

Why Do Similar Reforms Produce Dissimilar Outcomes: Privatization Effectiveness in the Shadow of Ukraine's Orange Revolution

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Abstract

We examine the role of political stability on reform outcomes, exploiting a unique panel dataset of over 7,000 Ukrainian manufacturing enterprises, many of which were privatized following the collapse of communism. Our analysis focuses on the performance of these firms before and after the 2004 Orange Revolution, which resulted in a dramatic shift in the balance of power among regions in Ukraine. We find a sharp divergence after the Orange Revolution in the relative performance of privatized firms between regions supportive of and opposed to Viktor Yushchenko, eventual winner of the 2004 Ukrainian presidential election. This effect is driven by disproportionately weak productivity gains among privatized firms in regions outside of Yushchenko's geographic base in far western Ukraine, possibly reflecting conflict within the coalition that took power after the Orange Revolution.

1 Introduction

One of the major lessons of recent economic liberalizations in developing and transition states is that similar reforms often produce dissimilar outcomes. In some countries, market-oriented reforms have dramatically increased prosperity and efficiency. In others, the results have been disappointing. A prominent example is the privatization of state-owned enterprises in the postcommunist world. In Eastern Europe, the transfer of ownership to private owners has generally led to the expected efficiency gains; in the former Soviet Union, results have been disappointing (Megginson and Netter, 2001; Djankov and Murrell, 2002; Guriev and Megginson, 2007). Brown, Earle and Telegdy (2006), for example, find that privatization to domestic owners increased firm productivity by 15 percent in Romania, 8 percent in Hungary, and 2 percent in Ukraine, while decreasing productivity by 3 percent in Russia.

A leading hypothesis is that variation in the quality of government is responsible for these observed differences, but the particular mechanisms are poorly understood. From the perspective of the political economy of economic reform, one possibility is that private ownership requires a modicum of political stability to produce the desired incentives. In a polarized political environment, political instability can reduce incentives to invest in productivity-enhancing improvements (Alesina and Perotti, 1996; Frye, 2010). Both the security of property rights and the ability to get things done may depend on maintaining connections to political elites. A disruption in these connections can lead to reduced investment and a relative decline in productivity (Malesky and Samphantharak, 2008).

We explore the impact of government turnover on reform outcomes by exploiting a unique panel dataset of over 7,000 Ukrainian manufacturing enterprises, many of which were privatized in the mid- to late 1990s. Our research design takes advantage of a particular moment of political instability that followed this reform episode: the 2004 Orange Revolution, which resulted in a dramatic shift in the balance of power in Ukraine. Critically, the existing elite was tied to the owners of privatized firms in one part of the country, whereas Viktor Yushchenko, the victor in the Orange Revolution, had his political base in another. We thus identify the impact of government turnover on firm performance by exploiting a shock that affected two parts of the country in different ways.

We find a sharp divergence after the Orange Revolution in the relative performance of privatized firms between regions supportive of and opposed to Viktor Yushchenko. These results control for selection bias in the privatization process—that is, the fact that private ownership is not randomly assigned across firms—and they are robust to numerous changes in specification and sample, including instrumental-variables techniques that take advantage of the ethnic and linguistic character of the 2004 presidential election. This effect is driven by disproportionately weak productivity gains among private firms in regions outside of Yushchenko’s geographic base in far western Ukraine, perhaps reflecting conflict within the coalition that took power after the Orange Revolution. Our interpretation of these results is that recently privatized firms in the far west of Ukraine had the least to fear and most to gain from his presidency. These firms consequently were most likely to undertake costly actions to improve productivity, as anticipated by privatization advocates.

The idea that similar formal rules (e.g., privatization-policy design) can produce dissimilar outcomes is a prominent theme in the new-institutionalist literature, as expressed, for example, by North (1990). The emphasis on property rights in much of this work, and in particular the idea that property rights can be provided selectively (e.g., Haber, Razo and Maurer, 2003; Milanovic, Hoff and Horowitz, 2010), is consistent with a specific interpretation of our results—that the Orange Revolution led to a shift in property-rights protection from one group of firms to another. Echoing the discussion in North, Wallis and Weingast (2009) of an earlier period in English history, in Ukraine, “ownership rights var[y] with the power of the lord” (p. 157). As the lord changes, so does the protection of property rights.

This paper also contributes to a burgeoning literature on the “political connections” of firms (e.g., Fisman, 2001; Faccio, 2006; Gehlbach, Sonin and Zhuravskaya, 2010). Although we cannot measure connections directly, our results are broadly supportive of the idea that political ties matter for economic performance. More generally, our research design allows us to examine the impact of political stability on a specific reform outcome, thus contributing to a vast literature on the political economy of economic reform. Shleifer (1997) provides an early statement of the hypothesis that the impact of reform could be sensitive to the quality of government. Previous explorations of this hypothesis using large firm-level datasets include Brown, Earle and Gehlbach (2009) and Bruno, Bytchkova and Estrin (2008). Relative to this literature, the innovation of our paper is to examine the impact of political stability by exploiting a shock to the geographic balance of power within a particular country.

The paper proceeds as follows. In Section 2, we describe the political context that motivates our research design. We discuss our data in Section 3 and empirical strategy in Section 4. Section 5 presents our results. Section 6 concludes.

2 Context

In late December 2004, following a tumultuous month of street protests and a do-over election, Viktor Yushchenko was declared the president-elect of Ukraine. The events of that period are popularly known as the Orange Revolution.

The seeds of the Orange Revolution were planted in 2002, when Yushchenko’s Our Ukraine party won a plurality in national voting for the Rada, Ukraine’s parliament.¹ Yushchenko, who had briefly served as prime minister in the early 2000s, came within a whisker of forming a governing coalition with the Socialist Party and the Bloc of Yulia Tymoshenko, an oligarch-turned-populist who was one of Ukraine’s savviest political operators. (Tymoshenko’s party was known colloquially as BYuT, a not-so-subtle reference to her striking physical appearance). But heavy-handed tactics secured a majority for a government loyal to President Leonid Kuchma.

Since that time, a fevered contest for power had been waged between Yushchenko and Tymoshenko, on the one hand, and Kuchma and his appointed successor, Viktor Yanukovich,

¹Half the seats in 2002 were chosen by national proportional-representation voting, the other half in single-member districts.

on the other. Fear of a Yushchenko victory would lead to his poisoning in September 2004 at the probable hands of Yanukovich’s political operatives, and subsequently to massive electoral fraud to secure Yanukovich’s victory in a runoff election on November 21. The popular unrest that followed, modeled to some extent on earlier “colored revolutions” in the post-communist region (Beissinger, 2007; Tucker, 2007), ultimately led to the do-over election that catapulted Yushchenko to the presidency.²

During the latter years of his reign, Kuchma was supported by a narrow business elite drawn primarily from the eastern half of the country.³ Yanukovich represented one of these clans, the mining and steel interests based in the far eastern region of Donetsk. These eastern businessmen had profited from their close relationship with the state, and they spent generously to prevent Yushchenko’s victory: estimates of total campaign expenditures in 2004 exceed one percent of GDP (Åslund, 2006, p. 20).

The 2002 election had signaled that these businessmen from the east might lose the protection of those in power, and most of them were indeed expelled from the presidential court following Yushchenko’s victory in 2004. Yushchenko’s political base was in the historically Hapsburg west of the country (Clem and Craumer, 2005), and he owed nothing to the men who had financed the campaign against him. Power in Ukraine is exercised from the center, and Yushchenko used his control over gubernatorial appointments to replace every one of Ukraine’s 27 governors the year after the Orange Revolution.⁴ Tymoshenko was named to head a government that was notable for the absence of easterners. Although some businessmen from the east did succeed in eventually establishing contacts with those now in power, many apparently did not. In the words of one analyst, reputational concerns make it “difficult to move from one cart to another.”⁵ The turnover in governors may have been especially consequential, as these officials evidently play a key role in allocating land and permits to local businesses.⁶

In principle, these actions may have had two effects, which are not mutually exclusive. First, they might have increased confidence among businessmen in the west of the country, who now had better ties to those in power. Figure 1, which represents smoothed data from quarterly business surveys conducted by the Institute for Economic Research and Policy Consulting in Ukraine, provides some evidence in support of this point. The most notable change after the Orange Revolution (illustrated by the vertical line in late 2004) occurs in Lviv, the core of Yushchenko’s geographic base.⁷

Second, the change in government may have decreased confidence among businessmen in

²For an excellent summary of these events, see Wilson (2005).

