SECTION 4: SPATIAL MARKET INTEGRATION

Chapter 4.1

Economic Consequences of Russia’s Internal Border

Daniel Berkowitz and David N. DeJong

Abstract: In previous work BERKOWITZ and DEJONG, used regional commodity-price data covering the period 1993-96 to document the existence of an internal economic border that divides Russia into two distinct economic regions: the ‘Red Belt’ and the ‘rest of Russia’. The Red Belt represents a group of regions that have broadly resisted the implementation of federally initiated market reforms. Here, we extend this work by quantifying two economic implications of this internal border. First, we show that the Red-Belt border has limited the transmission of price signals to regions within the Red Belt. Second, we show that regions within the Red Belt have experienced extremely poor growth performances relative to Russia as a whole.

Keywords: market integration; regionalization; price transmission; economic growth.

1. INTRODUCTION

The Russian economy appears to be imploding. According to one conservative estimate, real gross domestic product in Russia fell by 37.8 percent between 1990 and 1995. It then held steady in 1996 and 1997,
raising hopes that Russia had finally bottomed out and was perhaps on the
verge of an expansion. However, the economic crisis resumed in August of
1998 when the federal government defaulted on $40 billion of its domestic
debt and allowed the ruble to devalue sharply. The default and devaluation
were followed by widespread bank failures, a sharp increase in the inflation
rate, an accelerated outflow of capital, and a consensus among analysts that
the Russian economy still had not hit bottom.

The internal cohesion of Russia’s economy has been badly strained by
the August crisis. In an effort to protect the standard of living of their
constituents, many regional leaders have imposed price controls on basic
goods, set up border controls to limit the export of consumer goods, and
issued ration cards to limit consumption by non-residents. Where food
shortages have arisen, regional governments are reported to have stopped
food shipments to other regions. Moreover, many regions, strapped for the
funds needed to finance regional programs, have stopped paying taxes to the
federal government. While the August crisis has undoubtedly weakened
inter-regional economic ties, a lack of internal cohesion has plagued the
Russian economy since the early 1990s. For example, in previous work
(BERKOWITZ and DEJONG 1998a), we used regional commodity-price data
from the period 1993-96 to document the existence of an internal economic
border that divides Russia into two distinct economic regions: the Red Belt
and the rest of Russia. The Red Belt represents a group of regions that have
broadly resisted the implementation of federally initiated market reforms.
Here, we extend this work by quantifying two economic implications of this
internal border. First, we show that the Red-Belt border has limited the
transmission of price signals to regions within the Red Belt. Second, we
show that regions within the Red Belt have exhibited extremely poor growth
rates compared to Russia as a whole. This finding is not merely attributable
to their resistance to federally initiated market reforms: it obtains even upon
conditioning on differences in the reform policies they have adopted. The
problems associated with regionalization we document here predate the
August 1998 crisis; the surge in regionalization spurred by this crisis thus
bodes ominously for Russia’s economic future.

2. BORDERS AND INTER-CITY PRICE
TRANSMISSION

In the early 1990s, Russia broke with its socialist past: the federal
government initiated a broad and immediate price-liberalization policy and
began rapidly to privatize state-owned retail shops and state-owned
enterprises. During this period, there was clear evidence of a breakdown in
inter-regional relations resembling the current breakdown (see KOEN and
Various local governments, often in collusion with local mafias, resisted the
federally initiated price reforms by attempting to enforce artificially low
commodity prices. They supported these low prices by limiting cross-border
trade flows using a variety of methods that included export quotas, high
border taxes, and the issuance of ration tickets and local currencies.
Furthermore, inter-regional trade was hampered by a notoriously inefficient
transport sector (HOLT 1993; JOSKOW et al. 1994). These problems made it
difficult for traders and middlemen to integrate the Russian economy by
moving goods from low-cost regions to high-cost regions.

