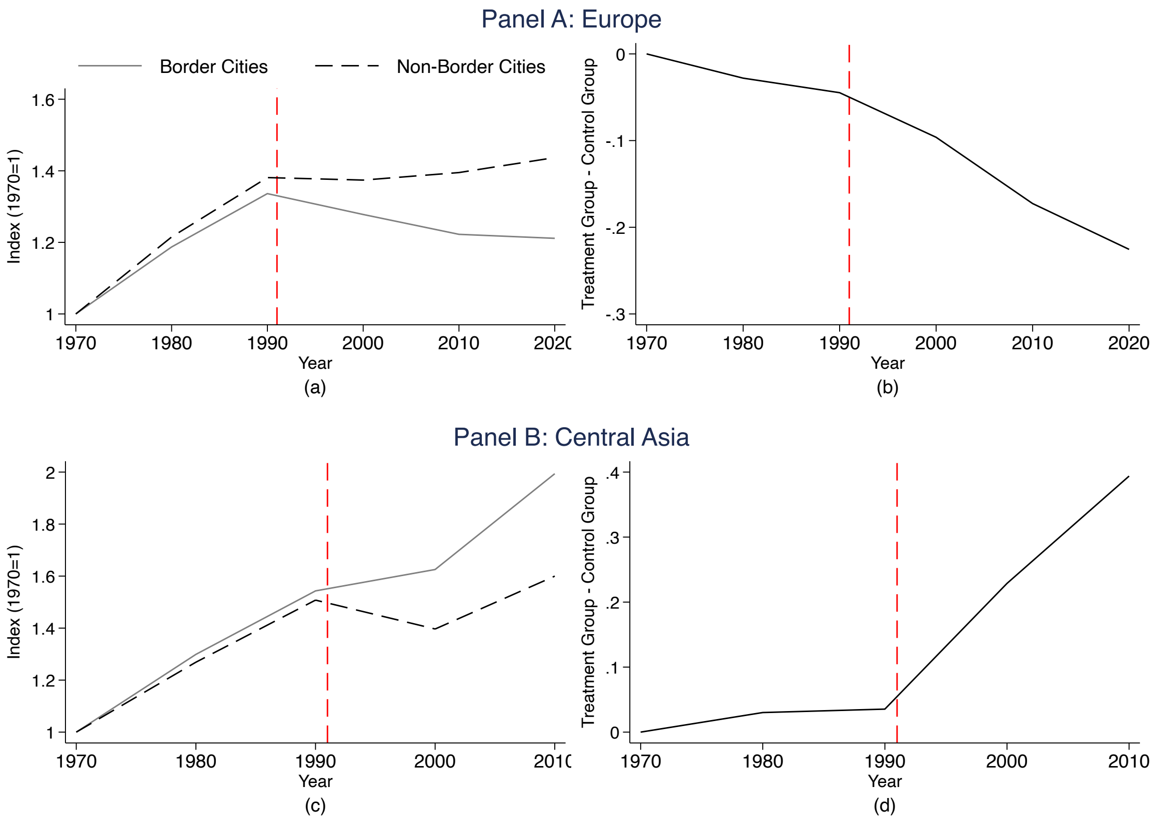


Figure 1: Indices of Internal Border and Non-Border City Population

Notes: Panel A includes all post-Soviet countries geographically situated in Greater Europe: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Russia, and Ukraine. Moldova is excluded due to an unbalanced panel. The Central Asia panel includes all five post-Soviet Central Asian countries, but the balanced index shown here includes only two post-collapse periods, as Turkmenistan and Uzbekistan conducted only two censuses after the Soviet dissolution.

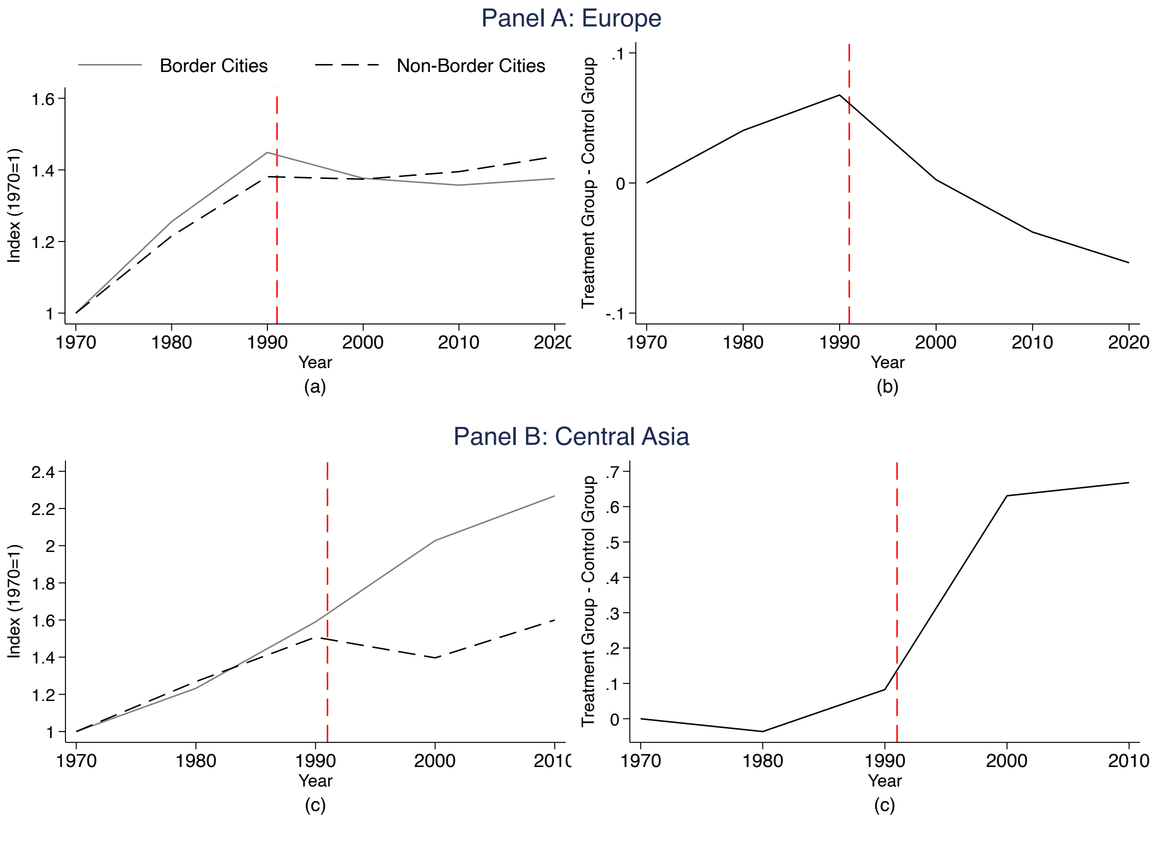


Figure 2: Indices of External Border and Non-Border City Population

Notes: Panel A includes all post-Soviet countries geographically situated in Greater Europe: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Russia, and Ukraine. Moldova is excluded due to an unbalanced panel. The Central Asia panel includes all five post-Soviet Central Asian countries, but the balanced index shown here includes only two post-collapse periods, as Turkmenistan and Uzbekistan conducted only two censuses after the Soviet dissolution.

