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**Reform, Uncertainty and Spillovers  
a Gravity Model Approach**

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# Reform, Uncertainty and Spillovers A Gravity Model Approach

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## Abstract

Reforms often occur in waves, seemingly cascading from country to country. We argue that such reform waves may be driven by informational spillovers: uncertainty about the outcome of reform is reduced by learning from the experience of similar countries. We motivate this hypothesis with a simple theoretical model and then test it empirically. Our results confirm the presence of informational spillovers with respect to political liberalization but offer little support for informational spillovers with respect to economic reforms.

Keywords: reform, transition, institutions, uncertainty, spillovers, contagion.

JEL Codes: O11, O47, P27

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# 1 Introduction

Political and economic changes often occur in waves, in a pattern sometimes described as domino effect: process of change initiated in one country appears to spill over the borders to other nearby and/or similar countries. Examples of this phenomenon in the political domain include the events of 1848 in Europe, emergence of new independent countries from the ruins of the Ottoman and Hapsburg Empires in the late 19<sup>th</sup> and early 20<sup>th</sup> century, decolonization following the end of the 2<sup>nd</sup> World War, democratizations in Latin America in the late 1980s and in Eastern Europe in the early 1990s, and most recently the Arab Spring in the Middle East and the Occupy movement in Western countries. On the economic front, we observe waves similar, such as the Washington consensus reforms push forward in less developed and post-communist countries during the late 1980s and throughout 1990s. Reform waves can be observed also with respect to less dramatic changes. The ban on smoking in restaurants and bars, adopted first in Ireland has since spread to most of European countries. Eastern Europe, on the other hand, has experienced similar legislative spillovers with respect to the adoption of the flat tax, first introduced in Estonia in 1994.<sup>1</sup>

What drives such waves? One explanation is that the events in one country or jurisdiction have a direct causal effect on the events elsewhere. This can be referred to as a *domino effect*: the tumbling of one brick in a sequence undermines the stability of the next brick and so on. An alternative explanation is that each of these waves represents a *fad*: events in one country are mimicked by people elsewhere. While these two phenomena are similar, there is an important qualitative difference between them. In the course of the domino effect, the events in one country depend on the outcome of similar preceding events elsewhere. With fads, people mimic behavior of others because they develop a taste for doing so –with the outcome of the event in question being less relevant.

We argue that reform waves such as those discussed in the preceding examples represent domino effects rather than mere fads. The outcome of every reform is inherently uncertain and can be either positive or negative. Reversing an already-

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<sup>1</sup>In both cases, the innovation originated outside Europe: smoking bans were implemented in various US jurisdiction long before their introduction in Ireland while Hong Kong has had a flat tax for decades before its adoption in Estonia.

implemented reform, furthermore, is costly. Uncertainty about reform outcome combined with costly reversal may cause efficiency-enhancing reforms to be postponed or not implemented at all: a phenomenon referred to as the *status-quo bias* (see Fernandez and Rodrik, 1991, and Alesina and Drazen, 1991). Individuals, however, can infer important signals about the likely outcome of the reform by observing the outcomes of similar reform implemented elsewhere. If the reform outcome turns out positive in one country, then other similar countries become more likely to implement the same reform; a negative outcome in one country can stop the reform in its track in other countries too.

We denote these signals *informational spillovers*. While much of the literature on the relationship between reforms and uncertainty has been written with economic reforms in mind, we expect spillovers to apply to political and economic reforms alike. If informational spillovers of reforms are important, we would expect nearby countries to be affected more strongly than distant ones. Similarly, events in countries that are similar with respect to cultural, political or historical legacies are likely to bear more weight than events in dissimilar countries. We therefore formulate our analysis in the framework of the gravity model. This approach has found wide-spread application in the trade literature where it explains the size and direction of bilateral trade flows remarkably well by relating them to the economic sizes of both countries and the distance between them. We posit, in line with the gravity model, that the reform spillovers between two countries should be proportional to the stock of reforms already present in the two countries and inversely related to the distance between them. To test for their presence, we look at the post-communist transitions in Central and Eastern Europe (with our data spanning the period until the onset of the recent economic and financial crisis, i.e. 1990-2008). We consider the post-communist countries because of two reasons: (1) the vast majority of them at least attempted economic and political reforms during the period in question, and (2) this group of countries displayed a great deal of variation in the depth and outcomes of reforms implemented. We measure reforms using indexes of democratization and economic liberalization but also consider the possibility that there are spillovers with respect to economic outcomes of reform, economic growth and inflation.

