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Russia's Internal Border

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Comments Welcome

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Abstract

In integrated economies, inter-city price differences can be explained largely by transportation costs. This is not the case in Russia. Here, we argue that this is due to an *internal border* that separates a region we denote as the Red Belt from the rest of Russia. Regions within the Red Belt exhibit high degrees of price dispersion and thus seem isolated. Moreover, these regions have been relatively slow to adopt economic reforms, and have suffered relatively low growth rates. The impact of the border on price dispersion is shown to be comparable to the impact of the U.S.-Canadian border.

JEL Classifications: P22, R12; Keywords: price dispersion, market integration.

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1. Introduction

The internal workings of fully integrated market economies are well understood. For example, to the extent that prices of comparable goods differ within such economies, these differences can be explained largely by transportation costs that eliminate arbitrage opportunities (Benson and Faminow, 1990; Engel and Rogers, 1996; Parsley and Wei, 1996; and Rogoff, 1996). This is not the case in Russia. Despite efforts undertaken since the early 1990s to transform itself from a system with fixed prices and administered inter-regional economic relations to one in which inter-regional relations are supposed to be guided by a flexible and informative price system, dramatic differences in prices of similar goods exist within Russia that seemingly cannot be accounted for by physical distance. Gardner and Brooks (1993) quantified these differences in a study of Russia's retail food market in 1992:

> It seems clear that large gains could be achieved by further market integration. The best evidence of this is from price relationships between cities in the same region. For example, Ulyanovsk on the Volga region had the largest volume of sugar sales (in monitored stores) in the Volga region, and the lowest price, at 25 rubles per kilo as of August 25. At the same time, the two nearest cities in our sample, Syzran' and Samara, 150 and 286 kilometers away, and both also on the Volga River, had prices of 62.5 rubles. Transportation costs in this situation could not have been more than a few rubles per kilo. The profit potential appears enormous, as do the potential welfare gains. (p.29)

DeMasi and Koen (1996) document that price dispersion in Russia has remained high relative to international standards since 1992.

Here, we argue that the primary culprit behind Russia's apparent lack of market integration is the behavior of a relatively isolated cluster of regional economies referred to hereafter as the Red Belt. We support this argument using a procedure akin to that of Engel and Rogers (1996) which indicates the presence of an *internal border* that separates the Red Belt from

the rest of Russia. Engel and Rogers sought to determine the extent to which the U.S.-Canadian border accounts for differences in city-specific commodity prices beyond that accounted for by physical distance. They found the impact of the border to be substantial: controlling for distance, cities on opposite sides of the border feature substantially higher differences in commodity prices than do cities on either side of the border. This suggests that while the U.S. and Canadian economies are integrated individually, they are less closely integrated jointly.

We adopt the Engel-Rogers methodology to examine the economic importance of Russia's Red-Belt border. We define the Red Belt as those regional entities (oblasts, republics, and krais) that voted against the incumbent reformist coalition in favor of the Communist Party during the 1996 presidential elections. (Figure 1 presents a map of Russia that highlights the Red Belt; Table 1 indicates the capital cities of each region included in our data set, and whether these cities belong in the Red Belt.) We employ this border definition because it demarcates a sharp difference in attitudes towards economic reform: the incumbents proposed to extend pro-market reforms, while the Communists proposed to reverse them. This border definition turns out to set apart the Red Belt from the rest of Russia along other key dimensions, a point we return to below.

Like Engel and Rogers, we find the economic importance of Russia's Red-Belt border to be substantial: it is a significant explanatory variable in accounting for inter-city price differences. However, the role it plays in accounting for price differences is distinct from that played by the U.S.-Canadian border. While the U.S.-Canadian border separates two individually-integrated economies, Russia's Red Belt does not appear to be internally integrated. Indeed, it is often the case that price differences observed between cities within the Red Belt are higher than differences observed for cities on opposite sides of the Red-Belt border.