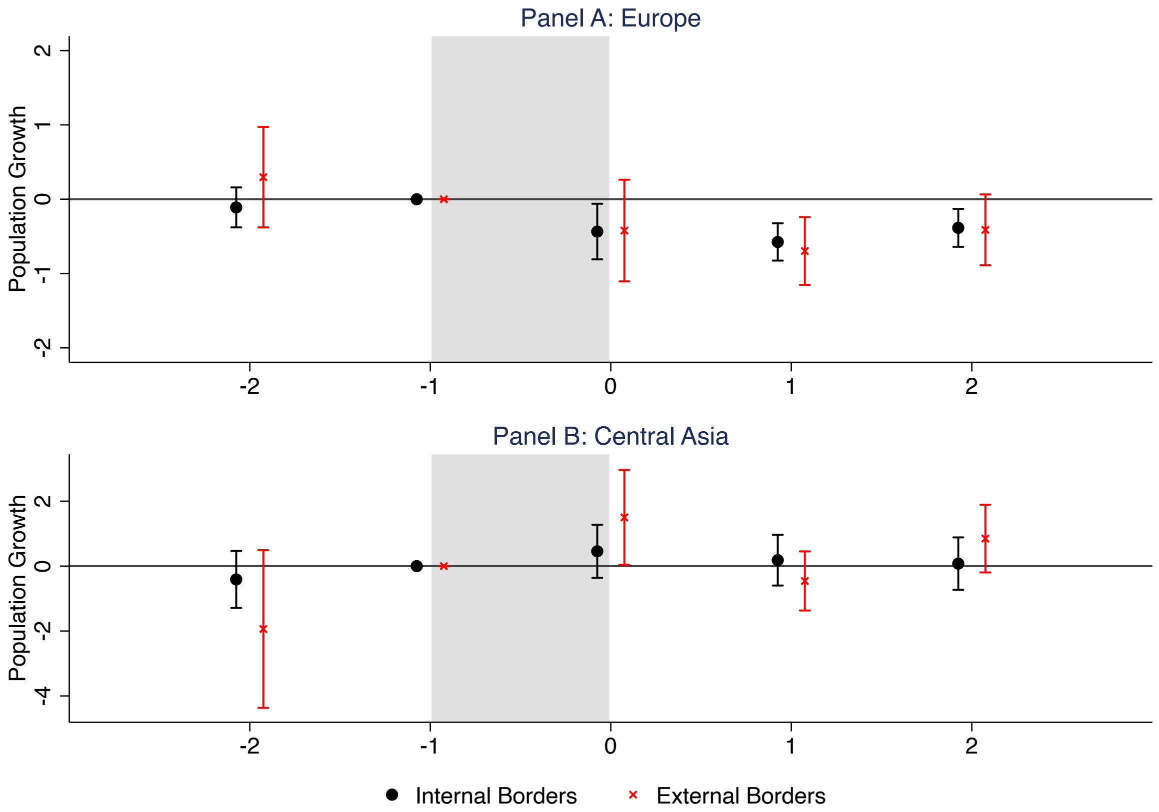


Figure 3: Urban Growth and Soviet Collapse: Event Study Plots

Notes: The figure presents coefficient plots from an event-study difference-in-differences analysis that regresses annualized population growth on year and city fixed effects, with an indicator for being near a border interacted with event-time fixed effects. Black-circled and red-crossed points represent estimates for internal and external borders, respectively, in Soviet Europe (Panel A) and Soviet Central Asia (Panel B). The event time is centered around the Soviet dissolution in 1991 ($t = 0$), with $t = -1$ as the omitted baseline period. The gray shaded area highlights the period during which the Soviet Union dissolved, between $t = -1$ and $t = 0$. The control groups include non-border cities. Standard errors are clustered at the city level, and error bars represent 95% confidence intervals.

Table 1: Urban Growth and Market Access: Main Results

	Dependent Variable: Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Europe						
IB × Division	-0.415***		-0.317***	-0.310***	-0.476**	-0.061
	(0.121)		(0.118)	(0.118)	(0.190)	(0.123)
EB × Division		-0.668***	-0.518**	-0.517**	-0.613*	-0.125
		(0.239)	(0.237)	(0.234)	(0.339)	(0.218)
IB				0.009		
				(0.103)		
EB				0.322		
				(0.225)		
Outcome mean (%)	0.502	0.548	0.513	0.513	0.597	0.433
Cities	1,026	867	1,083	1,083	534	549
Observations	5,072	4,302	5,347	5,347	2,620	2,727
Adj. R^2	0.448	0.429	0.438	0.353	0.389	0.522
Panel B: Central Asia						
IB × Division	0.470		0.398	0.375	0.868	0.185
	(0.400)		(0.390)	(0.394)	(0.656)	(0.435)
EB × Division		1.507**	1.347**	1.333**	2.3**	0.559
		(0.668)	(0.634)	(0.646)	(0.962)	(0.811)
IB				-0.005		
				(0.334)		
EB				-0.229		
				(0.597)		
Outcome mean (%)	1.290	1.266	1.314	1.314	1.288	1.345
Cities	145	66	152	152	83	69
Observations	670	310	699	699	384	315
Adj. R^2	0.312	0.288	0.293	0.258	0.239	0.433
City sample	IB Only	EB Only	All	All	Small	Large
City FE	✓	✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE				✓		
Border Pair FE				✓		

Notes: The dependent variable is annualized city population growth (%). "IB" and "EB" indicate cities within 75 km of internal and external borders, respectively. "Div" equals one for post-1991 periods. In Column (1), "IB Only" excludes cities that are exclusively near external borders from the sample, ensuring the control group (interior cities) is not contaminated by the inclusion of exclusively external-border cities; only IB × Div is included as the treatment variable. Similarly, in Column (2), "EB Only" excludes cities exclusively near internal borders, so that exclusively internal-border cities do not enter the control group. Column (3) includes both treatment interactions simultaneously on the full sample. Column (4) replaces city fixed effects with country and border-pair fixed effects. Columns (5)–(6) split the sample at the median 1970 population. All specifications include city and year fixed effects unless otherwise noted. Standard errors clustered at the city level are in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Urban Growth and Sectoral Composition

	Dependent Variable: Population Growth					
	Internal Border			External Border		
	(1) Manuf.	(2) Agric.	(3) Mining	(4) Manuf.	(5) Agric.	(6) Mining
Panel A: Europe						
IB × Div × Share	-2.303***	0.773	2.328***			
	(0.644)	(1.487)	(0.719)			
IB × Div	1.529***	-0.410***	-0.570***			
	(0.552)	(0.145)	(0.149)			
EB × Div × Share				-2.253	1.741	1.225
				(1.424)	(1.360)	(2.140)
EB × Div				1.318	-0.648**	-0.658**
				(1.204)	(0.288)	(0.281)
% Share × Div	1.299***	-0.040	-1.227**	1.310***	0.011	-1.208**
	(0.429)	(0.894)	(0.511)	(0.429)	(0.891)	(0.511)
Effect at mean	-0.391	-0.392	-0.391	-0.571	-0.609	-0.572
Mean sector share	0.834	0.023	0.077	0.838	0.022	0.071
Outcome mean (%)	0.482	0.482	0.482	0.527	0.527	0.527
Cities	960	960	960	811	811	811
Observations	4,744	4,744	4,744	4,024	4,024	4,024
Adj. R^2	0.466	0.458	0.464	0.444	0.436	0.441
Panel B: Central Asia						
IB × Div × Share	-3.077	-8.565	4.210*			
	(2.106)	(5.799)	(2.405)			
IB × Div	2.635	0.794	-0.053			
	(1.701)	(0.496)	(0.405)			
EB × Div × Share				-6.067**	-8.846	-109.054
				(2.671)	(5.938)	(77.503)
EB × Div				5.544***	2.031**	1.057
				(2.029)	(0.859)	(0.713)
Share × Div	4.046**	7.934	-4.738**	4.049**	7.976	-4.742**
	(1.989)	(5.750)	(2.288)	(2.017)	(5.843)	(2.319)
Effect at mean	0.370	0.522	0.472	1.370	1.516	-11.061
Mean sector share	0.736	0.032	0.125	0.688	0.058	0.111
Outcome mean (%)	1.310	1.310	1.310	1.275	1.275	1.275
Cities	132	132	132	58	58	58
Observations	608	608	608	271	271	271
Adj. R^2	0.356	0.334	0.359	0.321	0.280	0.328
City FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Notes: The dependent variable is annualized city population growth (%). IB and EB indicate cities within 75 km of internal and external borders, respectively. Div equals one for post-1991 periods. "% Share" refers to the 1989 employment share in manufacturing (Columns 1, 4), agriculture (Columns 2, 5), or mining (Columns 3, 6) in 0 to 1 units. "Effect at mean" reports the implied border effect evaluated at the sample mean of the relevant sector share. Columns (1)–(3) exclude cities near external borders only; Columns (4)–(6) exclude cities near internal borders only. The Central Asia EB × Mining specification (Column 6, Panel B) yields unstable estimates due to few cities with substantial mining shares near external borders. Robust standard errors clustered at the city level are in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix A - Figures & Tables