In the next section, we discuss the related literature on the role of uncertainty in

determining the success of reforms and on spillovers or contagion effects in reforms. In section 3, we formulate a simple model of informational spillovers in reforms. We discuss the data in section 4, section 5 presents our methodology and section 6 presents our empirical findings. The last section then outlines our main conclusions.

## 2 Related Literature

The relationship between uncertainty and reform success has been explored extensively in the literature motivated by the reforms (and their failures) in Latin America and Eastern Europe during the 1980s and 1990s. Fernandez and Rodrik (1991) coined the term *status-quo bias* to describe situations when countries appear to reject reforms that are expected to increase overall welfare. They argue that this is due to uncertainty about the distribution of costs and benefits of the reform. In particular, it is possible that a reform that benefits the majority of the population *ex post* is nonetheless rejected *ex ante*. This is likely to happen if (some) voters expect their payoff from implementing the reform to be negative. Alesina and Drazen (1991), similarly show that uncertainty about the distribution of benefits and costs of reforms can lead to inefficient delays due to war of attrition. Dewatripont and Roland (1992 a,b; 1995) consider aggregate rather than individual uncertainty. They point out that that under uncertainty, reforms implemented gradually rather than in a big-bang fashion are more likely to succeed because their gradual implementation partially resolves the underlying uncertainty about their eventual outcome. If reform reversal is costly, gradual reform thus allows the voters to receive a signal about the outcome of the full reform. Depending on the signal, they can either implement the full reform or reverse the initial reform to return to the status quo. Doing so helps avoid reversing the full reform, which is assumed to be more costly than reversing a partial reform.

The notion that reforms in one country can affect reforms elsewhere is not new. Gassebner, Gaston and Lamla (2008) and Campos and Horvath (2006) define this as a 'contagion effect'. They argue the term can be used not only for adverse effects but also for beneficial effects of reform. Brueckner (2000), analyzing welfare reform, argues that the level of benefit provision in neighboring states affects policymakers' decision on the generosity of the welfare state.

Brezis and Verdier (2003) formulate a theoretical model in which regime collapse in

one country reduces the effectiveness of repression in another country. This is because democratization in a neighboring country makes it easier for repressed citizens to emigrate. That, in turn, reduces the ability of the dictator to repress protest and makes political liberalization more likely (in the same way as emigration of East Germans via Hungary eventually lead to the fall of the Berlin Wall). While spillovers of this kind appear, at a superficial level, similar to the informational spillovers considered in our paper, there is a crucial difference: Brezis and Verdier consider effectiveness of repression, not uncertainty about the preparedness of the government to repress protest and the outcome of such repression. Furthermore, the decision on reform is taken by the authoritarian government, not voters. As the events of the recent Arab Spring (and also the Romanian revolution of 1989) demonstrate, reforms often take place regardless of the willingness of dictators to allow them.

Gassebner et al.'s (2011) propose a theoretical model of reform spillovers. The mechanism facilitating reform spillovers, however, is different from the one envisaged in our paper. They consider contagion of reforms because of inter-jurisdictional competition due to factor mobility as well as because of trade between countries, and argue that the former is more likely to play a role. They then proceed to test their model using data on a broad panel of countries, with reform measured by the index of economic freedom (Heritage Foundation). They find that economic reforms in other countries are indeed important for reform progress and that these spillovers are better facilitated by geographic and cultural proximity than by trade. Importantly, they only consider economic reforms and do not repeat their analysis for political changes.

In the remainder of the paper, we develop a simple theoretical model of informational spillovers and their impact on reforms under uncertainty. We argue that this mechanism can be at work for economic and political reforms alike. We then test this model empirically on a sample of post-communist countries undertaking both kinds of reforms.