³Viktor Medvedchuk, the head of Kuchma’s presidential administration, led a business group based in Kyiv, but this group had few production assets of the sort included in our dataset.

⁴Authors’ calculation based on news reports from the National News Agency of Ukraine. We use the term “governor” to refer to any head of regional administration.

⁵Interview with Jorge Zukoski, American Chamber of Commerce in Ukraine, June 2010. This point was also stressed in an interview with Anna Derevyanko, European Business Association, June 2010.

⁶Interview with Jorge Intriago, Ernst and Young, June 2010. In contrast, the direction of subsidies to individual businesses is less possible, given changes in budgetary procedures implemented in the early 2000s; interview with Ildar Gazzizulin, International Centre for Policy Studies, June 2010.

⁷We are grateful to Oksana Kuziakiv for providing these data.

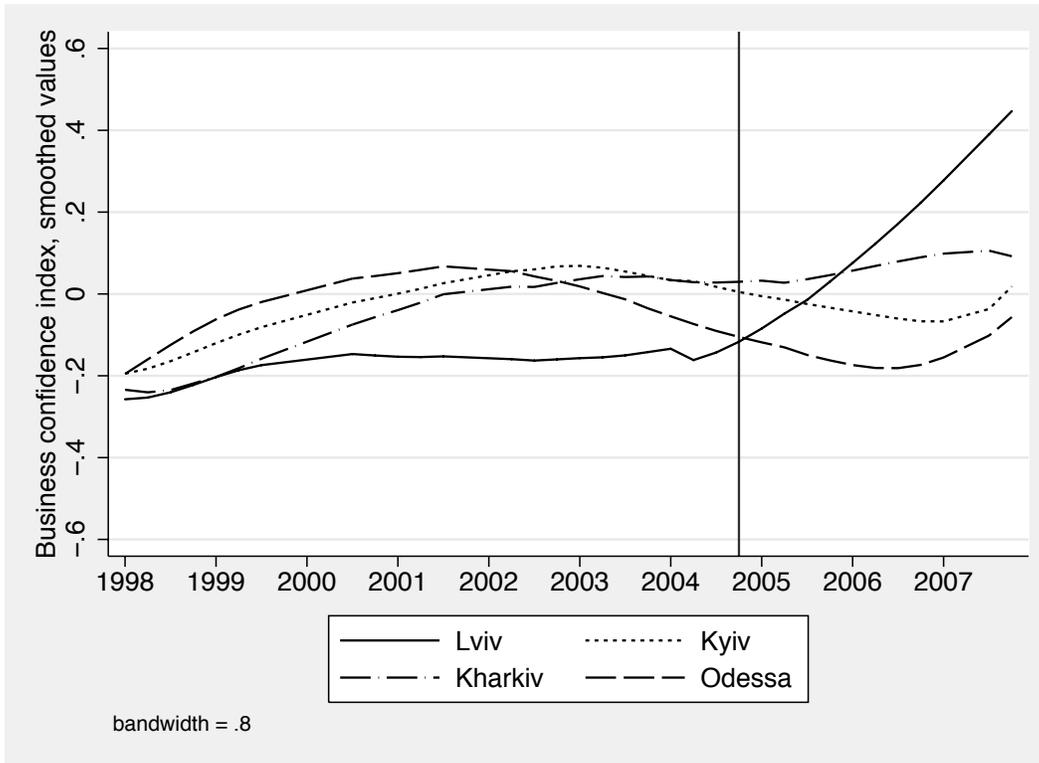


Figure 1: Business confidence over time in four Ukrainian regions

the east. Shortly after taking power, the Tymoshenko government launched a series of investigations against eastern businessmen (Wilson, 2005, pp. 168–169). In addition, a noisy campaign in favor of “reprivatization” (i.e., nationalization and subsequent privatization of previously privatized enterprises) targeted many of the eastern businessmen who had acquired assets under Kuchma on the cheap. The threat was credible, given the overwhelming majority of Ukrainians who were in favor of revising privatization (Åslund, 2009, pp. 206–207; see also Denisova et al., 2009). In the end, only two previously privatized enterprises were seized by authorities (Paskhaver and Verkhovodova, 2007), but the perceived threat to property rights has been blamed for the collapse in GDP growth that followed the Orange Revolution (Åslund, 2005).⁸

In sum, the Orange Revolution entailed a dramatic shift of power away from the businessmen who controlled the economy in the eastern half of the country, toward those with ties to Yushchenko in the west. The question of this paper is how this affected the environment for private enterprise in the east and west of Ukraine. Much of Ukraine’s industry had been privatized in the mid- to late 1990s, with the goal of improving incentives for firms to undertake costly actions that would improve productivity. The political instability ushered in by the Orange Revolution had the potential to weaken these incentives for some new private owners, even as it increased those for others. Our primary hypothesis is therefore that the Orange Revolution resulted in a relative decline in the productivity of privatized

⁸Other factors include inflation of official figures in 2004 resulting from tax evasion and the decline in world metals prices in 2005; interview with Dmitro Sologub, Raiffeisen Bank Aval, June 2010.

firms in anti-Yushchenko regions, relative to that in pro-Yushchenko regions.

3 Data

As we discuss more fully in the following section, our research design employs a multilevel approach, with firms nested in 27 regions (*oblasti*) of Ukraine. Using the firm data, we first estimate the effect of private ownership on firm productivity at the region-year level. We then estimate the differential effect of the Orange Revolution on these first-stage estimates using data on voting in the 2004 Ukrainian presidential election and other regional characteristics. Here we discuss our firm-level and regional data in turn.

Our firm-level data are collected by the Ukrainian State Statistics Service (Derzhkomstat) and its Soviet-era predecessor. The primary source is industrial-enterprise registries, which include all industrial firms with more than 100 employees, plus those that are more than 25 percent owned by the state and/or by legal entities that are themselves included in the registry. Once firms enter the registries, they typically continue to report even if the original conditions for inclusion are no longer satisfied. The data thus correspond to the “old” sector of firms (and their successors) inherited from the Soviet system. We supplement the registry data with balance-sheet data and information from the State Property Committee and State Securities Commission.

The resulting database includes measures of *Output*, *Employment*, and *Capital stock*, as well as industry affiliation and regional location. With respect to ownership, we classify firms as *Domestic private* if the state holds less than 50 percent of the shares and domestic private shareholders own more than foreigners; the firm is classified as *Foreign private* if the state holds less than 50 percent of the shares and foreign shareholders own more than domestic private owners. The residual category is state ownership. We exclude non-manufacturing sectors and non-profit organizations from the sample. To focus on the effects of private ownership with a relatively homogeneous comparison group, we also include only firms that are state-owned on entry into the database. Finally, we retain firm-years in the sample only when they contain complete information, which does not reduce the sample appreciably. The resulting sample of initially state-owned firms, some of which were then privatized, contains information on a panel of 7,684 enterprises, with 85,075 firm-year observations for 1989 and 1992–2007; data for 1990 and 1991 (before privatization was initiated) are not available.

In the second stage of our multilevel research design, we investigate the effect of the Orange Revolution on the relative performance of privatized firms in regions supportive of and opposed to Viktor Yushchenko, the eventual presidential-election winner. We use region-level data on the *Yushchenko vote* in the do-over runoff election of December 2004. As Figure 2 illustrates, there was a strong regional character to this vote, with Yushchenko doing better in the west than the east of the country. (The cities of Kyiv and Sevastopol are governed administratively as regions, and the data in this paper distinguish between these cities and the surrounding regions of Kyiv oblast and Crimea.)