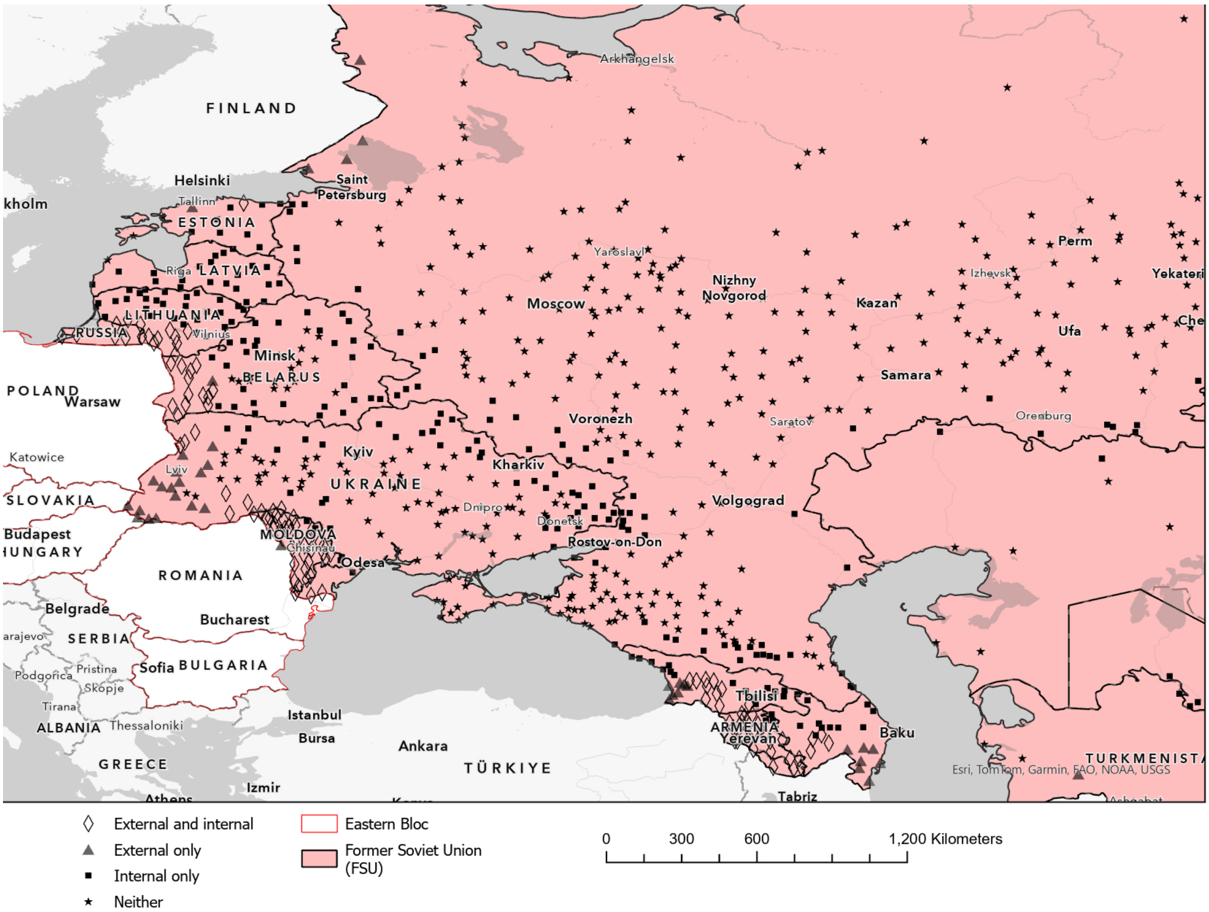


Figure A1: Cities by Type in the European Former Soviet Union

Notes: The map shows the distribution of city types. The cities that were within 75 km of both internal and external borders are denoted by rhombi, the cities that are within 75 km of only internal and only external borders are denoted by squares and triangles, respectively. Interior cities are marked by stars. A cut-off distance of 75 km is chosen following Redding and Sturm (2008).

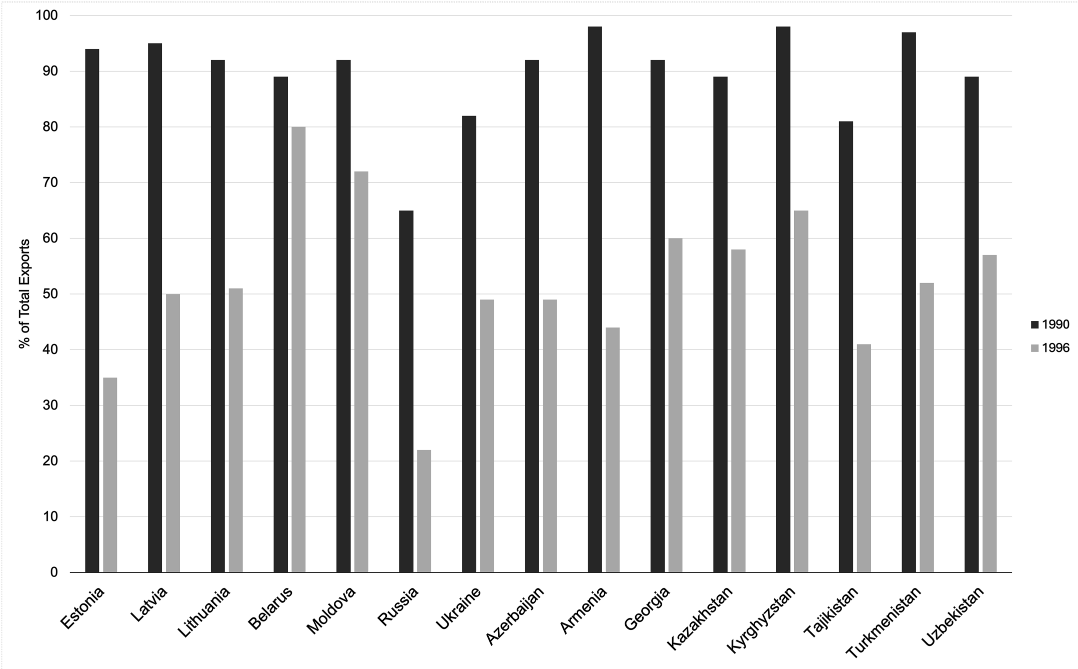
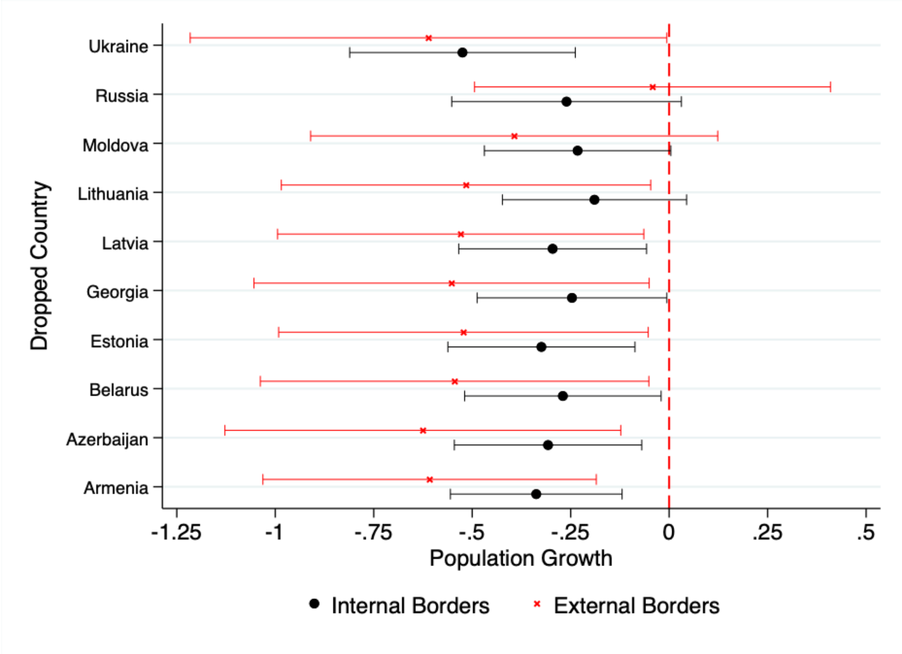
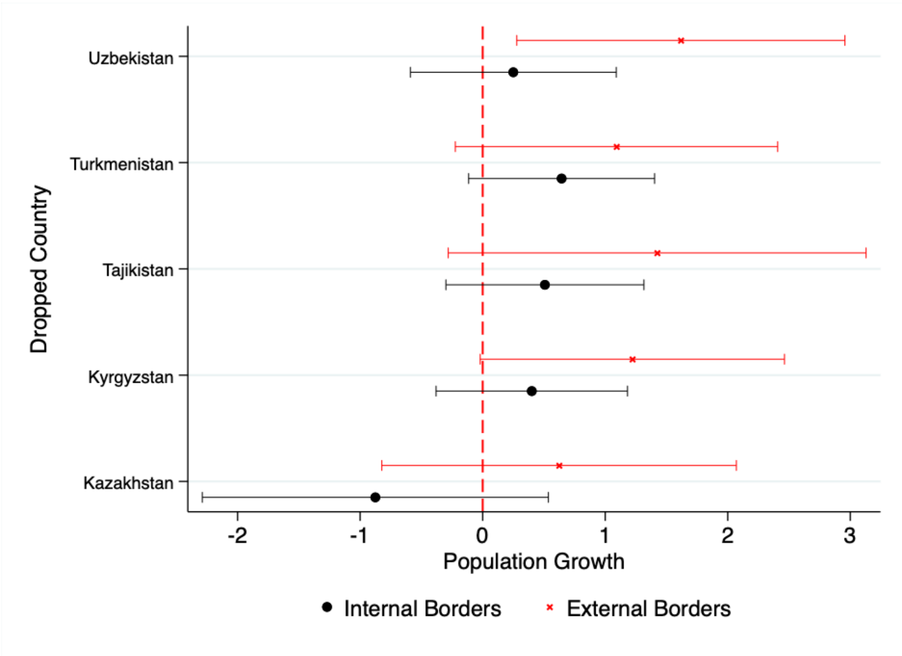


Figure A2: The share of exports to former Soviet countries relative to total exports, 1990 and 1996
Source: Reconstructed from Djankov and Freund (2002)



(a) Europe

Notes: This figure replicates the leave-one-out robustness check for ten European post-Soviet countries. Circles and X markers denote IB and EB effects, respectively. Both IB and EB effects remain negative and significant, the EB effect when excluding Russian cities, which make up most of the sample, is less precise.



(b) Central Asia

Notes: This figure replicates the analysis for five Central Asian countries. EB effects remain consistently positive and significant, while IB effects are smaller and less precise.