While the roles played by the U.S.-Canadian and Red-Belt borders in accounting for price dispersion are distinct, their economic importance is comparable. For example, Engel and Rogers found that distance and the U.S.-Canadian border account for 14 and 30 percent of cross-border differences in food prices. Our results for distance and Russia's Red-Belt border are 31

and 9 percent. The impact of the border relative to distance is lower in our data in part because distance costs are significantly higher in Russia due to Russia's relatively underdeveloped transport infrastructure (Holt, 1993; and Joskow, Schmalensee and Tsukanova, 1994). This consideration, coupled with the fact that U.S.-Canadian trade involves different currencies, customs regulations, etc., renders the impact of Russia's internal border particularly striking.

Beyond their presidential preferences and relative economic isolation, we document several additional dimensions along which regions in the Red Belt are distinct relative to those outside the Red Belt. In terms of attitudes towards economic reform, regions within the Red Belt have lagged behind the rest of Russia in adopting federally-initiated policies to liberalize prices and eliminate distortionary budgetary subsidies. The failure to adopt these reforms in fact provides a strong rationale for the economic isolation we observe within the Red Belt. Suppose a local government chose to subsidize food prices in an attempt to win the loyalty of its constituents. (Berkowitz, 1996, argues for the plausibility of this motive; additional motives are offered by Shleifer and Vishny, 1992; Polterovich, 1993; and Murrell, Dunn and Korsun, 1996.) Given openness to trade with neighboring localities, this subsidization effort would benefit far more than the local constituents, and would ultimately become unsustainable.

An example of this behavior is provided by the Ulyanovsk oblast. Recall the example offered by Gardner and Brooks (1993) (quoted above) of the low price of sugar in Ulyanovsk, which by no coincidence lies in the Red Belt. The government of Ulyanovsk is notorious for maintaining price controls. They accomplish this by coercing manufacturers within the oblast to sell portions of their output at artificially low prices; they then block non-residential consumption by issuing ration coupons (Solnick, 1996). Many other regional governments have adopted similar practices (Koen and Phillips, 1993; and Mitchneck, 1995). But as noted above, our results indicate that this behavior is concentrated primarily in the Red Belt.

Perhaps not coincidentally, regions within the Red Belt have performed poorly relative to their non-Red-Belt counterparts. In particular, we document that standards of living as of

1993:IV were significantly lower in the Red Belt compared with the rest of Russia, as were real income growth between 1993:IV and 1996:IV, and the number of new legally registered small private firms as of January 1996. It is beyond the scope of this paper to establish the pattern of causality, if it exists, between the Red Belt's resistance to economic reform and its poor economic performance. However, the sharp contrast between the Red Belt and the rest of Russia provides an interesting natural experiment that promises to yield insights into the relationship between Russia's economic reforms and its overall economic performance.

2. Price Dispersion and Distance

In economies with well-developed integrated markets, price differentials for similar goods sold in different cities depend upon the distance between cities. As an illustration, define Q_{ij} as the percentage difference in the price of a tradeable commodity sold in cities i and j at date t: $Q_{ij} = \text{abs}(\ln(P_i / P_j))$. In the absence of transport costs, taxes and other barriers to cross-city trade, arbitrage opportunities will exist unless Q_{ij} is zero. If these opportunities are exploited, Q_{ij} will eventually be driven to zero. Of course, transport costs between cities that trade this good place a lower bound on these differentials. If the price difference is lower than the bound, then arbitrage and trade between the two cities is not profitable even if Q_{ij} is nonzero. Denoting d_{ij} as the distance between city i and j, $\text{abs}(\ln(P_i / P_j))/\ln(d_{ij})$ measures the impact of a one-percent increase in the distance separating cities i and j on the percentage difference in prices. Using the interpretation of d_{ij} from Krugman's (1991) transport-cost model, $1 - 1/(d_{ij})$, is the share of a good that depreciates when it is transported between cities i and j. This implies that when there is two-way trade between cities, the relative price (P_i / P_j) fluctuates within the band $[1/(d_{ij}), (d_{ij})]$, and thus the variance of Q_{ij} should be increasing in distance.