Early in the transition period, several studies documented the existence
of unusually large inter-city price differentials for similar goods within
Russia, and thus concluded that Russia’s efforts to advance market
integration appeared ineffective (e.g. GARDNER and BROOKS 1993; and
DEMASI and KOEN 1996). In contrast, BERKOWITZ et al. (1998) found that
these inter-city price differentials belied the existence of important internal
economic linkages that were manifested by the transmission of price
innovations across regions within Russia. (Similar evidence was presented
by GOODWIN et al. 1998.) Specifically, BERKOWITZ et al. (1998) used
GRANGER (1969) causality tests to investigate the extent to which prices in
one city market were responsive to price innovations initiated in other city
markets. The tests were applied to time-series data on ten food prices
measured in 25 major cities in Russia’s Central and Volga regions. For each
food item, causality tests were conducted for every possible combination of
city pairs. Results obtained using data on market-sector prices of onions are
representative. For these data, 80 percent of the cross-city-price pairs
yielded rejections of the no-causality hypothesis. Thus, BERKOWITZ et al.
(1998) found widespread evidence of market integration. However, the
evidence was not universal, as there are clearly regions within Russia that
have attempted to isolate themselves economically. Indeed, throughout the
1990s, Russia has abounded with examples of goods differed dramatically
in prices from one city to another without the differences being explained by
distance. In the remainder of this section, we first summarize evidence
indicating that anomalous differences in price levels largely reflect the
presence of the ‘Red Belt’ border. We then show that this border is in part
accountable for the isolated breakdowns in causal price relationships
observed in the BERKOWITZ et al. data set.

In BERKOWITZ and DEJONG (1998a), we quantified the existence of the
Red-Belt border using the statistical procedure developed by ENGEL and
ROGERS (1996). Engel and Rogers sought to determine the extent to which
Daniel Berkowitz and David N. DeJong

the U.S.-Canadian border gives rise to differences in city-specific commodity prices beyond the level 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 were found to feature substantially higher differences in commodity prices than 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 adopted the Engel-Rogers methodology to examine the economic importance of Russia’s Red-Belt border. We defined the Red Belt as those regions in which the citizenry supported the Communist Party (headed by Zyuganov) against the incumbent coalition (headed by Yeltsin) in the 1996 presidential elections (the regions are illustrated in Figure 1 and listed in its corresponding index). We employed 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.

To describe the methodology, let

\[ Q_{ij}(t) = \frac{\text{abs}\left(\ln P_i(t) - \ln P_j(t)\right)}{\ln P_i(t)} \]

(1)

denote the absolute price dispersion between cities i and j at date t for a specific good. Volatility is measured as the standard deviation of \( Q_{ij}(t) \) computed over the observations spanned in our sample. Table 1 lists price volatility per 1000 kms for nine products: market-sector beef, milk, onions and potatoes; state-sector beef, milk, onions and potatoes; and a basket of food goods. The food-basket data range from the first quarter of 1995 through the last quarter of 1996 (14 observations); the market- and state-sector data range from February 1993 through February 1995 (101 observations). The results obtained by Engel and Rogers using a similar food basket are also included in the table for purposes of comparison.

Table 1 shows that for each product, the average volatility measure computed for cities within the Red Belt is larger than for cities outside the Red Belt. Moreover, in eight of nine cases, average volatility measures computed within the Red Belt exceed those computed for cities across the border. A comparison of our results for the food basket with those obtained in Engel and Rogers (1996) is striking.
Figure 1: Results of presidential elections in 1996.

- Regions that voted for B. Yeltsin in both rounds.
- Regions that voted for G. Zuyanov in both rounds.
- Regions that changed from Zuyanov to Chirkin between the rounds in 1996.
Table 1: Price volatility\(^{a1}\) per 1000 km in Russia

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Red Belt</th>
<th>Non-Red Belt</th>
<th>Cross border</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef (state)</td>
<td>0.1912</td>
<td>0.1159</td>
<td>0.1556</td>
</tr>
<tr>
<td>Onions (state)</td>
<td>0.4756</td>
<td>0.3337</td>
<td>0.4246</td>
</tr>
<tr>
<td>Potatoes (state)</td>
<td>0.5469</td>
<td>0.3112</td>
<td>0.4246</td>
</tr>
<tr>
<td>Milk (state)</td>
<td>0.3680</td>
<td>0.1909</td>
<td>0.2381</td>
</tr>
<tr>
<td>Beef (market)</td>
<td>0.1444</td>
<td>0.1395</td>
<td>0.1640</td>
</tr>
<tr>
<td>Onions (market)</td>
<td>0.3840</td>
<td>0.2866</td>
<td>0.3833</td>
</tr>
<tr>
<td>Potatoes (market)</td>
<td>0.4372</td>
<td>0.2972</td>
<td>0.3858</td>
</tr>
<tr>
<td>Milk (market)</td>
<td>0.3447</td>
<td>0.2705</td>
<td>0.2984</td>
</tr>
<tr>
<td>Food basket</td>
<td>0.0569</td>
<td>0.0349</td>
<td>0.0431</td>
</tr>
</tbody>
</table>

Note: a) Volatility is measured as the standard deviation of \( Q_{ij}(t) \) computed over the observations spanned in our sample (see text for further explanations).