Figure A3: Dropping One Country at a Time

Table A1: Summary of Census Data

Country	Cities	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Armenia	21	1970	1979	1989	2001	2011	2016
Azerbaijan	36	1970	1979	1989	2002	2011	2015
Belarus	45	1970	1979	1989	1999	2009	2019
Estonia	13	1970	1979	1989	2000	2011	2017
Georgia	31	1970	1979	1989	2002	2014	2020
Kazakhstan	73	1970	1979	1989	1999	2009	2021
Kyrgyzstan	21	1970	1979	1989	1999	2009	2021
Latvia	13	1970	1979	1989	2000	2011	2020
Lithuania	22	1970	1979	1989	2001	2011	2021
Moldova	24	1970	1979	1989	2004	2014	
Russia	677	1970	1979	1989	2002	2010	2021
Tajikistan	20	1970	1979	1989	2000	2010	2021
Turkmenistan	9	1970	1979	1989	1995	1999	
Ukraine	201	1970	1979	1989	2001	2014	2021
Uzbekistan	29	1970	1979	1989	2005	2020	
Total	1235						

Notes: Census years are recorded for each country from 1970 to the most recent available year.

Table A2: Descriptive Statistics by Region

Variable	Group	Mean	S.D.	Min	Max	Obs.
			Europe			
Population Growth	IB=1	0.40	1.96	-13.61	14.81	1,298
	IB=0	0.55	1.75	-8.11	27.25	4,049
Population	IB=1	96,554	186,841	3,740	1,609,959	1,598
	IB=0	122,972	430,398	5,433	12,500,000	4,876
IB Distance (km)	IB=1	40.08	19.87	0.26	74.52	1,620
	IB=0	468.47	662.45	75.54	4,594.41	4,878
EB Distance (km)	IB=1	357.40	339.50	3.07	1,658.53	1,620
	IB=0	706.84	491.53	0.07	2,028.30	4,878
Large (=1)	IB=1	0.422	0.494	0	1	1,620
	IB=0	0.535	0.499	0	1	4,878
Log(Lights)	IB=1	7.57	1.64	0.92	11.95	6,030
	IB=0	8.67	1.41	0.92	14.50	13,290
Population Growth	EB=1	0.63	2.38	-13.61	27.25	528
	EB=0	0.50	1.73	-11.64	23.03	4,819
Population	EB=1	81,995	154,610	3,740	1,201,539	649
	EB=0	120,290	402,452	4,702	12,500,000	5,825
IB Distance (km)	EB=1	424.22	914.38	1.39	3,334.45	666
	EB=0	354.52	556.40	0.26	4,594.41	5,832
EB Distance (km)	EB=1	36.92	21.91	0.07	74.65	666
	EB=0	686.28	465.04	75.73	2,028.30	5,832
Large (=1)	EB=1	0.324	0.468	0	1	666
	EB=0	0.528	0.499	0	1	5,832
Log(Lights)	EB=1	7.20	1.55	1.10	11.13	2,654
	EB=0	8.50	1.50	0.92	14.50	16,666
			Central Asia			
Population Growth	IB=1	1.38	2.10	-8.71	16.36	397
	IB=0	1.23	2.37	-7.23	12.84	302
Population	IB=1	127,625	272,445	8,169	2,571,668	485
	IB=0	87,180	118,089	6,920	1,184,469	366
IB Distance (km)	IB=1	26.06	19.34	1.59	70.68	528
	IB=0	210.89	110.27	78.52	502.41	384
EB Distance (km)	IB=1	322.65	298.65	6.29	1,539.92	528
	IB=0	565.99	399.06	2.82	1,464.23	384
Large (=1)	IB=1	0.409	0.492	0	1	528
	IB=0	0.516	0.500	0	1	384
Log(Lights)	IB=1	8.11	1.74	3.53	12.05	1,495
	IB=0	8.13	1.62	3.18	11.54	1,166
Population Growth	EB=1	2.05	1.94	-6.68	5.39	37
	EB=0	1.27	2.23	-8.71	16.36	662
Population	EB=1	83,178	131,667	6,920	604,700	46
	EB=0	111,776	224,553	8,169	2,571,668	805
IB Distance (km)	EB=1	171.61	111.79	42.27	382.07	54
	EB=0	99.62	115.96	1.59	502.41	858
EB Distance (km)	EB=1	26.12	18.80	2.82	56.86	54
	EB=0	450.22	361.52	80.53	1,539.92	858
Large (=1)	EB=1	0.444	0.502	0	1	54
	EB=0	0.455	0.498	0	1	858
Log(Lights)	EB=1	6.94	1.72	3.18	11.50	308
	EB=0	8.27	1.62	3.53	12.05	2,353

Notes: "Population Growth" is the annualized average over the whole period, and "Population" is in levels. "IB Distance" and "EB Distance" measure straight-line kilometers from each city to the closest internal and external post-Soviet border, respectively. "Large (=1)" is a binary indicator for cities above the sample median in 1970 population. "Log(Lights)" denotes average annual log-transformed nightlight intensity.

Table A3: Treatment Descriptive Statistics by Region

Variable	Mean	S.D.	Min	Max	Obs.
		Europe			
Division	0.500	0.500	0	1	6,498
IB	0.249	0.433	0	1	6,498
EB	0.102	0.303	0	1	6,498
IB × Division	0.125	0.330	0	1	6,498
EB × Division	0.051	0.221	0	1	6,498
IB (0-25 km)	0.066	0.248	0	1	6,498
EB (0-25 km)	0.034	0.182	0	1	6,498
IB (0-25 km) × Division	0.033	0.178	0	1	6,498
EB (0-25 km) × Division	0.017	0.130	0	1	6,498
IB (0-50 km)	0.171	0.376	0	1	6,498
EB (0-50 km)	0.069	0.254	0	1	6,498
IB (0-50 km) × Division	0.085	0.280	0	1	6,498
EB (0-50 km) × Division	0.035	0.183	0	1	6,498
IB (0-100 km)	0.323	0.468	0	1	6,498
EB (0-100 km)	0.131	0.338	0	1	6,498
IB (0-100 km) × Division	0.162	0.368	0	1	6,498
EB (0-100 km) × Division	0.066	0.248	0	1	6,498
IB (0-125 km)	0.393	0.489	0	1	6,498
EB (0-125 km)	0.162	0.368	0	1	6,498
IB (0-125 km) × Division	0.197	0.398	0	1	6,498
EB (0-125 km) × Division	0.081	0.273	0	1	6,498
IB × Year 2-6 (same)	0.042	0.200	0	1	6,498
EB × Year 2-6 (same)	0.017	0.130	0	1	6,498
		Central Asia			
Division	0.500	0.500	0	1	912
IB	0.579	0.494	0	1	912
EB	0.059	0.236	0	1	912
IB × Division	0.289	0.454	0	1	912
EB × Division	0.030	0.170	0	1	912
IB (0-25 km)	0.316	0.465	0	1	912
EB (0-25 km)	0.033	0.178	0	1	912
IB (0-25 km) × Division	0.158	0.365	0	1	912
EB (0-25 km) × Division	0.016	0.127	0	1	912
IB (0-50 km)	0.487	0.500	0	1	912
EB (0-50 km)	0.046	0.210	0	1	912
IB (0-50 km) × Division	0.243	0.429	0	1	912
EB (0-50 km) × Division	0.023	0.150	0	1	912
IB (0-100 km)	0.632	0.483	0	1	912
EB (0-100 km)	0.086	0.280	0	1	912
IB (0-100 km) × Division	0.316	0.465	0	1	912
EB (0-100 km) × Division	0.043	0.202	0	1	912
IB (0-125 km)	0.678	0.468	0	1	912
EB (0-125 km)	0.125	0.331	0	1	912
IB (0-125 km) × Division	0.339	0.474	0	1	912
EB (0-125 km) × Division	0.063	0.242	0	1	912
IB × Year 2-6	0.096	0.295	0	1	912
EB × Year 2-6	0.010	0.099	0	1	912

Notes: This table reports summary statistics for treatment-related variables across Europe and Central Asia. "Division" marks post-collapse years. "IB" and "EB" indicate whether a city lies within 75 km of internal or external borders, with their interaction terms capturing treated units in a difference-in-differences setup. Distance-band variables (e.g., "IB (0–25 km)") indicate proximity to borders at varying thresholds. Interactions with "Division" capture heterogeneous treatment timing. "IB × Year 2–6" and "EB × Year 2–6" are event-time interaction terms used in the event-study specification; summary statistics are reported once because the underlying border indicator is time-invariant, so means are identical across event-time periods. Treatment indicators are not mutually exclusive.