Engel and Rogers (1996) studied the relationship between inter-city price dispersion and distance in the U.S. and Canada, and found a significant relationship for a wide range of goods. (Parsley and Wei, 1996, presented similar evidence for the U.S.) These findings provide a basis

upon which to judge Russia's success in establishing market reforms. As we document below, if we consider Russia as a single economic entity, it fails in this comparison. However, if we separate the Red Belt from the rest of Russia, this apparent failure is reversed dramatically.

3. Dispersion, Distance, and Borders

We use two sets of data on retail food prices to analyze relationships between inter-city price dispersion and distance. The first set spans the period February 1992 through February 1995. During this period, Russian enumerators collected weekly price data for similar goods sold in the transforming state sector and in the existing market sector for a wide range of cities. In any given city, prices in the market sector were typically determined by market forces, while state-sector prices were potentially subject to direct ceilings or indirect regulations such as profit margin caps. We have data on both state and market prices for four food goods during this period: beef, onions, potatoes, and milk. (By February 1995, the process of privatization had blurred the distinction between state and market sectors, thus Russian enumerators reported only one price for any given good.) The second data set is quarterly, and spans the period 1995:I through 1996:IV. This data set measures the cost of a basket of 19 retail food goods. The Appendix to this paper contains a detailed description of each data set. Each data set includes observations from 46 Russian cities, including Moscow, St. Petersburg, and all provincial capitals that account for at least 30 percent of the provincial population.

We identify regions as lying within the Red Belt if they preferred the opposition Communist Party led by Zyuganov against the reformist incumbent Yeltsin during both rounds of the June 1996 elections.[1] Zyuganov's economic platform included a return to broad price

[1] We also considered an expanded version of the Red Belt that included regions that voted for Zyuganov in the first round and then supported Yeltsin in the second round. This modification had very little impact on our results, thus we only report results based on our original definition.

controls, broad subsidies for goods and services, an increase in state-initiated resource allocation (planning), and a slowdown in the process of privatization. Yeltsin's program included more progress in price liberalization, elimination of distortionary budget subsidies, further deregulation of economic activity and a deepening of privatization. Thus the Red Belt had very different preferences for economic reform than the rest of Russia. Further, the Communists Party leaders who dominate the Red Belt favor administrative allocation of inputs and credits. This tendency to coordinate economic activity via traditional administrative methods within the Red Belt, versus the transition towards market allocation in the rest of Russia, also suggests that there are frictions associated with crossing this internal border.

We begin our analysis by reporting summary statistics on price dispersion. We quantify price dispersion between any two cities using two measures. Let $Q_{ij}(t) = \text{abs}(\ln(P_i(t) / P_j(t)))$ denote the absolute price dispersion between cities i and j at date t for a specific good. The first measure we use is the mean of $Q_{ij}(t)$ computed over the observations spanned by our sample; the second measure is the standard deviation of $Q_{ij}(t)$. Hereafter, we will refer to these as mean and volatility measures of dispersion. Table 3 reports average values of each of these measures, normalized by average inter-city distances, for three groups of city comparisons: comparisons between cities within the Red Belt, outside the Red Belt, and on opposite sides of the border. Note that for each commodity we consider, the average volatility measure computed for cities within the Red Belt is larger than for cities outside the Red Belt; this is also true for the mean measure in six of nine cases. Moreover, in eight of nine cases, average volatility measures computed within the Red Belt exceed those computed for cities *across* the border. This pattern is reversed using the mean measure: average mean measures of dispersion computed for cities across the border exceed those computed for cities within the Red Belt in six of nine cases.