Some of our equations also include various time-varying regional characteristics: *Industrial*

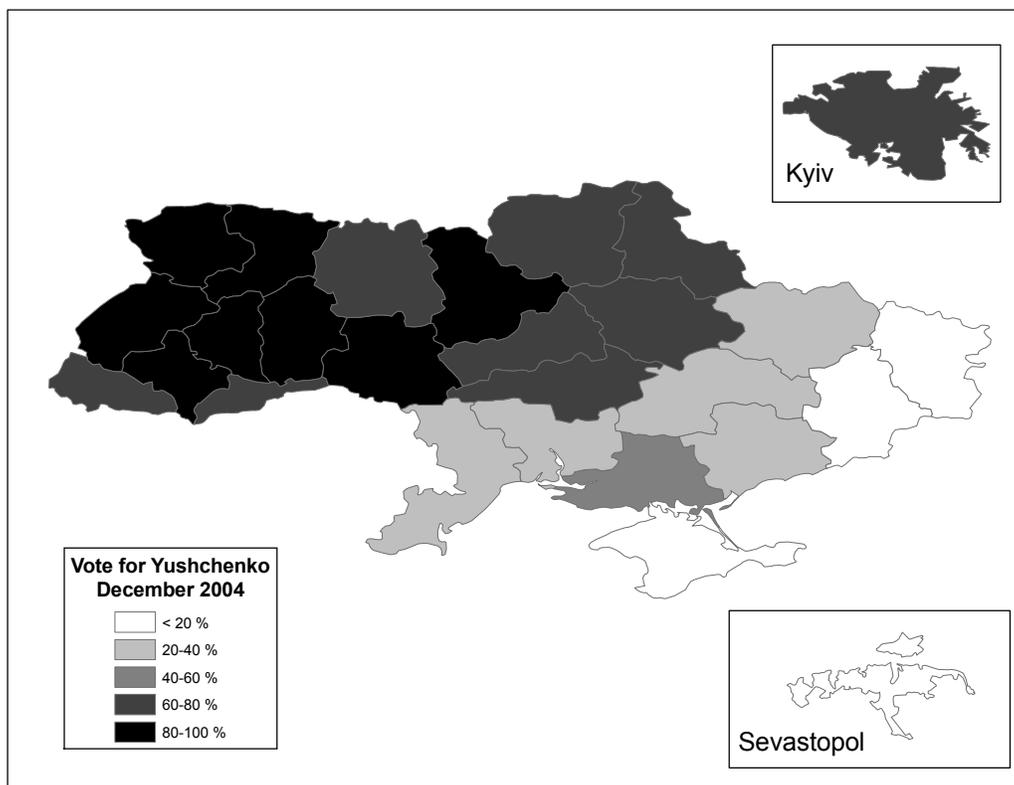


Figure 2: Voting in Ukraine’s 2004 presidential election

production growth; Unemployment, using the International Labour Organization methodology; *Foreign direct investment*; and *Population*. All of the latter variables are drawn from annual statistical yearbooks and the *Regions of Ukraine* publications of the Ukrainian State Statistics Service. Finally, in some exercises we also use data on the *Our Ukraine* vote and *BYuT [Bloc of Yulia Tymoshenko]* vote in the 2002 parliamentary elections. All vote shares are recorded as proportions.

As we discuss below, one potential concern with our research design is that the 2004 election results may be endogenous to firm performance at the regional level. To address this concern, we exploit a striking feature of the 2004 elections: the strong correlation between vote outcome and the ethnic and linguistic character of the region. Regions with large shares of self-identified Russians (*Russian ethnicity*) and Russian speakers (*Russian language*) were overwhelmingly less likely to vote for Yushchenko in 2004. Notably, this pattern was not so evident in earlier presidential elections, when machine politics tended to overwhelm cultural identification with one candidate or another.⁹ Moreover, the data source for these variables is the 2001 Ukrainian Census, well prior to the Orange Revolution, thus avoiding concerns that events during the Orange Revolution may have changed ethnic self-identification. After

⁹The emergence of this ethnic and linguistic divide seems to have more to do with underlying cultural predispositions than attitudes toward Russia *per se*; see, for example, Tucker (2007). Darden and Grzymala-Busse (2006) and Darden (2010) trace these predispositions to the introduction of national identities in the communist and precommunist periods.

controlling for the sectoral composition of regions, which may depend on the timing of their incorporation into the Russian Empire or the Soviet Union, there is thus little reason to think that ethnicity or language use should be correlated with changes in privatization effectiveness other than through the effects of the Orange Revolution. To a partial extent, we can check this assumption by exploiting overidentification tests when both Russian ethnicity and Russian language interacted with a dummy for the years following the Orange Revolution are used as instruments.

4 Empirical strategy

Our general research design follows the multilevel approach in Brown, Earle and Gehlbach (2009), which builds on the analysis of firm-level data in Brown, Earle and Telegdy (2006, 2010). As in Brown, Earle and Gehlbach (2009), we first use panel data on manufacturing enterprises to estimate the effect of private ownership on firm performance at the regional level, following which we regress those estimates on various regional characteristics. Relative to a one-step “random coefficient” model, which is asymptotically equivalent (e.g., Beck, 2005), this two-step approach economizes on computation, given the very large number of firm-year observations in our data and numerous region-level specifications that we employ. Our method differs from Brown, Earle and Gehlbach (2009) primarily in the nature of higher-level variation that we exploit. Brown, Earle and Gehlbach (2009) focus on cross-sectional variation in Russia, taking advantage of plausibly exogenous differences across Russian regions in the size of public administrations. In contrast, we exploit changes in the quality of government over time as well as across space in Ukraine. Thus, we estimate *time-varying* regional effects of private ownership on firm performance in the first step of our multilevel procedure.

Our estimates of the effect of private ownership on firm performance exploit the presence of firms in our dataset that experience both state and private ownership as a consequence of privatization. The fundamental issue in identifying these effects is that firms are not randomly selected for privatization. Absent an experimental or quasi-experimental setting, any analysis of privatization effects therefore requires detailed panel data with a large number of privatized and state-owned firms within industries and a long time series of observations on each firm before and after the privatization process. Our data meet these criteria. We exploit these data to control for selection bias in the privatization process, using program-evaluation techniques that correct not only for the possibility that firms selected for privatization may have different performance on average than firms remaining state-owned, but also that they may exhibit different performance growth. As Brown, Earle and Telegdy (2006) show, once these two idiosyncratic factors are taken into account, there is no statistically significant difference in the behavior of preprivatization productivity across privatized and state-owned firms.

In particular, we employ a specification containing both a firm fixed effect (FE) and a firm-specific trend (FT), also known as a “random-growth” model, to estimate the effect of private ownership on firm performance. Figure 3 illustrates the approach: the inclusion of

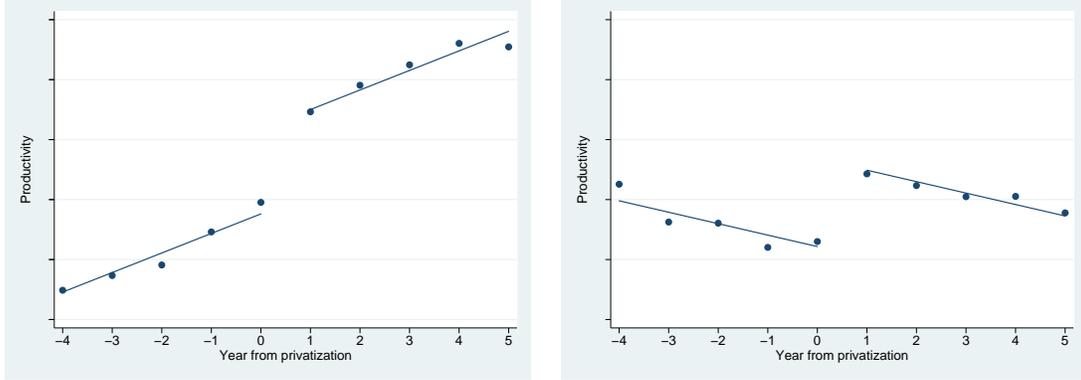


Figure 3: Two firms with similar estimated effects of private ownership after controlling for firm fixed effects and firm-specific trends

fixed effects and trends results in an apples-to-apples comparison, such that the estimated effect of private ownership is approximately the same for the two firms depicted in the figure. In addition, we include a full set of industry-year effects to control for time-varying industry characteristics and shocks that may be correlated with both ownership and performance. Our estimates are therefore based on deviations resulting from privatization from the performance trend for each individual firm, controlling for industry-year shocks.