Table A4: Urban Growth and Soviet Dissolution: Robustness Checks

	Dependent Variable: Population Growth (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Europe						
IB × Division	-0.314***	-0.686***	-0.284**	-0.303***	-0.317*	-0.225*
	(0.121)	(0.131)	(0.117)	(0.115)	(0.120)	(0.130)
EB × Division	-0.509**	-0.477**	-0.578***	-0.474	-0.518	-0.575**
	(0.242)	(0.224)	(0.224)	(0.310)	(0.254)	(0.259)
Outcome mean (%)	0.510	0.547	0.708	0.513	0.513	0.549
Cities	1,053	973	1,083	1,029	1,083	1,026
Observations	5,199	4,808	4,264	5,094	5,347	5,106
Adj. R^2	0.435	0.485	0.469	0.455	0.438	0.437
Panel B: Central Asia						
IB × Division	0.388	0.383	0.358	0.473	0.398	0.401
	(0.397)	(0.401)	(0.393)	(0.402)	(0.308)	(0.399)
EB × Division	1.347**	1.448*	0.508	1.792**	1.347*	1.221*
	(0.635)	(0.852)	(0.541)	(0.745)	(0.686)	(0.633)
Outcome mean (%)	1.319	1.342	1.736	1.297	1.314	1.392
Cities	149	140	152	150	152	131
Observations	685	650	547	691	699	594
Adj. R^2	0.288	0.303	0.190	0.289	0.293	0.304
Sample restriction	Pop 1970<500k	Non-conflict	Excl. 1989–99	Excl. both IB&EB	Two-way clustering	Excl. WTO-by-2001
City FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Notes: The dependent variable is annualized city population growth (%). IB and EB indicate cities within 75 km of an internal or external border, respectively. Division equals one in post 1991 periods and zero otherwise. All specifications include city fixed effects and year fixed effects. *Column (1) Pop 1970 < 500k:* Restricts the sample to non-primate cities with 1970 population below 500,000. This addresses concerns that cities with exceptional *propiska* enforcement or very deep national networks drive the baseline results. *Column (2) Non conflict borders:* Drops cities exposed to conflict border pairs. Internal conflict exposed pairs excluded treatment cities along Armenia-Azerbaijan, Georgia-Russia, Kyrgyzstan-Tajikistan, and Russia-Ukraine border pairs. External conflict exposed pairs excluded treatment cities along Armenia-Türkiye and Afghanistan-Tajikistan. Interior cities remain in the sample. Border cities on non-conflict border pairs remain. *Column (3) Exclude 1989 to 1999:* Excludes the 1989 to 1999 intercensal period. This removes the immediate collapse decade where measurement error, boundary changes, and short run turmoil are most intense. *Column (4) Exclude both IB and EB:* Drops cities that are simultaneously within 75 km of both an internal and an external border. This ensures treatment is not mechanically mixing internal and external exposure in the same city. *Column (5) Two way clustering:* Standard errors are two-way clustered by city and census year for Europe. For Central Asia, standard errors are clustered at the city by year level due to a much smaller sample. *Column (6) Exclude WTO by 2000:* Drops countries that joined the WTO by 2000 nd re-estimates the baseline on the remaining countries. This is meant to soak up early, policy driven trade liberalization that could interact with border proximity. Standard errors are clustered as stated below and reported in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Column (5) implements two-way clustering by city and census year for Europe (1,026 city clusters × 5 year clusters).

Table A5: Urban Growth and Soviet Dissolution: Distance-Based Robustness Checks

	Dependent Variable: Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Europe						
IB×Division	-0.310	-0.304**	-0.208*	-0.398***	-0.400***	-0.492***
	(0.206)	(0.137)	(0.108)	(0.113)	(0.115)	(0.117)
EB×Division	-1.046**	-0.745**	-0.671***	-0.389*	-0.368*	-0.414*
	(0.423)	(0.316)	(0.198)	(0.210)	(0.210)	(0.212)
Outcome mean (%)	0.513	0.513	0.513	0.511	0.522	0.545
Distance sample (IB&EB)	All	All	All	<2000 km	<1500 km	<1000 km
Cities	1083	1083	1083	1046	963	819
Observations	5347	5347	5347	5162	4747	4027
Adj. R^2	0.437	0.438	0.439	0.450	0.447	0.447
Panel B: Central Asia						
IB×Division	0.376	0.422	0.373	0.452	0.277	0.396
	(0.312)	(0.359)	(0.433)	(0.407)	(0.401)	(0.469)
EB×Division	1.818**	1.284*	1.194*	1.319**	1.170*	1.250*
	(0.883)	(0.738)	(0.607)	(0.644)	(0.630)	(0.667)
Outcome mean (%)	1.314	1.314	1.314	1.322	1.358	1.392
Distance sample (IB&EB)	All	All	All	<1250 km	<1000 km	<750 km
Cities	152	152	152	144	138	124
Observations	699	699	699	659	629	559
Adj. R^2	0.291	0.290	0.291	0.280	0.283	0.269
Treatment Cut-off	25km	50km	100km	75km	75km	75km
City FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Notes: This table reports robustness checks on population growth using varying proximity thresholds to internal (IB) and external (EB) Soviet borders. Division = 1 for years from 1991 onward. Cutoffs are indicated in the "Treatment Cut-off" row. All models include city and year fixed effects. Standard errors are clustered at the city level and shown in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Summary Statistics: Sectoral Composition (1989)

	All Cities			IB Cities			EB Cities			Interior		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Panel A: Europe												
Manufacturing share	0.832	0.229	1,015	0.824	0.246	255	0.848	0.205	106	0.837	0.224	705
Agriculture share	0.025	0.080	1,015	0.033	0.106	255	0.037	0.100	106	0.020	0.062	705
Mining share	0.076	0.204	1,015	0.090	0.224	255	0.059	0.168	106	0.072	0.198	705
Total employment	18,065	40,965	1,015	17,506	33,515	255	13,064	25,337	106	18,609	44,258	705
Panel B: Central Asia												
Manufacturing share	0.729	0.292	139	0.759	0.291	83	0.539	0.373	9	0.712	0.264	49
Agriculture share	0.044	0.134	139	0.032	0.114	83	0.203	0.333	9	0.037	0.076	49
Mining share	0.113	0.254	139	0.114	0.270	83	0.001	0.003	9	0.127	0.245	49
Total employment	12,480	20,590	139	13,626	21,642	83	4,441	6,862	9	11,754	19,944	49

Notes: This table reports summary statistics for 1989 sectoral employment shares and total employment across city types. IB Cities are within 75 km of an internal border; EB Cities are within 75 km of an external border; Interior cities are beyond 75 km of both border types. Sectoral shares are calculated as sector employment divided by total city employment in 1989. In Europe, sectoral composition is similar across city types. In Central Asia, EB cities have notably lower manufacturing shares (0.54 vs 0.71–0.76) and higher agriculture shares (0.20 vs 0.03–0.04), though the sample includes only 9 cities.

Table A7: Robustness to Matching – Europe

	Dependent Variable: Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Matching On	1970 Population	1989 Industrial Employment	1989 Industrial Turnover	1989 Manufacturing	1989 SIC	Military Size & Number
Panel A: Europe – Internal Borders						
IB × Division	-0.551***	-0.318**	-0.517***	-0.436***	-0.614***	-0.432***
	(0.131)	(0.142)	(0.132)	(0.138)	(0.198)	(0.137)
Outcome mean	0.460	0.481	0.402	0.419	0.405	0.534
Observations	3,010	2,917	2,838	2,927	1,605	3,556
Cities	613	594	578	596	331	717
Adj. R^2	0.426	0.440	0.432	0.432	0.396	0.485
Panel B: Europe – External Borders						
EB × Division	-0.525*	-0.695**	-0.826***	-0.651**	-0.776*	-0.826**
	(0.275)	(0.272)	(0.263)	(0.264)	(0.408)	(0.409)
Outcome mean	0.653	0.586	0.524	0.542	0.596	0.745
Observations	1,272	1,164	1,263	1,233	665	490
Cities	260	238	258	252	138	100
Adj. R^2	0.356	0.333	0.364	0.373	0.278	0.307

Notes: This table reports difference-in-differences estimates on matched samples to test whether pre-existing city characteristics explain the border effects. Each column estimates the baseline specification (Equation 3) on a subsample of treated border cities and their matched controls. Matching is performed using 1:2 nearest-neighbor matching without replacement on the covariate indicated in each column header. The dependent variable is annualized city population growth (%). "IB × Div" and "EB × Div" indicate internal and external border cities in post-1991 periods, respectively. All specifications include city and year fixed effects. Standard errors clustered at the city level are in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Robustness to Matching – Central Asia

	Dependent Variable: Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Matching On	1970 Population	1989 Industrial Employment	1989 Industrial Turnover	1989 Manufacturing	1989 SIC	Military Size & Number
Panel A: Central Asia – Internal Borders						
IB × Division	0.479	0.565	0.621	0.546	0.337	0.379
	(0.431)	(0.495)	(0.522)	(0.429)	(0.623)	(0.630)
Outcome mean	1.315	1.333	1.345	1.375	1.382	1.562
Observations	628	574	561	547	491	317
Cities	136	125	122	119	107	69
Adj. R^2	0.297	0.320	0.321	0.360	0.332	0.407
Panel B: Central Asia – External Borders						
EB × Division	3.344*	0.857	1.309	1.218	0.158	3.819*
	(1.764)	(1.246)	(1.387)	(2.263)	(1.256)	(1.450)
Outcome mean	1.463	1.538	1.378	1.538	1.755	2.294
Observations	71	56	80	58	53	22
Cities	16	13	18	13	12	5
Adj. R^2	0.184	0.142	0.0464	-0.0505	0.442	0.401