### 3 Reform, Uncertainty and Informational Spillovers

The fundamental problem of implementing political or economic reform is that their outcome is inherently uncertain. Attempts at political change may lead to democracy and rule of law but it can also degenerate into political instability, infighting or open

political conflict. In 1989, Polish and Romanian transitions both started with broadly based popular protests and both ended up with their countries implementing wide-ranging democratization and eventually joining the EU. The initial trajectory, and the associated economic and human cost of the changes, were dramatically different. Similarly, Tunisian and Libyan protests both lead to the fall of the incumbent regime but at dramatically different costs. Economic reform, likewise, can bring about economic growth and rising living standards or it can give rise to unemployment and run-away inflation. The contrast, for example, between the outcomes of economic reforms in Russia and China, is especially poignant.

The role of uncertainty about reforms and their outcomes was well recognized in the early transition literature (see Fernandez and Rodrik, 1991; Dewatripont and Roland, 1992a,b and 1995; and others). This literature shows how uncertainty about the outcome of the reform (or its distributional implications) can lead to it being inefficiently postponed or abandoned altogether. Reducing the uncertainty therefore can be the key to the successful implementation of the reform. Dewatripont and Roland(1992a,b) show that gradual reform is associated with partial resolution of uncertainty about the outcome of the full reform. In their framework, a partial reform is never optimal on its own – but the cost of reversing a partial reform is lower than that of reversing the full reform. By implementing the partial reform first, the voters obtain a signal about the outcome of the full reform. With this signal, and with the resulting reduction in uncertainty, they can make a better informed choice whether to continue with the remaining reform measures or reverse those already implemented.

We formulate a simple three-period model which builds on Dewatripont and Roland with a crucial difference: in our framework, the resolution of uncertainty comes from observing the experience of other countries. Consider country  $i$  with a continuum of risk-averse voters. The voters can be heterogeneous but we only consider uncertainty about aggregate outcomes (i.e. those common for all voters). The status quo is associated with a negative payoff that accrues to all voters; the period value of that payoff is  $-\gamma_i$ . This disutility can stem either from economic policies or political repression in the status quo: excessive state interference in the economy, distortionary taxes, tolerance of smoking in public places or disregard for political rights of individuals. The status quo can be amended by implementing a reform; the outcome of that reform,

however, is uncertain, and may even be worse than the status quo. Based on the information available before the reform, the voters can form expectations about the period value of the reform's outcome. Let  $E(\omega_i|I_i)$  be the expected value of the future payoff,  $\omega_i$ , conditional on the information available at present,  $I_i$ . For simplicity, we assume that the same payoff will accrue in every period after the implementation of the reform, unless the reform is reversed. If the outcome of the reform is worse than the status quo, the reform can be reversed in the third period; reversal is associated with cost  $-\xi_i$  and the decision whether to maintain the reform or reverse it is taken at the end of the first period, after the payoff is revealed (and incurred). If the reform is reversed, the reversal cost is incurred and thereafter the status-quo payoff is again restored. For simplicity, we assume that the status quo payoff and reversal costs are not uncertain.

Assuming no informational spillovers (autarky), the return from implementing the reform will be

$$E(\omega_i|I_i) + \delta E(\omega_i|I_i) + \delta^2 E(\omega_i|I_i) \quad (1)$$

in case the reform is maintained, and

$$E(\omega_i|I_i) - \delta \xi_i - \delta^2 \gamma_i \quad (2)$$

if it is reversed. The payoffs that accrue during the second and third periods are discounted by discount factor  $\delta$ .

The reform therefore will be implemented if

$$E(\omega_i|I_i) > -\gamma_i \quad (3)$$

where  $I_i$  stands for all the information available to the voters in country  $i$ , including the information on expected distribution of the reform's payoff, and it will be maintained if

$$\omega_i + \delta \omega_i > -\xi_i - \delta \gamma_i \quad (4)$$

Note that the decision whether to maintain or reverse the reform is based on the actual outcome, revealed as the reform has been implemented, rather than its expectation.