The next step in our analysis involves evaluating the statistical and economic significance of the relationship between inter-city price dispersion and distance in Russia, as well as the impact of the border on price dispersion. We pursue this using a regression analysis closely

related to that conducted by Engel and Rogers (1996). Letting Q_{ij} denote either the sample mean or standard deviation of $Q_{ij}(t)$ computed between cities i and j, the baseline cross-section regression equation we consider is given by

$$Q_{ij} = \delta \log d_{ij} + \beta B_{ij} + \sum_{m=1}^{n} \gamma_m D_m + u_{ij}, \quad (1)$$

where d_{ij} denotes the distance between cities i and j, B_{ij} is a dummy equal to 1 for pairs of cities located on different sides of the Red-Belt border and 0 otherwise, and D_m is a dummy included for each of the n cities in our sample. For each regression involving cities i and j, the dummies (D_i, D_j) are assigned values of 1, otherwise they are 0; these dummies are included to eliminate city-specific effects. Note that this baseline regression imposes a logarithmic relationship between dispersion and distance, thus the marginal impact of distance on dispersion is decreasing in distance. Variations on this specification support the imposition of this restriction.

The first regressions we ran were variations on (1) in which the dummy B_{ij} was excluded. The point of this step was to determine whether a statistically significant relationship exists between inter-city price dispersion and distance throughout all of Russia. The results of these regressions (not reported) were decidedly negative: using linear, quadratic and log specifications for distance, the data provided virtually no indication of a statistically significant relationship between dispersion and distance. Thus viewing Russia as a single economic entity, its inter-regional pattern of price dispersion is inconsistent with those of integrated market economies.

A sharply different picture emerges when the Red-Belt dummy is included in (1). Table 3 reports our regression results for (1) obtained using each of our nine commodities and both measures of price dispersion. In 17 of these 18 cases, the estimated coefficient on distance we obtained was significant at the 1-percent level: controlling for the border effect, distance clearly affects price dispersion. Moreover, in 14 cases, the estimated coefficient on the border dummy we obtained was significant at the 1-percent level, and was positive in all cases.

To illustrate the economic significance of distance and the border, we compare these results with those obtained by Engel and Rogers (1996) for the U.S. and Canada. We do this by comparing our regression results for the volatility measure of dispersion obtained for the food basket with the results they obtained using a volatility measure for a food-price index (their good 1). In their baseline specification, they obtained point estimates for the border and distance of 0.0075 and 0.000464; our baseline point estimates are 0.0056 and 0.0024.[2] The ratio of the U.S.-Canadian border to the Red-Belt border is roughly 1.34, which suggests that the border separating the U.S. and Canada is not substantially wider than Russia's internal border. However, Russia's distance coefficient is more than five times larger than the U.S.-Canadian coefficient. Thus controlling for the border, transport costs are much more important in Russia.

Since the impact of distance on volatility is greater in Russia than in the U.S. and Canada, while the impact of Russia's internal border is comparable to the U.S.-Canadian border, the impact of Russia's border relative to distance is lower than the U.S.-Canadian border. One way to measure this is to compute the relative contribution of distance and the border to overall price dispersion in both locations. The average cross-border-price volatility between the U.S. and Canada is 0.0247. Since the border effect between the United States and Canada is 0.0075, the border is responsible for 30.4 percent (0.0075/0.0247) of volatility. Furthermore, since average log distance (measured in kilometers) between cross-border city pairs is 7.68 between the U.S. and Canada, and the distance coefficient in this case is 0.000464, distance on average accounts for 14.4 percent (7.68*0.000464/0.0247) of volatility. In Russia, the average cross-border-price volatility is 0.05734, and the average log distance between cross-border-city pairs in kilometers is 7.98. This implies that the contribution of the border and distance to volatility in Russia are 9.1 percent (0.0056/0.05734) and 30.6 percent (0.0024*7.98/0.05734).

[2] Engel and Rogers measured distance in terms of miles. Here, we convert their point estimate to correspond to our use of kilometers.