Our performance measure is multifactor productivity, the quantitative outcome most closely tied to economic welfare and the variable for which there is the best-documented evidence of variation in privatization effects (see above). This outcome is broader than the measures of capital investment used in various other firm-level studies (e.g., Malesky and Samphantharak, 2008), as it incorporates the multitude of costly actions that may be taken to improvement firm performance. In the transition contest, for example, improving productivity may require layoffs of redundant employees, which for political reasons may be costly, or the identification of new markets outside of the former Communist bloc.

The estimating equation for the first stage is

$$x_{jrst} = f_s(k_{jrst}, l_{jrst}) + F_{jrst}\phi + D_{jrst}\vartheta_{st} + D_{jrst}\delta_{rt} + \psi_{st} + \mathbf{w}_t\alpha_j + \eta_{jrst}, \quad (1)$$

where j indexes firms, r indexes regions, s indexes sectors, and t indexes periods. The variable x_{jrst} is output; f_s is an industry-specific production function, where k_{jrst} is capital stock and l_{jrst} is employment; F_{jt} is an indicator of whether the firm was foreign-owned at the end of year $t - 1$, with ϕ the associated coefficient; and D_{jrst} is an indicator for domestic private ownership, the effect of which we allow to vary by sector-year (ϑ_{st}) and region-year (δ_{rt}). The variable ψ_{st} is a fixed sector-year effect, so that comparisons are within industry-year cells, and \mathbf{w}_t is a vector of aggregate time variables, with α_j the vector of associated individual-specific slopes. Finally, η_{jrst} is an idiosyncratic error.

Given the very small number of foreign-privatized firms in our data set, we do not attempt to estimate a separate foreign-privatization effect for each region, but rather assume an effect (ϕ) that is constant across regions. In fact, as discussed above, Brown, Earle and Telegdy (2006) find uniformly positive and large effects of foreign privatization across the countries

in their study, in contrast to the quite different effects of domestic privatization that are our focus. For conciseness, in what follows we often refer simply to estimated private-ownership or privatization effects, omitting the qualifier “domestic.”

These region-year ownership effects (δ_{rt}) control for variation in industrial composition across regions and over time through the sector-year privatization effect ϑ_{st} . In addition, we permit production functions to vary across sectors (f_s), and as discussed above we include sector-year fixed effects (ψ_{st}), so that comparisons are within industry-year cells.¹⁰ With respect to the functional form of f_s , we assume an unrestricted Cobb-Douglas production function; Brown, Earle and Telegdy (2006) show that the estimated effects of privatization are little affected by alternative assumptions on the form of the production function (e.g., trans-log or Cobb-Douglas with constant returns to scale).

Our method of controlling for selection bias is embodied in the specification of \mathbf{w}_t . The FE&FT model with firm fixed effects and firm-specific trends (the “random growth” model) has $\mathbf{w}_t \equiv (1, t)$, so that $\alpha_j \equiv (\alpha_{1j}, \alpha_{2j})$, where α_{1j} is a fixed unobserved effect and α_{2j} is the specific trend for firm j . In practice, the FE&FT model is estimated in two steps, the first detrending all variables for each firm separately and the second estimating the model on the detrended data.

In the second stage of our two-stage procedure, we wish to estimate the following model:

$$\delta_{rt} = \mathbf{Z}_{rt}\mu + \theta_t + \mathbf{w}_t\zeta_r + u_{rt}, \quad (2)$$

where δ_{rt} is the productivity effect of domestic private ownership for region r at time t ; \mathbf{Z}_{rt} is a vector of time-varying regional characteristics, with μ the associated vector of coefficients; θ_t is a year-specific effect; \mathbf{w}_t is a vector of time variables, as in the previous equation, with ζ_r the associated vector of coefficients; and u_{rt} is an idiosyncratic error.

In most of our analysis, the vector \mathbf{Z}_{rt} includes the interaction of an indicator for the years after the Orange Revolution and the vote for Yushchenko in the final round of the 2004 presidential election. In other words, we compare the impact of the Orange Revolution on the relative performance of private firms in regions that supported Yushchenko and those that did not.

As in the firm-level analysis, we define $\mathbf{w}_t \equiv (1, t)$, so that we allow for both region fixed effects and region-specific trends. As Figure 4 illustrates, trends in the effect of private ownership on firm productivity differ sharply across regions before the Orange Revolution, even after controlling for year fixed effects. In Sumy, for example, privatization effectiveness trends sharply downward before the Orange Revolution, whereas in Odesa the trend is clearly positive. If these trends are correlated with vote for Yushchenko in 2004, then models with fixed effects only would produce biased estimates of the impact of the Orange Revolution on firm performance. Our empirical strategy corrects for these differences by estimating a separate linear trend for each region.

¹⁰We follow Brown, Earle and Telegdy (2006) in reporting results for a partitioning of firms into 10 sectors, trading off the benefits of disaggregation of sectors and number of observations within individual sectors, though as we discuss below, our results are robust to greater disaggregation.

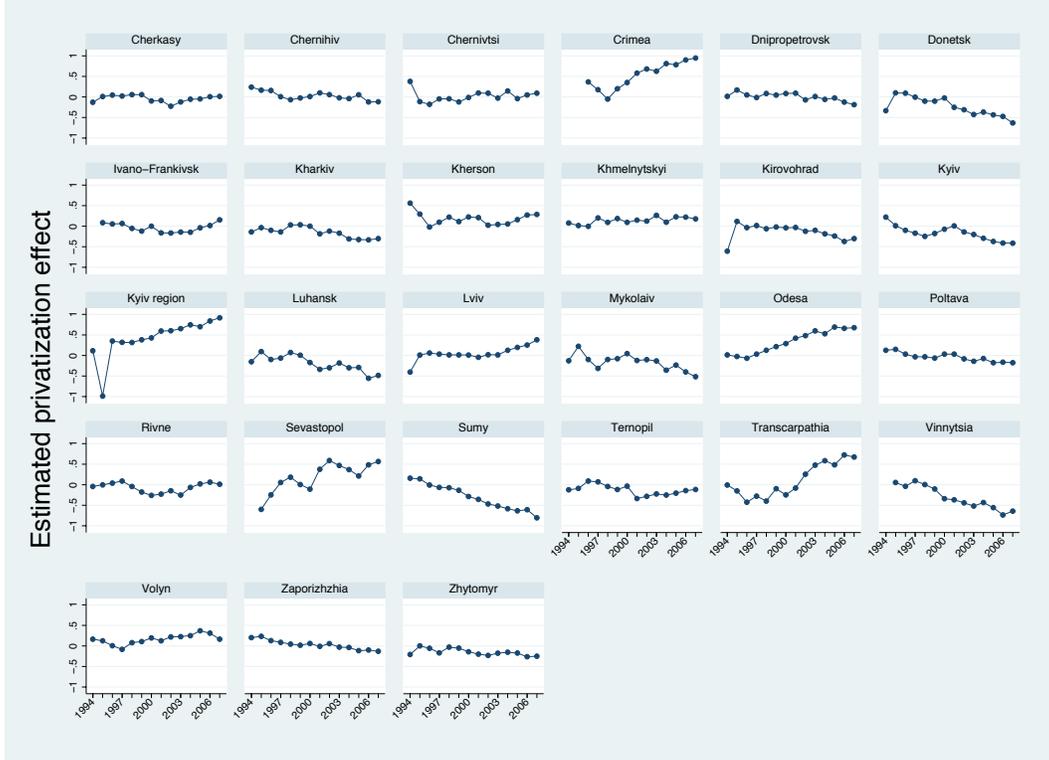


Figure 4: Trends in the effect of private ownership on firm productivity, controlling for year fixed effects