Notes: This table reports difference-in-differences estimates on matched samples to test whether pre-existing city characteristics explain the border effects. Each column estimates the baseline specification (Equation 3) on a subsample of treated border cities and their matched controls. Matching is performed using 1:2 nearest-neighbor matching without replacement on the covariate indicated in each column header. The dependent variable is annualized city population growth (%). "IB × Div" and "EB × Div" indicate internal and external border cities in post-1991 periods, respectively. All specifications include city and year fixed effects. Standard errors clustered at the city level are in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Descriptive Statistics for Matched Samples in Europe

Matching Variable	Group	Mean	S.D.	Min	Max	Obs.
		Europe: IB vs. Interior				
Population 1970	IB=1	77,885	152,370	10,065	1,222,852	1,620
	IB=0	78,665	146,841	10,037	1,170,133	2,208
Industrial Employment	IB=1	17,575	33,508	195	250,404	1,524
	IB=0	16,724	31,096	190	274,489	2,226
Industrial Turnover	IB=1	382,745	675,022	70	4,758,280	1,530
	IB=0	407,721	724,176	64	4,796,282	2,046
SIC	IB=1	13,162	6,555	2,730	32,720	1,518
	IB=0	16,452	6,924	2,730	32,720	528
Manufacturing Turnover	IB=1	245,184	488,580	70	3,781,983	1,518
	IB=0	274,817	526,857	64	3,728,328	2,154
Military Count	IB=1	8.08	17.72	1	160	1,074
	IB=0	10.62	47.67	1	796	3,432
Military Size	IB=1	17.59	37.89	2	339	1,074
	IB=0	23.54	107.23	2	1,784	3,432
		Europe: EB vs. Interior				
Population 1970	EB=1	60,889	114,896	10,149	766,705	666
	EB=0	63,760	117,322	10,136	770,905	1,176
Industrial Employment	EB=1	13,315	25,414	97	161,117	624
	EB=0	14,084	26,340	37	158,143	1,098
Industrial Turnover	EB=1	281,721	521,377	70	3,176,533	636
	EB=0	278,702	523,180	64	3,107,729	1,128
SIC	EB=1	13,092	6,258	2,730	27,520	630
	EB=0	14,841	6,225	2,730	27,520	360
Manufacturing Turnover	EB=1	175,682	339,865	70	2,117,026	630
	EB=0	186,157	353,817	64	2,161,119	1,062
Military Count	EB=1	7.76	15.26	1	105	396
	EB=0	14.65	27.87	1	166	294
Military Size	EB=1	16.53	32.27	2	218	396
	EB=0	31.65	59.62	2	360	294

Notes: This table reports descriptive statistics for the matched samples used in Table A7. "IB" and "EB" denote cities within 75 km of internal and external borders, respectively. Matching is performed using 1:2 nearest-neighbor matching without replacement on the indicated covariate, based on baseline city characteristics (1970 for population, 1989 for industrial variables). Observation counts reflect city-period pairs in the panel structure; lower counts in Table A7 arise because the dependent variable (annualized population growth) requires two consecutive census observations, which are unavailable for some city-period combinations. Counts vary across covariates due to missing data in the pre-collapse industrial census. Industrial and manufacturing turnover are in thousands of local currency units. "SIC" is the sum of 2-digit Soviet industrial classification codes present in each city, used as a proxy for sectoral diversity. "Military Count" refers to the number of Soviet military-industrial establishments (factories, design bureaus, and research institutes) in each city that closed between 1989 and 1991, as documented in the Dexter and Rodionov (2024) database. "Military Size" is the sum of size classifications of these closed establishments, where size is coded from 1 (fewer than 100 workers) to 3 (more than 1,000 workers). Both military variables thus measure defense sector divestment rather than the stock of active facilities.

Table A10: Descriptive Statistics for Matched Samples in Central Asia

Matching Variable	Group	Mean	S.D.	Min	Max	Obs.
		Central Asia: IB vs. Interior				
Population 1970	IB=1	60,740	78,990	10,238	430,618	510
	IB=0	62,233	83,617	10,184	523,271	336
Industrial Employment	IB=1	12,049	16,199	147	87,890	492
	IB=0	11,718	19,873	118	117,556	294
Industrial Turnover	IB=1	330,075	453,680	1,330	2,403,345	498
	IB=0	486,119	678,238	954	2,731,450	270
SIC	IB=1	12,125	7,294	2,730	49,111	498
	IB=0	14,664	8,230	2,730	35,330	150
Manufacturing Turnover	IB=1	219,543	354,893	690	1,825,853	474
	IB=0	208,579	328,201	579	1,414,383	264
Military Count	IB=1	5.28	11.54	1	72	276
	IB=0	2.92	2.65	1	11	150
Military Size	IB=1	11.70	25.18	2	158	276
	IB=0	6.32	5.80	2	23	150
		Central Asia: EB vs. Interior				
Population 1970	EB=1	49,292	73,462	11,375	253,118	54
	EB=0	54,297	80,648	11,208	266,815	90
Industrial Employment	EB=1	4,441	6,531	163	21,598	54
	EB=0	5,018	6,827	147	22,022	96
Industrial Turnover	EB=1	116,812	131,846	2,523	382,986	54
	EB=0	126,923	134,793	2,080	386,449	96
SIC	EB=1	10,460	5,636	7,239	20,130	48
	EB=0	11,530	6,153	7,239	20,110	36
Manufacturing Turnover	EB=1	77,858	94,535	1,642	281,351	42
	EB=0	79,070	95,258	1,362	302,282	84
Military Count	EB=1	1.33	0.49	1	2	18
	EB=0	1.50	0.51	1	2	24
Military Size	EB=1	2.67	0.97	2	4	18
	EB=0	3.00	1.02	2	4	24

Notes: This table reports descriptive statistics for the matched samples used in Table A8. "IB" and "EB" denote cities within 75 km of internal and external borders, respectively. Matching is performed using 1:2 nearest-neighbor matching without replacement on the indicated covariate, based on baseline city characteristics (1970 for population, 1989 for industrial variables). Observation counts reflect city-period pairs in the panel structure; lower counts in Table A8 arise because the dependent variable (annualized population growth) requires two consecutive census observations, which are unavailable for some city-period combinations. Counts vary across covariates due to missing data in the pre-collapse industrial census. Industrial and manufacturing turnover are in thousands of local currency units. "SIC" is the sum of 2-digit Soviet industrial classification codes present in each city, used as a proxy for sectoral diversity. "Military Count" refers to the number of Soviet military-industrial establishments (factories, design bureaus, and research institutes) in each city that closed between 1989 and 1991, as documented in the Dexter and Rodionov (2024) database. "Military Size" is the sum of size classifications of these closed establishments, where size is coded from 1 (fewer than 100 workers) to 3 (more than 1,000 workers). Both military variables thus measure defense sector divestment rather than the stock of active facilities.

Appendix A1 - Data Cleaning

Night Lights Data

Several steps were undertaken to transform pixel-level lights data into city-level data following Storeygard (2016). First, 30 satellite-years of night lights data were merged into a single binary grid, indicating whether a pixel was lit above 20 in at least one year.[20] These ever-lit areas were then converted into polygons by aggregating contiguous lit pixels and summing their relative digital values, that range from 0 to 63, for each year. I excluded polygons that did not correspond to a known city, using census population data with latitude and longitude coordinates from Brinkhoff (2021). The discarded lights likely represent forest fires, sensor noise not flagged by the satellite algorithm, or smaller towns and large villages, accounting for 10 to 20 percent of total digital numbers in the 15-country sample. Additionally, I removed lights from gas flares, as identified by Elvidge et al. (2009). To further minimize errors, I limited the lights to the borders of the FSU countries. The night lights dataset is annual from 1992 to 2013, enabling analysis only for the period following the division.[21]

[20]A digital number threshold of 20 is used to minimize blooming effects and sensor noise around urban peripheries while retaining reliably lit areas. Li et al. (2020) show that thresholds of 20 to 30 effectively eliminate such artifacts and produce more consistent time series data.

[21]Gibson et al. (2021) highlight key issues with DMSP night lights data, such as blurring and top-coding, which can distort economic measurements. They particularly note that these errors lead to poor predictions of economic activity in low-density rural areas. However, my study focuses on whole cities with populations of at least ten thousand people in 1970, where these data provide more reliable insights. Additionally, the results are robust to dropping big cities such as Moscow, where top coding may be an issue.

Appendix B - Effects by Individual Border Pair

To further probe how the effect differs for each border pair, I estimate the following three-way interaction model separately for internal and external borders:

$$y_{ct} = \sum_{j=1}^{J} \beta_j \big(\text{border}_c \times \text{division}_t \times \mathbf{1}\{\text{borderpair}_c = j\}\big) + \alpha_c + d_t + \epsilon_{ct}, \tag{4}$$

where border_c indicates proximity to internal or external borders, $\mathbf{1}\{\text{borderpair}_c = j\}$ is an indicator equal to one if city c's nearest border belongs to border pair j and zero otherwise, and J is the total number of border pairs. City fixed effects α_c absorb all time-invariant city characteristics, including border-pair membership, while year fixed effects d_t control for common census year shocks. This model allows isolation of how the Soviet Union's dissolution uniquely influenced population growth around distinct borders.