Source: Data on Russia is taken from Berkowitz and DeJong (1998b).

First, transport costs, as proxied by volatility per 1000 km, are much higher in Russia. Second, the difference in volatility per thousand km between an average Canadian and U.S. city is not as large as the difference between the Red Belt and the rest of Russia (see Table 2). Furthermore, while price volatility in the Engel and Rogers study is always highest when crossing the U.S.-Canadian border, it is the case that volatility measures calculated between cities within the Red Belt are higher than differences observed for cities on opposite sides of the Red Belt border. Thus, regions within the Red Belt exhibit exceptionally high price volatility, and seem isolated from each other as well as from the rest of Russia.

Table 2: Price volatility per 1000 km in United States and Canada

<table>
<thead>
<tr>
<th></th>
<th>U.S.-U.S.</th>
<th>Canada-Canada</th>
<th>Cross borders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food basket</td>
<td>0.0569</td>
<td>0.0349</td>
<td>0.0431</td>
</tr>
</tbody>
</table>

Note: a) Volatility is measured as the standard deviation of \( Q_{ij}(t) \) computed over the observations spanned in our sample (see text for further explanations).

Source: Data on the United States and Canada is taken from Engel and Rogers (1996).

Next, we used Engel and Rogers’ regression analysis to evaluate the statistical and economic significance of the relationship between inter-city price volatility and distance in Russia, as well as the impact of the border on price volatility. Let \( Q_i \) denote the sample standard deviation of \( Q_{ij}(t) \) computed between cities i and j. Since there are 46 cities in our sample,
there are a total of \( N = \frac{46 \times 45}{2} = 1,035 \) possible city comparisons for each product we consider. (For the food basket, we had data for all 46 cities. For some of the other goods, we had incomplete price data in certain cities, reducing the number of possible cross-city comparisons.) The baseline cross-section regression equation that we estimated is

\[
\mathbf{q} = \mathbf{\delta d} + \mathbf{\beta d} + \gamma \mathbf{C} + \mathbf{u},
\]

where \( \mathbf{q} \) is an \( N \times 1 \) vector containing the \( Q_{ij} \)'s, \( \mathbf{d} \) is an \( N \times 1 \) vector of log distances, \( \mathbf{b} \) is a border-dummy vector, \( \mathbf{C} \) is an \( N \times 46 \) city-specific dummy matrix, and \( \mathbf{u} \) is an error vector. The coefficient \( \delta \) measures the impact of log distance on price dispersion, \( \beta \) measures the border effect, and the \( 46 \times 1 \) vector \( \gamma \) captures city-specific effects. Each of the 46 columns of \( \mathbf{C} \) corresponds to a particular city. The column corresponding to the \( i \)th city contains a 1 in each row in which the price measure of city \( i \) is paired with another city; otherwise, the entry contains a 0. Thus, we controlled for city-specific effects to account for measurement error and other city-specific idiosyncrasies. For an arbitrary row in (2) in which cities \( i \) and \( j \) are compared, the regression equation is

\[
Q_{ij} = \delta d_{ij} + \beta b_{ij} + \gamma_i e_i + \gamma_j e_j + u_{ij},
\]

where \( d_{ij} \) denotes the log 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 \( c_i \) and \( c_j \) equal 1.

In order to test for market integration, we first ran regressions for (2) in which the Red-Belt dummy \( \mathbf{b} \) was excluded. This allowed us to test whether or not there is a statistically significant direct relationship between volatility and distance. We found that no such relationship exists. This result is robust to other specifications, including linear and quadratic representations of the distance variable. Studies of developed market economies (e.g., Engel and Rogers 1996; Parsley and Wei 1996; Rogoff 1996) have consistently found that inter-city price volatility increases as function of distance. Thus, our results suggest that, because Russia’s inter-regional food-price volatility behavior is inconsistent with that of integrated market economies, the Russian agro-food economy as a whole is not well integrated.