In practice, we do not observe δ_{rt} directly, but instead have an estimate $\hat{\delta}_{rt} = \delta_{rt} + v_{rt}$ from estimation of Equation 2. Our estimating equation for the second stage is therefore

$$\hat{\delta}_{rt} = \mathbf{Z}_{rt}\mu + \theta_t + \mathbf{w}_t\zeta_r + (u_{rt} + v_{rt}) = \mathbf{Z}_{rt}\mu + \theta_t + \mathbf{w}_t\zeta_r + \varepsilon_{rt}, \quad (3)$$

where we define $\varepsilon_{rt} \equiv u_{rt} + v_{rt}$. Estimation of Equation 3 poses a minor complication, in that the precision of first-stage estimates of δ_{rt} will generally be greater in region-year cells with more firm-year observations, implying that ε_{rt} will have smaller variance in such region-years. In principle, we could correct for this second-stage heteroskedasticity by employing a feasible generalized least squares (FGLS) estimator of the sort suggested by Hanushek (1974), though this would be somewhat cumbersome given the panel structure of our second stage. In practice, OLS estimates of Equation 3 are consistent, and working with similar data Brown, Earle and Gehlbach (2009) find little difference between OLS and FGLS estimates. (Relative to the Russian data used in Brown, Earle, and Gehlbach, 2009, the Ukrainian data in this paper are also comparatively balanced across regions.) We therefore estimate Equation 3 by OLS, calculating heteroskedasticity-robust standard errors.

A more serious econometric concern is that the election outcome in 2004 may be endogenous to regional firm performance. As we discuss above, we therefore also estimate Equation 3 by two-stage least squares, using the interaction of an Orange Revolution indicator and Russian ethnicity and language, respectively, as instruments for the Orange Revolution \times Yushchenko vote interaction.

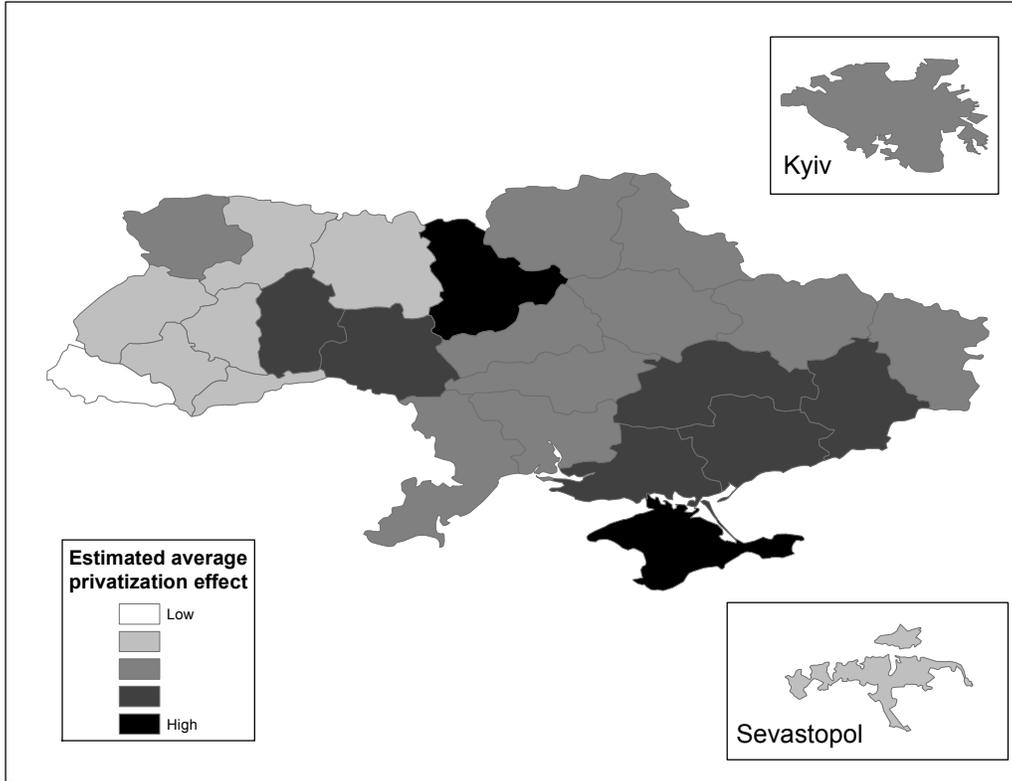


Figure 5: Average effect of private ownership on firm productivity, by region

5 Results

5.1 Estimation

As a preliminary step, we estimate the average regional impact of domestic private ownership on multifactor productivity, using the following variant of Equation 4:

$$x_{jrst} = f_s(k_{jrst}, l_{jrst}) + F_{jrst}\phi + D_{jrst}\vartheta_s + D_{jrst}\delta_r + \psi_{st} + \mathbf{w}_t\alpha_j + \eta_{jrst}, \quad (4)$$

Figure 5 illustrates the estimated regional effects. In general, private ownership has a more positive impact on firm productivity in the eastern regions of Ukraine. Variation in these estimated effects is quite large, ranging from a 39-percent reduction in firm productivity in Transcarpathia to a 29-percent increase in Crimea. These cross-regional differences are comparable to those documented for Russia in Brown, Earle and Gehlbach (2009).

Our focus in this paper is on variation over time in regional ownership effects, not on the average effect. The primary question is whether the relative performance of privatized firms was affected by the regime change that followed the Orange Revolution in 2004. To estimate this effect, we take advantage of the strong geographic character of the Orange Revolution: as discussed above, many of the actions subsequently taken by President Yushchenko were directed against business elites in the eastern regions where Yushchenko did poorly in the

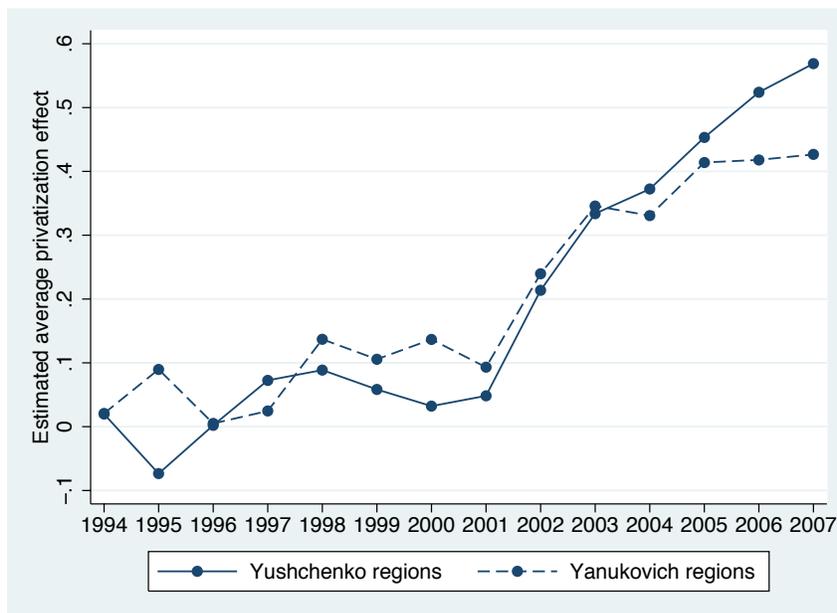


Figure 6: Average effect of privatization on firm productivity, by year

2004 presidential election, and his government was composed almost entirely of individuals from other parts of the country. Our hypothesis is therefore that the performance of privatized firms in pro-Yanukovich regions decreased after the Orange Revolution, relative to that in pro-Yushchenko regions.