Figure B1 illustrates these effects for internal border pairs. Cities in Eastern Europe generally experienced negative growth, reflecting economic disruptions and decreased trade connectivity after 1991. Particularly pronounced declines occurred near borders involving Russia, Ukraine, Belarus, and the Baltic states, where Soviet-era industrial and agricultural supply chains were abruptly severed. The Baltics faced prolonged adjustment costs due to delayed integration with Western Europe, while Moldova-Ukraine and Belarus-Ukraine borders became emblematic of fragmented regional economies. In the Caucasus, effects varied: militarized borders like Armenia-Azerbaijan saw near-total economic isolation due to conflict, whereas Georgia's borders with Russia mirrored post-2008 geopolitical tensions. Central Asian border cities, in contrast, show positive urban growth near intra-regional borders, likely buoyed by preserved rail connectivity and reoriented trade networks, though smaller samples limit precision for some pairs.

Figure B2 shows results for external border pairs. Most Slavic and Baltic countries faced negative growth due to severed economic connections with Eastern Bloc countries after the dissolution of COMECON. However, Kaliningrad emerged as an outlier, leveraging its exclave status through cross-border cooperation with the EU and targeted economic policies. In the Caucasus, while the observation count for

Turkiye-Armenia is notable, the closed and militarized status of this border—due to the unresolved Nagorno-Karabakh conflict and lack of diplomatic relations—likely stifled formal economic integration. Post-Soviet economic chaos and Georgia's conflicts likely drove urban decline along the Türkiye-Georgia border, eclipsing its strategic geographic advantages. Central Asian cities along exterior borders show positive growth, particularly where Soviet-era isolation gave way to reopened trade corridors with Iran, Afghanistan, and China. These regions transformed into gateways for informal markets and infrastructure projects, offsetting the loss of centralized Soviet trade frameworks.

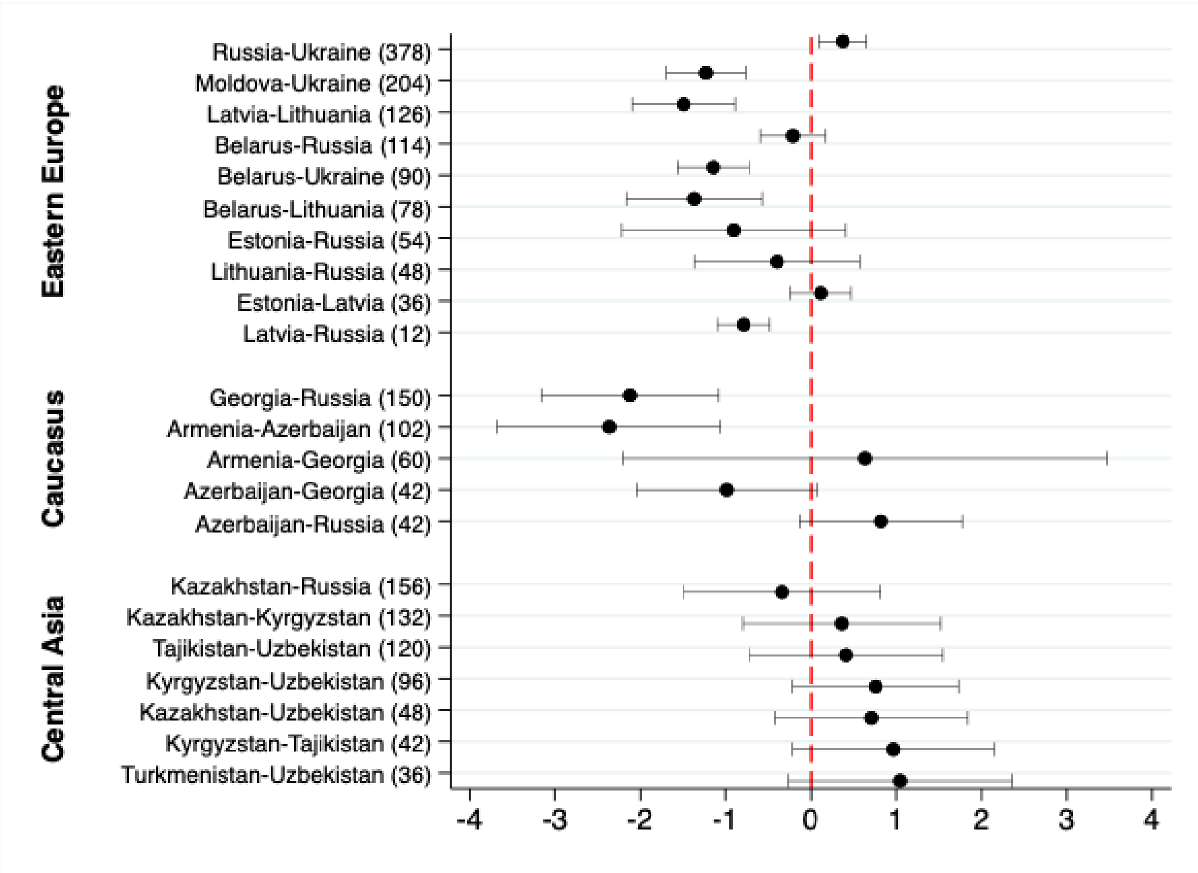


Figure B1: Coefficient plot for internal border pairs by region

Notes: This figure presents the coefficient estimates from separate regressions of population growth on internal border treatment interactions, conducted independently for Eastern Europe, Caucasus, and Central Asia. Each region's regression uses interior cities within that region as the control group. Confidence intervals represent the 95% level, with horizontal tails indicating precision. The numbers in parentheses following border pair labels indicate the number observations in the corresponding treatment border pair group. Standard errors are clustered at the unique city identifier. The vertical dashed red line represents a coefficient of zero.

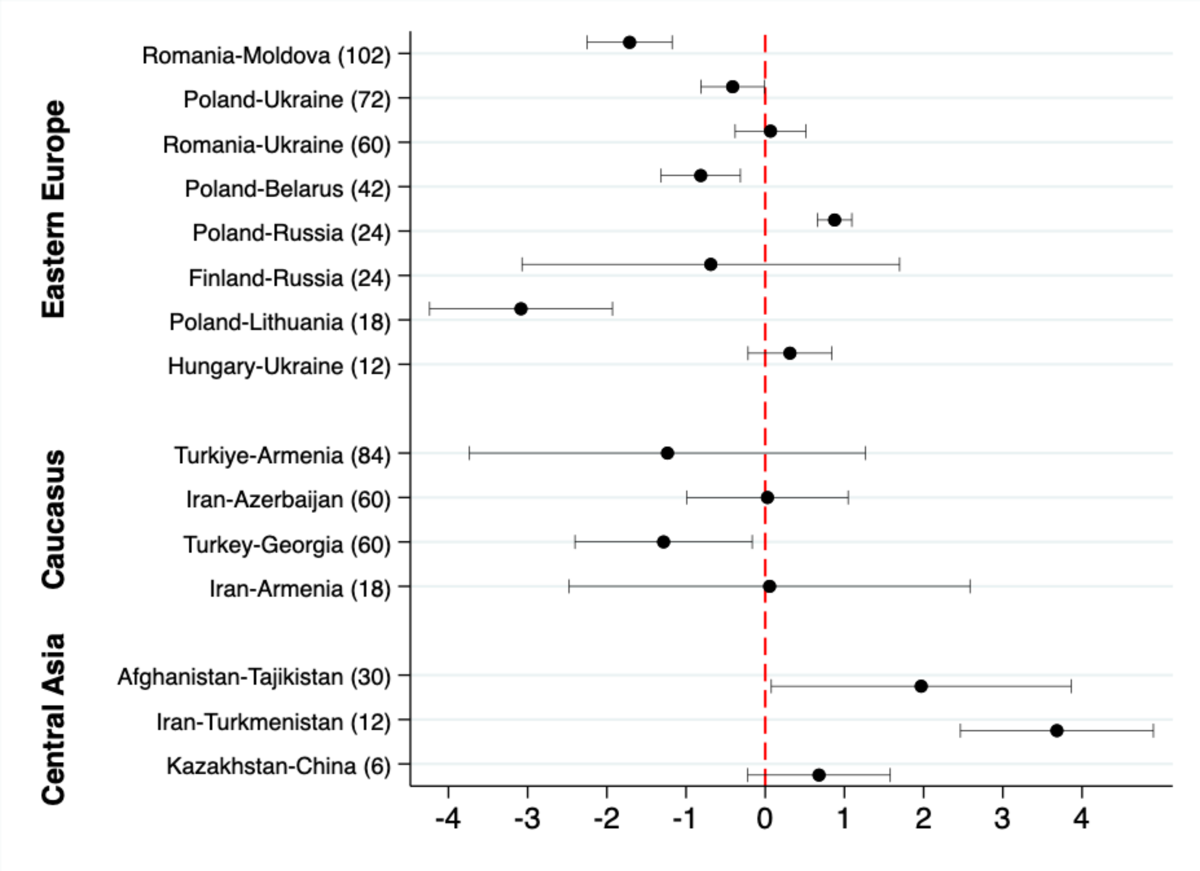


Figure B2: Coefficient plot for external border pairs by region

Notes: This figure illustrates coefficient estimates derived from separate regressions of population growth on external border treatment interactions, conducted individually for Eastern Europe, Caucasus, and Central Asia. Each regression employs interior cities within the respective region as controls. The regressions exclude certain external border pairs as indicated in the detailed regression specifications. The numbers in parentheses following border pair labels indicate the number observations in the corresponding treatment border pair group. Confidence intervals at the 95% level include horizontal tails for precision, and standard errors are clustered by city. The vertical dashed red line indicates a zero coefficient.