A sharply different picture emerges when the Red-Belt dummy is included in (2). In all nine cases, the estimated distance coefficient \( \delta \) we obtained was statistically significant at the 1-percent level. Thus, controlling for the impact of the ‘internal border’, inter-city price volatility increases as a function of distance. Furthermore, the estimate of the border dummy coefficient \( \beta \) we obtained was always positive, and was statistically significant at the 1-percent level in five out of nine cases.
In order to provide context for interpreting the impact of Russia’s internal border on price volatility, it is useful to compare its impact with that of the U.S.-Canadian border. Engel and Rogers’ point estimate of $\beta$ obtained using their food-basket price index is roughly 1.34 times higher than the estimate of $\beta$ we obtained using our food-basket price index. This suggests that the border separating the U.S. and Canada is not substantially wider than the Red Belt that divides Russia. Taking into account that U.S.-Canadian trade involves different taxes, regulatory systems, customs regulations, and currencies, this finding is striking.

We conclude this section by returning to the BERKOWITZ et al. (1998) evidence regarding patterns of inter-city price linkages within Russia. As noted above, they documented widespread but less-than-universal evidence of causality between prices of similar goods across cities. Here, we note that cities in their sample that lie within the Red-Belt border exhibit relatively weak causal linkages compared with cities outside the border. Table 2 illustrates this tendency by reporting correlations between the Red-Belt dummy variable and an index that characterizes the propensity of each city to exhibit a causal relationship with the remaining cities in the sample. A higher index number indicates that the city in question was found to have a statistically significant causal relationship with a greater proportion of all other cities. We have such an index for each of eight of the ten goods that BERKOWITZ et al. (1998) examined. We find a negative correlation between the border dummy and the index for each good, indicating that cities within the Red-Belt border exhibit weaker causal relationships than those outside the border. The correlations obtained for state- and market-sector beef are trivial: -0.02 and –0.03. The remaining correlations are nontrivial, ranging as high as –0.57 for market-sector milk.

3. **BORDERS AND GROWTH**

In pursuit of its transition from a command to a market economy, post-Soviet Russia has witnessed enormous regional differences in economic growth rates. For example, from the fourth quarter of 1993 through the fourth quarter of 1996, the city of Moscow enjoyed an annual growth rate in per capita income of over 17 percent; over the same period, per capita income in the Mariy-El Republic declined at the alarming annual rate of 22 percent. The Russian experience is not merely a case of rich regions getting richer: there is little correspondence within Russia between regional standards of living as of the fourth quarter of 1993 and subsequent regional growth rates. For example, while Oryol was relatively prosperous in the fourth quarter of 1993, it experienced an annual average growth rate of
15.9 percent from the fourth quarter of 1993 through the fourth quarter of 1996.

Table 3: Price causality breakdowns and the Red-Belt border

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef (state)</td>
<td>-0.02</td>
</tr>
<tr>
<td>Onions (state)</td>
<td>-0.14</td>
</tr>
<tr>
<td>Potatoes (state)</td>
<td>-0.30</td>
</tr>
<tr>
<td>Milk (state)</td>
<td>-0.16</td>
</tr>
<tr>
<td>Beef (market)</td>
<td>-0.03</td>
</tr>
<tr>
<td>Onions (market)</td>
<td>-0.19</td>
</tr>
<tr>
<td>Potatoes (market)</td>
<td>-0.23</td>
</tr>
<tr>
<td>Milk (market)</td>
<td>-0.57</td>
</tr>
</tbody>
</table>

Not only have regions within Russia experienced enormous differences in economic growth, they have also had considerable discretion in adopting economic-reform policies that have been initiated at the federal level. The result of this discretion is a wide variation in the scope and depth of the reforms that have been implemented at the regional level. In BERKOWITZ and DEJONG (1998b), we exploited these differences in analyzing whether regional differences in reform policies can account for regional differences in growth rates, and found that to a considerable degree, they can. Most notably, we found that regional-government privatization initiatives and regional-government initiatives to gain control over their capital stock (e.g. plants, equipment, machinery and social infrastructure) have had a significant impact on the formation of new legal enterprises, which in turn has had a significant impact on economic growth.