Figure 6 presents a rough comparison of trends in the relative performance of privatized firms in regions where Yushchenko and Yanukovich did relatively well in the December 2004 (do-over) runoff election.¹¹ In both parts of the country, private ownership has little impact on firm performance through 2001. The sharp acceleration after that date may be a consequence of the extensive economic reforms carried out during Yushchenko’s 17-month stint as prime minister in 2000 and 2001. There is little obvious difference in the trajectories of Yushchenko and Yanukovich regions before the Orange Revolution, but trends diverge after Yushchenko’s election as president. By 2007, ownership by domestic private shareholders is estimated to have a 14-percentage-point greater impact on firm productivity in Yushchenko regions than in Yanukovich regions, a difference that is statistically significant ($p=0.096$).

To formally test the hypothesis of a differential impact of the Orange Revolution on the performance of privatized firms, we turn to the empirical strategy outlined in the previous section. As discussed there, we estimate a model with region and year fixed effects and region-specific trends. Our determinant of interest is the interaction of an Orange Revolution indicator, 0 through 2004 and 1 thereafter, and the vote for Yushchenko in the December runoff election. (The “direct effects” are subsumed by the region and year fixed effects.) For most specifications, we report results for a balanced panel of estimated private-ownership effects from 1996 through 2007: there are relatively few privatizations prior to 1996 (observe

¹¹Yushchenko received at least two-thirds of the vote in the 14 regions (out of 27 total) defined here as “Yushchenko regions.”

the erratic behavior in 1994 and 1995 in Table 4), and certain regional controls are available only from 1996. Further, we drop Sevastopol from the analysis, as there are very few firm-year observations in that region (city), and some regional variables are unavailable for numerous years in the sample. As we discuss below, however, we check the robustness of our results to estimation on an unbalanced panel of all 27 regions for the period from 1994 through 2007.

Table 1 presents these estimates of the impact of the Orange Revolution on the relative performance of privatized firms. Column (1) reports results for a baseline specification with region fixed effects and region-specific trends. The estimated effect of the Orange Revolution \times Yushchenko vote interaction is large and statistically significant at the 0.01 level.¹² To put this in perspective, Yushchenko’s vote share in the December election ranged from 0.04 in Donetsk to 0.96 in Ternopil. The Orange Revolution is therefore estimated to have resulted in a decrease in the effect of private ownership on firm performance of 19 percentage points in the most anti-Yushchenko region, relative to the most pro-Yushchenko region.

The estimate in column (1) controls for many potential sources of variation across firms, time, and regions. To begin with, regional ownership effects are based on deviations resulting from privatization from the productivity trend for each individual firm, controlling for industry-year shocks. Thus, for example, private ownership would have the same impact on two firms—one in a sector experiencing rapid technological improvement, the other burdened with excess employment—if it increased productivity two percent above a positive trend in the first case and two percent above a negative trend in the second.

Moreover, these estimates control for differences across regions in industrial structure, as our first-stage model (Equation 1) allows for sector-specific privatization effects that vary over time: any difference between Donetsk and Ternopil is due to factors other than the presence of a large mining sector in the first region but not the second, including the fact that the mining sector may have been disproportionately affected by the decline in world metals prices in 2005. The inclusion of year fixed effects in the second-stage equation controls for common shocks to privatization effectiveness such as changes in macroeconomic policy, and the presence of region fixed effects controls for time-invariant characteristics such as urbanization and geographic location that may differentially impact private firms. Finally, the inclusion of region-specific trends allows for the possibility that the effect of regional characteristics may change over time. For example, product and input markets may be generally deeper in urbanized regions, but that relationship may have accelerated as the economic transition progressed.

Nonetheless, there may be time-variant regional characteristics that are correlated with the Orange Revolution effect that are not captured by region-specific trends. As a robustness check, we therefore include the vector of (possibly endogenous) controls described in Section 3: industrial production growth, unemployment, log FDI, and log population. Column (2) presents results with these covariates. Only unemployment has an estimated effect that is significantly different from zero, and the estimated effect of the Orange Revolution \times

¹²In a model with fixed effects only, the estimated effect of the Orange Revolution \times Yushchenko vote interaction is positive and just insignificant at conventional levels, with an estimated coefficient of 0.156 (SE = 0.096).

Table 1: The Orange Revolution and privatization effectiveness

	(1)	(2)	(3)	(4)	(5)
Orange Revolution × Yushchenko vote	0.203*** (0.057)	0.188*** (0.058)	0.565*** (0.197)	0.232*** (0.061)	0.259*** (0.067)
Industrial production growth		-0.060 (0.063)			
Unemployment		-0.820* (0.497)			
Log FDI		-0.015 (0.016)			
Log population		0.986 (1.685)			
Orange Revolution × western region			0.052 (0.054)		
Orange Revolution × southern region			0.235** (0.103)		
Orange Revolution × eastern region			0.286*** (0.110)		
Orange Revolution × western border				-0.033 (0.045)	
Orange Revolution × eastern border				0.028 (0.041)	
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Region-specific trends	Yes	Yes	Yes	Yes	Yes
Observations	312	312	312	312	373
Regions	26	26	26	26	27

Notes: Dependent variable is estimated regional privatization effect from firm-level FE&FT regression. Heteroskedasticity-robust standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

Yushchenko vote interaction is quite similar to that in column (1). We conclude that the baseline specification with fixed effects and region-specific trends captures the underlying relationship.

The results in columns (1)–(2) support the hypothesis that Yushchenko used his presidential power to alter business-state relations after the Orange Revolution, with the business environment for privatized firms worsening in regions that opposed his election, relative to those that supported it. An alternative explanation for these results is that privatized firms in particular regions benefited or suffered from Yushchenko’s efforts to realign Ukraine with the West, a policy that came at the expense of relations with Russia. In principle, the shifting geopolitical environment could have disproportionately affected firms with actual or potential trade ties to the European Union and Russia. (Changing relations with the European Union and Russia may also have affected particular *sectors*, but those effects would be

captured by the sector-specific privatization effects estimated in Equation 4.)

The specifications in columns (3) and (4) of Table 1 explore this possibility by including interactions of the Orange Revolution dummy with various dummies for geographic location. Column (3) divides Ukraine into four macro-regions, following the typology in Clem and Craumer (2005). Column (4) interacts the Orange Revolution dummy with indicators equal to one if the region borders Poland, Slovakia, Hungary, or Romania (Romania joined the European Union in 2007, but accession talks were well under way by the time of the Orange Revolution) or Russia, respectively. The Orange Revolution \times Yushchenko vote effect is large and significant in both regressions—indeed, substantially larger in column (3).

Column (5) reports results from estimation on a larger, unbalanced panel from 1994–2007, with Sevastopol included; the estimated Orange Revolution effect is quite similar to that in the preceding columns. As a further robustness check, we verified that the results in Table 1 are not driven by outliers, dropping regions one at a time from the sample. The estimated coefficient on the interaction of the Orange Revolution dummy and Yushchenko vote in the specification of Column (1) never drops below 0.17 in any of these 27 regressions, and the associated p -value is always below 0.01. Finally, we re-estimated Equation 4, partitioning firms into two-digit sectors rather than the more aggregated classification used in Brown, Earle and Telegdy (2006). The second-stage estimates are nearly identical to those reported above. The baseline results presented in this section prove quite robust.

5.2 Identification

As discussed above, one potential concern with these results is that the 2004 election outcome may be endogenous to regional firm performance. To address this issue, we consider two excluded instruments in the second step of our multilevel procedure: an interaction between the Orange Revolution dummy and the proportion of the regional population with self-declared Russian ethnicity, and an interaction between the Orange Revolution dummy and the proportion of the regional population speaking Russian as a native language.