Appendix C - Effects on Economic Activity Proxied by Night Lights

In this section, I examine whether the city-level population results for Europe and Central Asia also manifest in nighttime lights data, a widely used proxy for local economic activity. Although nighttime light data is only available from 1992 onward, I exploit this limitation by treating 1992, the first full year after the Soviet dissolution, as the omitted baseline. I estimate separate event-study specifications for internal and external border cities, comparing changes in log night lights relative to interior cities over the period 1993–2013.

$$\log(\text{lights})_{ct} = \sum_{\tau=1993}^{2013} \beta_\tau \big(\text{border}_c \times \mathbf{1}\{t = \tau\}\big) + \alpha_c + d_t + \epsilon_{ct}, \tag{5}$$

where $\log(\text{lights})_{ct}$ is the log of summed lights in city c in year t, border_c is a dummy equal to one if a city is within 75 km of a border and zero otherwise, and $\mathbf{1}\{t = \tau\}$ is an indicator for year τ. The year 1992 serves as the omitted baseline, so each coefficient β_τ captures the difference in log night lights between border and interior cities in year τ relative to 1992. City fixed effects α_c absorb time-invariant city characteristics, while year fixed effects d_t control for common annual shocks. The specification is estimated separately for internal border cities (IB) and external border cities (EB), with the two sets of coefficients plotted together in Figure C1. While this approach does not allow for direct observation of pre-1992 trends, it reveals important information about the relative trajectories of economic activity following the dissolution.

Figure C1 presents results for Europe (Panel A) and Central Asia (Panel B). In Europe, both internal and external border cities show negative deviations from interior cities in the years immediately following 1992. This does not necessarily imply an absolute decline in night light intensity; rather, it suggests that economic activity near borders grew more slowly (or recovered more weakly) relative to interior areas. This pattern is consistent with disruptions to Soviet-era trade and transport networks, which previously operated without regard to internal borders. The more pronounced negative trajectory for internal border cities highlights the economic cost of new frictions introduced by national boundaries. Tighter pre-existing integration within and with social European countries appears to have amplified the economic cost of fragmentation.

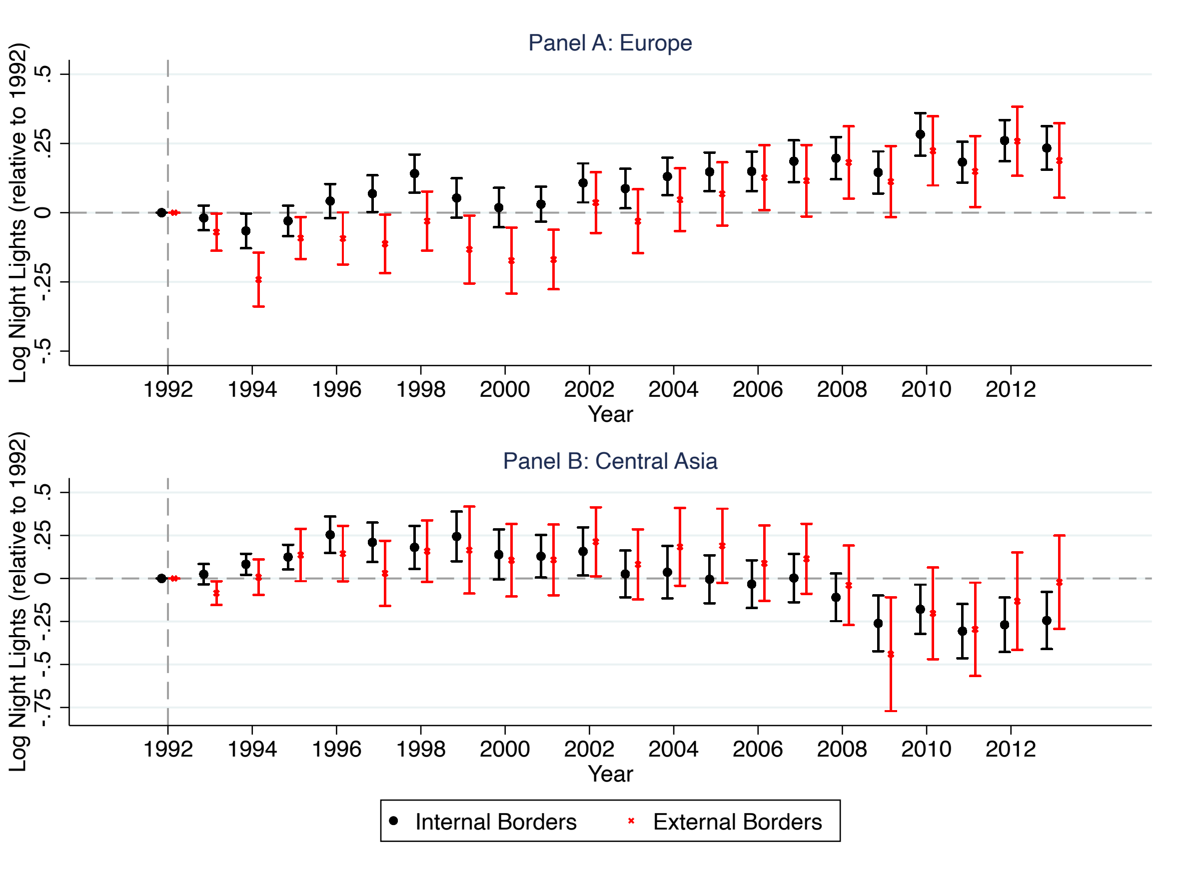


Figure C1: Event-study Estimates of Nighttime Light Intensity relative to 1992

Notes: This figure plots the coefficients from event-study regressions estimating changes in log nighttime light intensity—a proxy for economic activity—relative to the baseline year 1992. Black circles denote cities located near internal post-Soviet borders; red X's represent cities near external borders. Panel A shows that in Europe, internal border cities experienced sustained relative declines in light intensity throughout the 1990s, reflecting the disruptive effects of the Soviet collapse on previously integrated economies. External border cities in Europe also declined, but less sharply. In contrast, Panel B shows that Central Asia's internal border cities saw stable or mildly improving outcomes, while external border cities experienced rising light intensity over time—consistent with gains from opening up trade with non-Soviet neighbors such as China, Iran, and Turkey. Confidence intervals at the 95% level are shown. All regressions include city and year fixed effects and cluster standard errors at the city level.

After 2002, the relative trajectory shifts as both internal and external border cities in Europe begin to experience positive deviations in night light intensity relative to interior cities. This recovery may reflect broader regional stabilization, the normalization of border institutions, and increased cross-border cooperation. While only the Baltic states joined the EU during this period, several countries pursued economic liberalization and established free trade agreements, including within the Commonwealth of Independent States (CIS). Five post-Soviet European countries joined the WTO by 2002 (Estonia, Latvia, Georgia, Lithuania, Moldova), with Armenia following in 2003, though major economies like Russia and Ukraine joined much later (2012 and 2008, respectively). Investments in transport corridors, customs modernization, and institutional harmonization likely contributed to the gradual reintegration of previously disrupted economic zones, enabling border cities to catch up or even outperform interior regions in relative terms.

Results for Central Asia reveal a different pattern. Both internal and external border cities show positive and increasing deviations over time in the first decade following the Soviet collapse relative to 1992. These estimates suggest that economic activity in these cities increased more (or decreased less) than in the interior relative to the baseline, likely driven by weak pre-collapse integration and expanded access to neighboring markets that had been largely inaccessible during the Soviet period. However, in the mid 2000s, the initially positive relative trajectories for border cities begin to flatten or even reverse. This shift may reflect several dynamics: first, the early post-independence gains from reopening cross-border trade with each other and non-Soviet neighbors could have plateaued as economic centralization, increasing state control, high tariffs and tighter border enforcement due to perceived terrorism threats, particularly in countries like Uzbekistan and Turkmenistan, may have served to the detriment of peripheral areas (Mubinzhon and Ricardo, 2021). Moreover, only Kyrgyzstan joined the WTO during this period, and a shift away from informal trade networks may have curbed the local economic dynamism that characterized the 1990s.

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