In this section, we first summarize our (1998b) results, and then extend them by including the Red-Belt border as an additional explanatory variable in our model of economic growth. We find the marginal impact of the inclusion of this variable to be substantial: regions within the Red-Belt border have experienced relatively poor growth performances, even after we have compensated for differences in the reform policies and differences in initial conditions (initial income levels, industry mix, etc.).

Figure 2 illustrates the enormous variation in inter-regional economic growth observed within Russia by plotting average annual growth rates observed over the period 1993:IV to 1996:IV against real per capita income measured in 1993:IV. Also, Table 4 lists the fastest growers among the regions included in our sample, and Table 4b lists the most striking losers. Several aspects of Russia’s inter-regional growth experience are evident in
these numbers: regions that have experienced positive growth are relatively rare; the rapid economic decline suffered in Mariy-El Republic is unfortunately not altogether unusual; and economic prosperity as of 1993:IV only weakly corresponds with subsequent economic growth.

We investigated the relationship between differences in regional reform policies and regional growth experiences using a baseline structural model in which regional economic growth is a function of initial real per capita income levels, industrial characteristics, employment in the defense industry, and new-legal-enterprise formation. In turn, the establishment of new enterprises is modeled as a function of initial income levels and a group of regional-government policy variables that includes measures of privatization, price liberalization, control initiatives (which measure regional governments’ abilities to conduct independent tax and regulatory policies), and tax rates. The motivation for our growth equation comes from empirical work which suggests that the rapid development of new legal enterprises has contributed significantly to Poland’s economic success. It also comes from theoretical work which predicts that new enterprises enhance growth because they are more efficient and more responsive to demand than state enterprises and privatized-former-state enterprises. In addition, by providing expanded employment opportunities, new enterprises better enable politicians to implement efficiency reforms (such as hardening state-sector budget constraints) that reduce state-sector employment without losing the political support of their constituency. The motivation for the equation that relates new-enterprise formation and reform policies is the a priori view that these policies should provide a more favorable environment for entrepreneurial activity.2

Our baseline model provided empirical support for these theoretical predictions: as noted above, regional control initiatives, along with privatization initiatives, have had a significant positive impact on the formation of new legal enterprises, which in turn have had a significant positive impact on economic growth. This baseline model restricts the impact of economic reforms on growth to be indirect, channeled exclusively through a direct impact on the development of new legal enterprises. Implicit in this specification is the notion that the reform initiatives we measured have had a negligible impact on growth through their impact on the productivity of existing enterprises, both state-owned and formerly state-owned. We found no evidence against this restriction in the data we analyze. We also found no evidence against the exclusion of economic growth as an explanatory variable for new-legal-enterprise development. Moreover, we

---

2 See Berkowitz and DeJong 1998b, for references and further discussion.
found no evidence of simultaneity between growth and new-legal-enterprise development, suggesting the absence of feedback between these variables, and a negligible joint impact on these variables of variables not included in our analysis. Finally, we found our main results to be robust to a wide range of alternative specifications of our baseline model, and to alternative measures of the variables examined in our study.

Figure 2: Scatter plots of regional average growth rates for 1993:IV to 1996:IV against real per capita income in 1993:IV.

Source: Data from GOSKOMSTAT.

Table 4: Fastest and slowest growing regions in Russia

<table>
<thead>
<tr>
<th>Region</th>
<th>Average annual growth rate</th>
<th>Region</th>
<th>Average annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moscow city</td>
<td>17.3%</td>
<td>Mariy-El Republic</td>
<td>-22.0%</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>7.9%</td>
<td>Kurgan</td>
<td>-19.6%</td>
</tr>
<tr>
<td>Novgorod</td>
<td>6.6%</td>
<td>Murmansk</td>
<td>-17.2%</td>
</tr>
<tr>
<td>Tyumen</td>
<td>1.9%</td>
<td>Adyegey Republic</td>
<td>-16.5%</td>
</tr>
<tr>
<td>Chelyabinsk</td>
<td>1.9%</td>
<td>Oryol</td>
<td>-15.9%</td>
</tr>
<tr>
<td>Volgograd</td>
<td>0.2%</td>
<td>Bryansk</td>
<td>-14.7%</td>
</tr>
</tbody>
</table>