To evaluate the robustness of the results obtained using the baseline regression model, we also considered several variations. First, we included several city-specific policy variables in the regressions, including measures of local support for price-liberalization and privatization policies (the variables we considered are described in more detail in Section 4 and the Appendix). While these city-level policy variables were positive and significant for several commodities, their inclusion had a negligible impact on the sign and significance of the distance and border coefficients. Second, because distances between cities in the Far East (Ulan-Ude, Khabararovsk, Vladivostock, Petropavlovsk-Kamchatka and Magadan) and the rest of Russia are so large, we also ran the regressions with a Far East dummy variable and the city-specific policy variables. While the Far East dummy coefficients were typically positive and significant, this modification also had a negligible impact on the size and significance of the distance and border coefficients. Finally, we re-ran our regressions using linear and also quadratic specifications for the distance variable. In general, the linear model performed poorly. However, the linear term in the quadratic specification was typically positive and significant, while the squared term was negative and significant. This result indicates that volatility is indeed increasing and concave in distance.

4. Russia's Red Belt

We have found that price dispersion among regions in Russia's Red Belt are quite high relative to the rest of Russia, suggesting that these regions are relatively isolated economic entities. We have also found evidence of a significant border effect in modeling inter-city price dispersion in Russia. Accounting for this effect, a substantial portion of this price dispersion is accounted for by distance, as is the case in the U.S. and Canada. Here, we quantify additional features of the Red Belt that distinguish it from the rest of Russia.

Anti-reformist attitudes were clearly expressed within the Red Belt in the 1996 presidential elections. Thus it is not surprising that local governments within the Red Belt are far more active in manipulating prices than their counterparts outside the Red Belt. To quantify this,

we constructed indexes that rank each region in our sample on the extent to which they have ceased the practice of regulating prices. Specific indexes were constructed for the elimination of budgetary subsidies, agricultural subsidies, food-price controls, and consumer-price controls. In each case, a lower number indicates more extensive manipulation. We then compared the distributions of indexes within and outside the Red Belt to determine whether they appear significantly different. With the exception of agricultural subsidies, they do. Specifically, 1-sided t tests of the null hypothesis that mean index values within each region are equal reject the null at no less than the 10-percent significance level, as Table 4 reports.

Mindful of the literature which argues that economic reform enhances economic performance, we also tested the hypothesis that economic performance is weaker in the Red Belt than in the rest of Russia. We caution that these results do not establish the direction of causality between reform and performance. It may be the case that regions that are slow to reform perform poorly as a consequence. However, as Murrell, Dunn and Korsun (1996) argue, local politicians who observe a declining growth rate and standard of living may as a consequence revert to traditional socialist policies that they better understand. Using real income growth data for the period spanning 1993:IV through 1996:IV, we tested and rejected the null hypothesis that the Red Belt grew at the same pace as the rest of Russia at the 1-percent significance level (again, see Table 4). The hypothesis that the Red Belt had equal initial standards of living in 1993:IV is also rejected, this time at the 5-percent level. Finally, in previous work (Berkowitz and DeJong, 1998), we found that start-ups are highly positively correlated with regional real income growth. Thus not surprisingly, we find that the Red Belt had significantly less start-ups than the rest of Russia.

5. Conclusions

The extent to which Russia's internal market has become integrated during its recent transition has received considerable attention. The high inter-city price dispersion documented by Gardner and Brooks (1993) and DeMasi and Koen (1996) reflects negatively on the success of

Russia's attempt to achieve integration. Here, applying methods to study international market integration developed by Engel and Rogers (1996) to intra-national integration, we find that, controlling for Russia's internal border, market integration has progressed in Russia. Specifically, while transport costs in Russia are much higher than those observed in the U.S. and Canada, and while Russia's internal border is almost as "wide" as the border separating the U.S. and Canada, controlling for the internal border, Russia operates like a market economy in the sense that distance is an important explanatory variable for regional price dispersion. Similarly positive evidence is presented by Goodwin, Grennes, and McCurdy (1996) and Berkowitz, DeJong and Husted (1998), who found widespread evidence of intra- and inter-city co-movements between prices of comparable goods within Russia, particularly outside the Red Belt.