Table 2 reports the results of these instrumental-variables regressions. Both instruments are strongly correlated with the Orange Revolution \times Yushchenko vote interaction—Yushchenko did better in regions with few Russians—but the relationships are somewhat distinct, reflecting the imperfect correlation between language use and ethnic identity in Ukraine. The Hansen J -statistic, which allows for a test of overidentification in the presence of heteroskedasticity, comfortably supports the exclusion of these instruments in the first four specifications (though in column (3) only one of the two instruments is a significant predictor in the first stage), whereas it is borderline significant in the fifth. The estimated effect of the Orange Revolution \times Yushchenko vote interaction is substantively large in all regressions, and it is statistically significant in four out of five specifications. As in Table 1, these results are robust to dropping regions one at a time.

As an additional exercise, we consider the dynamics of the Orange Revolution effect. If this effect is causal, then pro- and anti-Yushchenko regions should diverge after the Orange Revolution, not before, though there is the possibility of anticipatory effects just prior to

Table 2: Instrumental-variables regressions

	(1)	(2)	(3)	(4)	(5)
Orange Revolution \times Yushchenko vote	0.161*** (0.055)	0.139** (0.056)	0.184 (0.309)	0.184*** (0.058)	0.256*** (0.072)
Industrial production growth		-0.062 (0.056)			
Unemployment		-0.856* (0.443)			
Log FDI		-0.016 (0.015)			
Log population		0.903 (1.486)			
Orange Revolution \times western region			0.096* (0.053)		
Orange Revolution \times southern region			0.057 (0.155)		
Orange Revolution \times eastern region			0.071 (0.174)		
Orange Revolution \times western border				-0.027 (0.039)	
Orange Revolution \times eastern border				0.017 (0.036)	
Russian ethnicity (first stage)	0.921*** (0.254)	0.882*** (0.259)	-0.089 (0.202)	1.161*** (0.292)	1.126*** (0.156)
Russian language (first stage)	-1.665*** (0.160)	-1.663*** (0.160)	-0.404** (0.160)	-1.828*** (0.187)	-1.766*** (0.113)
Hansen overidentification statistic p -value, Hansen statistic	0.027 0.870	0.169 0.681	0.295 0.587	0.035 0.852	3.022 0.082
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Region-specific trends	Yes	Yes	Yes	Yes	Yes
Observations	312	312	312	312	373
Regions	26	26	26	26	27

Notes: Dependent variable is estimated regional privatization effect from firm-level FE&FT regression. Heteroskedasticity-robust standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

the event. We can check this by estimating a dynamic specification of Equation 3, where we interact dummy variables for the years before and after the Orange Revolution with vote for Yushchenko in the 2004 presidential election. Formally, index event time by τ , with $\tau = 0$ corresponding to 2004, the year of the Orange Revolution. We report results from a specification that includes interactions for $\tau = -5, -4, \dots, 2, 3$, thus treating years before 1999 as the base category.

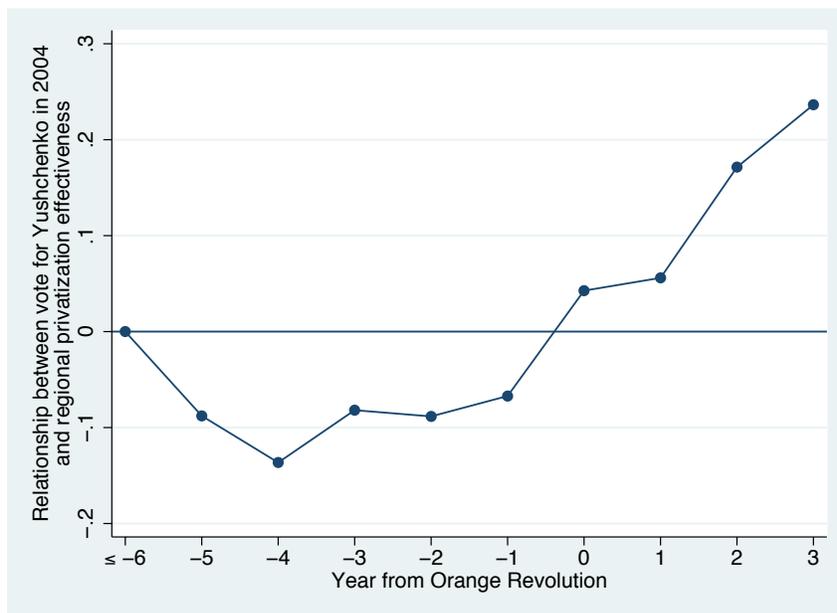


Figure 7: Dynamics of estimated Orange Revolution effect

Figure 7 depicts the dynamics of the Orange Revolution effect. After a small dip relative to the baseline period, the profile is essentially flat through $t = -1$, suggesting no change in the relationship between vote for Yushchenko and privatization effectiveness from 1999 to 2003. The kink at $t = 0$ corresponds to the year of the Orange Revolution. This movement is consistent with changes in firm behavior in anticipation of a possible regime change. As Kuzio (2006) reports, the popular belief that Yushchenko could win increased dramatically over the course of the election campaign and subsequent events in 2004. Firms may therefore have begun to adjust to a possible change in the business environment, expecting a shift in presidential favor to the western regions of the country. Finally, following the Orange Revolution, pro- and anti-Yushchenko regions increasingly diverge, with the effect reaching its maximum at $\tau = 3$, the last year in the data.

5.3 Interpretation

What accounts for the strong correlation between the Yushchenko vote in the 2004 presidential election and the post-Orange Revolution trends in privatization effectiveness? In principle, the results reported in the previous sections could be driven by one of four different outcomes: an increase in the performance of privatized firms in pro-Yushchenko regions, a decrease in the performance of privatized firms in pro-Yanukovich regions, a decrease in the performance of state-owned enterprises in pro-Yushchenko regions, or an increase in the performance of state-owned enterprises in pro-Yanukovich regions. Various intermediate scenarios are also possible.

Unfortunately, it is impossible to distinguish among these various scenarios with our research design, as the inclusion of fixed effects in the firm-level equation allows estimation of only

Table 3: Private versus state enterprises: absolute effects

	Private	State	Private	State
	(1)	(2)	(3)	(4)
Orange Revolution × Yushchenko vote	0.196*	0.080	0.169*	0.047
	(0.098)	(0.131)	(0.098)	(0.150)
Industrial production growth			-0.117	-0.063
			(0.086)	(0.177)
Unemployment			-0.637	-1.534
			(0.757)	(1.355)
Log FDI			0.005	-0.020
			(0.018)	(0.036)
Log population			-2.720	0.709
			(2.848)	(6.264)
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Region-specific trends	Yes	Yes	Yes	Yes
Observations	312	312	312	312
Regions	26	26	26	26

Notes: Dependent variable is estimated regional private and state ownership effect, respectively, from firm-level OLS regression. Heteroskedasticity-robust standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

relative, not absolute, effects. If we are willing to ignore selection effects (e.g., that more productive firms are more likely to be chosen for privatization), however, we may estimate the following variant of Equation 4, where we include state (S_{jrst}) and private (D_{jrst}) ownership effects:

$$x_{jrst} = f_s(k_{jrst}, l_{jrst}) + F_{jrst}\phi + D_{jrst}\varrho_{st} + D_{jrst}\kappa_{rt} + S_{jrst}\lambda_{st} + S_{jrst}\xi_{rt} + \psi_{st} + \eta_{jrst},$$

The implicit regional privatization effects in this equation, $\kappa_{rt} - \xi_{rt}$, differ from those in Equation 4 in that we do not control for firm-specific effects and trends through the inclusion of the term $\mathbf{w}_t\alpha_j$.