Source: Data from GOSKOMSTAT.
In order to quantify the marginal explanatory power of the Red-Belt border on Russia’s regional growth experience, we simply added the Red-Belt border dummy variable to the structural model we examined in BERKOWITZ and DEJONG (1998b). The resulting model is given by

\[
\begin{align*}
\text{(4) GROWTH} &= \beta_0 + \beta_1 \text{INITIAL} + \beta_2 \text{IO} + \beta_3 \text{DEFENSE} + \beta_4 \text{NEWENT} + \beta_5 b + u \\
\text{(5) NEWENT} &= \gamma_0 + X\gamma + e,
\end{align*}
\]

where

- **GROWTH** is a 47x1 vector containing annual average growth rates
- **INITIAL** measures the standard of living in the fourth quarter of 1993
- **IO** measures the value added of tradeable-goods sectors in 1985 per employed worker, net of labor costs, calculated using world market prices;
- **DEFENSE** measures the number of workers employed in the defense industry in 1985 per thousand employed workers
- **NEWENT** measures the number of new legal enterprises (proxied by the number of legally registered small privately owned enterprises) per thousand inhabitants as of January 1, 1996
- and **X** is a 47x6 matrix of policy variables and initial income levels.

OLS estimates of the growth regression (4), with and without the inclusion of the Red-Belt dummy, are as shown in Table 5 and 6. Regarding the GROWTH regression when the Red-Belt dummy is excluded (Table 5), the model fit is quite impressive: here, our $R^2$ statistic is 0.47. While neither INITIAL nor IO have statistically significant coefficients, the coefficients on DEFENSE and NEWENT are significant both statistically and quantitatively. Specifically, our estimates indicate that the additional employment in the defense industry of one worker per thousand total employed workers corresponds with an additional annual growth rate of 0.124 percent across regions. And remarkably, the addition of a single new enterprise per thousand total inhabitants corresponds with an additional annual growth rate of 1.88 percent across regions.

The fit of the GROWTH regression improves when the Red-Belt dummy is included (Table 6): the $R^2$ statistic increases by roughly 8.5 percent to 0.51 in this case. Furthermore, including the Red-Belt dummy has only a minor impact on the estimates of the additional coefficients: INITIAL and IO continue to have statistically insignificant coefficients, while the coefficients on both DEFENSE and NEWENT remain statistically and quantitatively significant. And remarkably, we estimate that the Red-Belt...
border accounts for, on average, a difference in annual growth rates of –3.3 percent. This is true even though we have attempted to account for differences in initial income levels, and the relatively conservative reform policies adopted in Red-Belt regions.

Table 5: Red-Belt dummy excluded

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Coefficient</th>
<th>t statistic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-17.152</td>
<td>-4.709</td>
<td>0.000</td>
</tr>
<tr>
<td>INITIAL</td>
<td>-0.464</td>
<td>-0.380</td>
<td>0.706</td>
</tr>
<tr>
<td>IO</td>
<td>0.063</td>
<td>1.056</td>
<td>0.297</td>
</tr>
<tr>
<td>DEFENSE</td>
<td>0.124</td>
<td>1.858</td>
<td>0.070</td>
</tr>
<tr>
<td>NEWENT</td>
<td>1.880</td>
<td>5.167</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Just why the Red-Belt border seems to have had such a substantial impact on growth is an open question. One possible explanation is provided by RIVERA-BATIZ and ROMER (1991), who theorized that increased flows of goods, ideas and people across economically integrated regions can enhance economic growth. The results of BERKOWITZ and DEJONG (1998a), and the additional results presented in Section 2, indicate that regions within the Red Belt are much more isolated economically that are those in the rest of Russia. The fact that these regions have experienced relatively poor growth performances is thus consistent with Rivera-Batiz and Romer’s theory.