The separation of Russia into the Red Belt and non-Red Belt zones offers a potential natural experiment on the impact of economic reform on economic performance: both zones had similar initial conditions in that they were both members of the formerly sociaist Russian Republic; and the Red Belt has moved more slowly on reform than the non-Red Belt. While it is too early to make conclusions about the impact of reform, preliminary evidence shows that the Red Belt lags by the criteria of real income growth, standard of living, entry of start-ups, and market integration. Furthermore, there is a fascinating natural experiment in the evolution of market integration. Gordon (1983) has argued that, even when regional leaders represent constituents' interests, free mobility of goods and factors can encourage them to implement taxes and subsidies that limit the extent of intra-national market integration. The Gordon model, and papers by Wildasin (1991) and Wilson (1991), show that as variances in regional preferences, size of regional markets, and regional endowments increase, incentives for regional leaders to use taxes and subsidies in a way that limits domestic market integration may also increase. Here, we have shown that the Red Belt is significantly different than the rest of Russia in terms of economic policy and performance. In a longer-term study, we could investigate whether these variances persist, and are positively correlated with the widening of the internal border.

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Appendix

The Center for Economic Forecasting and Analysis in Moscow supplied the inter-city distance data and price data examined in this study. The National Council for Eurasian and East European Research, in a grant to Karen M. Brooks and Bruce Gardner, and another grant to Daniel Berkowitz, financed the collection and tabulation of these data. The distance between each pair of cities accounts for transport routes. In order to check for the reliability of the price data, we have interviewed statisticians at the Center for Economic Forecasting and Analysis who oversee the collection of these data. Bruce Gardner has also interviewed these statisticians and has watched the enumerators in Moscow collect the data. Based on discussions with Gardner and Russian statisticians, we are convinced that the data are reliable.

We used real per capita income data to measure growth in the standard of living. Specifically, growth is the annualized average growth rate of per capita province-level money income, deflated by the province-level consumer price index measured between 1993:IV and 1996:IV.

To measure the initial standard of living, we divided nominal per capita income by the cost of the basket of 19 basic food goods in 1993:IV. This allowed us to normalize money income, taking into account the substantial disparities in nominal prices and incomes across Russia. We did not use regional CPI indexes to deflate money income, as they are not comparable across regions.

In order to measure the development of new enterprises within a region (startups), we used published data on the number of small registered private enterprises per thousand inhabitants in the region. These data are available for January 1, 1996.

Data sources for growth, initial standard of living and startups are reported in the Appendix to Berkowitz and DeJong (1998).

Data comparing regions by the extent to which they have eliminated budgetary subsidies,

agricultural subsidies, food price controls and consumer price controls are taken from the TACIS report (European Union (1997)). Agricultural subsidies and budgetary subsidies are reported for 1995; consumer price controls and food price controls are reported for 1996. All rankings have been converted to a scale of 0 (most conservative) to 1 (most liberal).

The data on food price controls is quite impressive. It is based on a survey conducted in November 1996 in the capital cities. The ranking differentiates between types of price controls: one point per product is assigned for direct controls such as subsidies, limitations on the profitability of the food industry and limitations on price mark-ups; three points are assigned for the establishment of fixed or maximum prices; and five points are assigned for rationing and the issuance of coupons. Therefore, the higher the score, the less extensive the price controls. The ranking is based on a basket of seventy-three food goods surveyed by Goskomstat.

There are no missing observations for the basket of 19 food goods observed during 1995 and 1996. Thus all 46 regions were included when calculating price dispersion for the basket of 19. However, there were some missing city-level data in the other food products observed during February 1992 through February 1995. Thus we have eliminated some cities when calculating price dispersion for these eight products. We have also eliminated this small group of missing cities from our regression analysis.

Map 2.
Results of presidential elections in 1996.