Table 3 regresses estimates of κ_{rt} and ξ_{rt} separately on the treatment variable in specifications analogous to those in the first two columns of Table 1. Regardless of whether we control for time-varying regional characteristics, there is a strong, positive effect of the Orange Revolution on the performance of private firms. In contrast, there is little evidence of a relationship between the Orange Revolution and the performance of state-owned enterprises. Thus, of the four scenarios posited above, the evidence points most strongly to the first two, that is, to a change in the absolute performance of privatized enterprises in either pro- or anti-Yushchenko regions. The kink in the trend for Yanukovich regions in Figure 6 suggests that the primary effect may have been to worsen the business environment for privatized firms in regions hostile to Yushchenko, rather than to improve it for firms in regions supportive of the

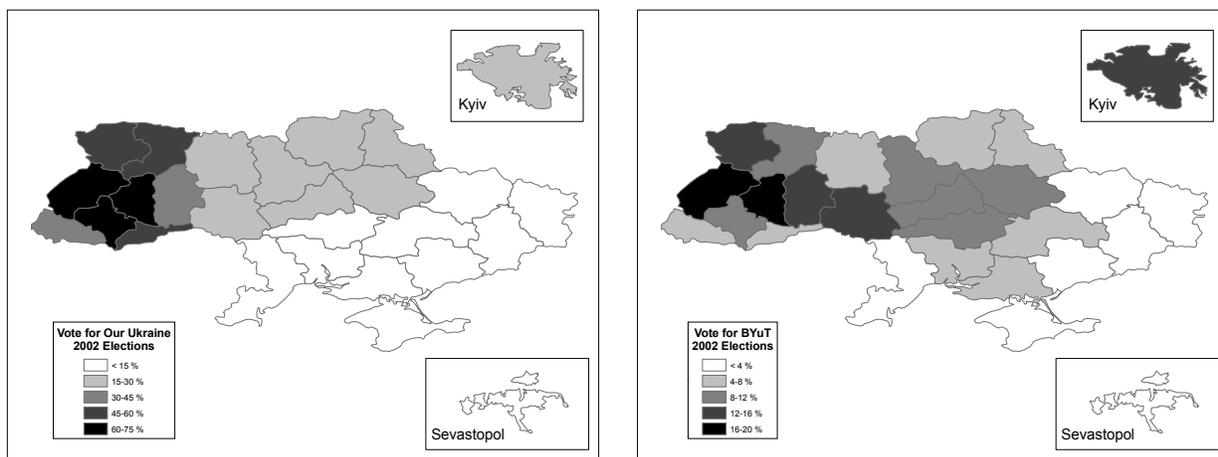


Figure 8: Vote for Yushchenko and Tymoshenko in 2002 parliamentary elections

new president, though of course the counterfactual of no Orange Revolution is unobserved.

Some understanding of context can aid further interpretation. The discussion in Section 2 suggests that Yushchenko himself was interested in realigning the relationship between government and business in various parts of the country, and that he had the means to do so through his control of gubernatorial appointments, among other presidential powers. Moreover, the business-confidence data summarized there suggest that firm owners and managers in western Ukraine may have been especially confident in their ability to reap benefits from Yushchenko’s ascension to the presidency.

We can explore Yushchenko’s personal role by distinguishing more carefully between regions that were consistently pro-Yushchenko, and those that gravitated to him after the 2002 parliamentary elections when Yulia Tymoshenko decided not to run for president. As Figure 8 illustrates, support for Yushchenko’s Our Ukraine party in 2002 was overwhelmingly concentrated in the far west of the country, whereas the BYuT (Bloc of Yulia Tymoshenko) vote was distributed more evenly throughout the western half of Ukraine.

Although Tymoshenko was Yushchenko’s partner in the Orange Revolution, her participation in the government was not ensured until January 2005, when she was named prime minister.¹³ Moreover, Tymoshenko held the premiership only until September 2005, when she was fired by Yushchenko. (Tymoshenko subsequently returned as prime minister in 2007, holding that office until Yanukovich returned to the presidency in 2010.) This ushered in a period of intense political competition between the two erstwhile allies, who were seen as rival candidates in the 2010 presidential elections. As Hale (2010) describes the environment, Yushchenko “aimed to drive a wedge between Tymoshenko and the voters in the country’s more assertively ethnic-Ukrainian western region, which had been his stronghold during the Orange Revolution, but which now backed Tymoshenko” (pp. 90–91). The most visible manifestation of this campaign was Yushchenko’s drive to elevate Stepan Bandera and

¹³An agreement signed between the two parties in July 2004 granted Tymoshenko Yushchenko’s support for the premiership, but this secret protocol was not revealed until after the Orange Revolution, when it was leaked to the press (Wilson, 2005, pp. 159–160).

Table 4: Disaggregation of Orange Revolution effect

	(1)	(2)
Orange Revolution × Our Ukraine vote	0.399*** (0.126)	0.393*** (0.073)
Orange Revolution × BYuT vote	-0.104 (0.560)	
Orange Revolution × swing vote		-0.089 (0.089)
Year fixed effects	Yes	Yes
Region fixed effects	Yes	Yes
Region-specific trends	Yes	Yes
Observations	312	312
Regions	26	26

Notes: Dependent variable is estimated regional privatization effect from firm-level FE&FT regression. Heteroskedasticity-robust standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

Roman Shukhevych, leaders of the wartime anti-Soviet partisan resistance (e.g., Marples, 2010), but there were more practical implications as well, such as Yushchenko’s refusal to let Tymoshenko meet with governors while she served as prime minister.¹⁴ Here we can explore the possibility that this conflict had consequences for the relative performance of privatized firms in different parts of the country.

The specification in column (1) of Table 4 unpacks the Orange Revolution effect by interacting the vote for Yushchenko’s and Tymoshenko’s respective parties in 2002 with the same Orange Revolution dummy used in Tables 1 and 2. The Orange Revolution effect is entirely driven by variation in support for Yushchenko’s Our Ukraine. The estimated coefficient on the Orange Revolution × BYuT vote interaction is in fact negative, though statistically insignificant. Thus, the (relative) performance of privatized firms increased in regions that were consistently supportive of Viktor Yushchenko, not those where individuals joined the Orange coalition closer to the 2004 presidential election.

Column (2) reports results from a similar specification that includes the interaction of the Orange Revolution dummy and vote for Our Ukraine in 2002, plus the interaction of the Orange Revolution dummy and the “swing” in Yushchenko’s vote from 2002 to 2004, defined as the Yushchenko vote in the December 2004 election minus the Our Ukraine vote in the 2002 parliamentary elections. The estimated coefficient on the latter term is small in magnitude and imprecisely estimated, implying that the primary divergence in the performance of privatized firms took place between regions populated by Yushchenko’s core supporters, on the one hand, and the rest of the country, on the other.

Taken together, the results of this section suggest the following interpretation of the effects

¹⁴Interview with Bohdan Senchuk, Swedish Trade Council, June 2010.

identified earlier. Recently privatized firms in various parts of the country reacted differently to Viktor Yushchenko's victory in the 2004 presidential election. Those in the far western regions that constituted Yushchenko's geographic base had the least to fear, and most to gain, from his presidency. Those in other parts of the country disproportionately avoided taking costly actions to improve productivity. The political instability produced by the Orange Revolution thus shaped the incentives of new private owners in very different ways, depending on where in the country they were located.

6 Conclusion

The Orange Revolution shifted the geographic balance of power in Ukraine. A change in the business environment accompanied that shift, as the effect of private ownership on firm productivity diverged between regions that had supported Viktor Yushchenko, winner of the 2004 presidential election, and those that had opposed him. Analysis of the dynamics of the relationship, and instrumental-variables regressions that exploit the strong correlation between regional voting in 2004 and the ethnic and linguistic character of the region, suggest that the effect is causal.

Roughly speaking, the impact of the Orange Revolution is similar in magnitude to the large differences in privatization performance observed across postcommunist countries. The results in this paper are thus consistent with the hypothesis that political stability is an important driver of reform outcomes.

Beyond this general conclusion, our results speak to long-standing debates about the role of core versus swing voters in policy making (for a review, see Cox, 2010). The relative performance of private enterprises improved most in regions that constituted Yushchenko's core political base, rather than in swing regions whose residents joined his coalition late in the game. Competition within the constellation of forces that took power during the Orange Revolution may have driven this outcome, as Yushchenko and his erstwhile ally Yulia Tymoshenko worked to secure different parts of the former Orange coalition. Coalition dynamics thus served to exaggerate the impact of political instability on firm performance.

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