If the border limits growth, then the persistence of the border needs to be explained. One explanation is that Red-Belt politicians maintain these borders in order to defend conservative economic policies. As noted above, in BERKOWITZ and DEJONG (1998a) we showed that regions within the Red Belt have lagged behind the rest of Russia in liberalizing prices and eliminating distortionary budgetary subsidies. The failure to adopt these reforms in fact provides a strong rationale for the economic isolation observed within the Red Belt. Suppose a regional government chose to maintain low food prices in order to win the allegiance of its constituents (for the plausibility of this motive, see BERKOWITZ 1996; and ALEXEEV and LEITZEL 1998). Given openness to trade with neighboring localities, the benefits would also be transferred to mobile nonresidential consumers and resellers, and these policies would ultimately become unsustainable. Thus regions that wish to maintain price controls and subsidies on goods and services must also maintain policies that limit nonresidential consumption.
Another explanation for persistence is that borders allow corrupt government officials and mafias to collect rent by disrupting normal trade flows (see Shleifer and Vishny 1993). Furthermore, the literature on inter-regional tax competition (Gordon 1983; Kanbur and Keen 1993) predicts that, when shoppers can cross borders to buy goods, smaller regions will tend to charge the lowest prices and collect the most revenue per capita. Specifically, if regional governments maximize tax revenues, relatively small regions maintain relatively low commodity prices, and in so doing, collect substantial revenues at the border from non-residents. It so happens that Red-Belt regions in our sample are indeed relatively small: the average Red-Belt capital city has a statistically significantly smaller population than the average non-Red Belt capital city. Thus, Red-Belt politicians may be exploiting ‘smallness’ in order to collect concealed border-tax revenues. Ulyanovsk oblast, a Red-Belt region, provides support for both explanations. The government of Ulyanovsk is notorious for maintaining price controls. They do this by forcing producers and distributors under their jurisdiction to sell shares of their output at low prices; they then block non-residential consumption by issuing ration coupons and enforcing border controls (Solnick 1996; Stoner-Weiss, personal correspondence). The cost of this set of policies has apparently been substantial: while Ulyanovsk was relatively prosperous by Russian standards in 1993, it experienced a disappointing annual average growth rate of -5.16 percent during 1993: IV through 1996: IV. The strong popularity of the governor of Ulyanovsk, Goryachev, provides some evidence that the citizens have been willing to bear the economic costs of these conservative economic policies. However, the Ulyanovsk case suggests that borders make corrupt government officials

---

3 This is based on a one-sided t test of the null hypothesis that the population averages in the Red- and non-Red-Belt capital-city populations are equal. The null is rejected at the 10-percent significance level.
and mafias rich. Stoner-Weiss has noted that border guards evidently collect revenues on goods flowing across the border. And even though Ulyanovsk is on a major trading route through Southern Russia and Central Asia, our budgetary data for 1995 show that there is no significant tariff revenue flowing into the regional budget. This suggests that there may be substantial unreported rents being extracted at the Ulyanovsk border.

We conclude by noting that the direction of causality between the erection of a border and poor growth performance may run in reverse: poor growth performances may encourage regional politicians to implement price-control policies that in turn necessitate the erection of a border. As MURRELL et al. (1996) argue, politicians who are under political pressure to please their constituents may revert to traditional socialist practices that they better understand in the face of decreases in economic output and standards of living. If poor growth causes borders to be erected, there is a danger that the financial crisis that culminated in 1998 will encourage more regions to erect internal borders, and thus further limit the extent of Russia’s internal economic coherency.

4. CONCLUSIONS

Since the early 1990s, the federal government of Russia has attempted to institute economic-reform policies such as price liberalization and mass privatization in order to facilitate a rapid transition to a market-oriented economy. During this period, pockets of resistance have emerged in which regional governments have maintained price controls and instituted policies designed to restrict trade with bordering regions. These pockets of resistance have severely challenged the internal cohesion of Russia’s economy. In this paper, we have documented the existence of a Red-Belt border that divides Russia into an anti-reform group of regions (the Red Belt) and the rest of Russia. The trade frictions this border imposes are found to be comparable with those imposed by the U.S.-Canadian border; furthermore, the Red-Belt border has been shown to restrict the transmission of market-price innovations to regions located within the Red Belt. Finally, regions within the Red Belt are shown to have experienced lower rates of economic growth than have their non-Red-Belt neighbors.

What remains unclear is just why the Red-Belt border seems to be such an important deterrent to regional economic growth. In order to address this issue, we must sort out the direction of causality between the erection of the border and the realization of relatively poor growth performances. We must also investigate the extent to which factors other than regional policies and
initial income levels provide incentives for regions to erect borders. These questions provide exciting topics for future research.

5. REFERENCES