Now we consider the case with informational spillovers. We assume the outcomes of reforms implemented elsewhere can be observed only with a lag. Therefore, voters in country  $i$  have an additional option: to postpone implementing the reform in order to observe its outcome in countries that have already implemented it. In that case, the



information set available to voters in country  $i$  is  $\Omega, X$ .  $\Omega$  is the vector of actual outcomes in the other countries,  $\omega_1, \dots, \omega_n$  while  $X$  is a vector of parameters  $\chi_1, \dots, \chi_n$  depicting how similar the conditions in the various other countries are to the conditions in country  $i$ . This strategy therefore yields a payoff

$$-\gamma_i + \delta E(\omega_i | \Omega, X) + \delta^2 E(\omega_i | \Omega, X) \quad (5)$$

in case the reform is maintained, and

$$-\gamma_i + \delta E(\omega_i | \Omega, X) - \delta^2 \xi_i \quad (6)$$

if it is reversed. The conditions for maintaining or reversing the reform are similar as before except that now this decision takes place at the end of the second period rather than the first period.

Postponing the reform is costly: it results in the negative status-quo payoff being incurred for one additional period (first term in the payoff functions (5) and (6)). The cost of doing so, however, may be outweighed by the benefit of improving the precision of the voters' expectations of the reform's outcome in the next two periods. If the informational spillovers from the other countries are significant, then this helps avoid the potential additional cost of having to reverse a reform whose outcome is worse than the status quo.

This result is similar to that of Dewatripont and Roland (1992a,b) who argue that gradual reform helps reduce uncertainty about the reform outcome. In this case, the reduction of uncertainty stems not from the reform being implemented gradually but from postponing it and learning from the experience of others. Once the outcomes of reforms implemented elsewhere are observed, the reform can still be implemented in a big bag fashion. On the other hand, if the cost of maintaining the status quo is very high, then this strategy may not be optimal.

Informational spillovers such as those discussed in the model above are likely to be one reason for political or economic changes occurring in waves, as was the case in the post-communist countries during 1989-91 or in the Middle East during 2011. For example, the decision of Polish and Hungarian communist governments not to suppress popular protests and then to engage in negotiations with the opposition in spring and summer of 1989 was likely to have been instrumental in encouraging the subsequent protests in East Germany and Czechoslovakia in fall of that year. Had either government

chosen to crack down on the protests as later happened in Romania, the enthusiasm for political change may well have waned throughout the region. Similarly, the positive outcome and relatively low cost of political change in Tunisia in spring of 2011 is likely to have encouraged similar protests throughout the Middle East. It is also not surprising that the remaining authoritarian regimes, such as North Korea and China, seek to suppress the spread of information about the on-going changes in the Middle East.<sup>2</sup>

On the economic front, the countries that initiated reforms relatively late benefited from learning from the experience of Poland and Hungary whose reforms were initiated in 1990. The (predominantly negative) experience with partial economic reforms in the former Yugoslavia in the course of the 1980s also could have had informational value.

Last but not least, the experience of other countries can help also with respect to selecting the toolkit for facilitating change. The reliance on text messages and social networks to organize political protests in Iran in the wake of the 2009 election was replicated throughout the Middle East in 2011 and is likely to have contributed to the success of those movements.<sup>3</sup> Economic reforms such as the voucher privatization during the early to mid 1990s, pension reform in mid to late 1990s or the introduction of the flat tax in the 2000s also proceeded in waves.

We therefore hypothesize, in line with our model, that the progress in political or economic reform should be related to spillover effects emanating from the stock of previous reforms implemented elsewhere, corresponding to the vector  $\Omega$ . The intensity of informational spillovers, furthermore, is also likely to depend on the extent of similarity between the two countries, as captured by vector  $X$  in our model. We therefore expect the spillovers to be higher for geographically as well as culturally close countries.

We test our model on a sample of post-communist countries during the 1990s and 2000s. We focus on these countries because virtually all of them at least attempted to

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<sup>2</sup> The government of North Korea was reported to stop its citizens who used to work in Libya under the Qaddafi regime from returning (see "North Korea bans citizens working in Libya from returning home," The Telegraph, 27 October 2011. China regularly suppresses news about popular protests in its media, regardless of whether those protests took place in China or elsewhere. Websites such as Facebook and Twitter, which helped coordinate protest in the Middle East and elsewhere, have been blocked in China. Searches for keywords such as 'Jasmine revolution' on google.com and baidu.com results in dramatically different list of entries.

<sup>3</sup> The Chinese government has learned this lesson too and responded to the 2009 unrest in Xinjiang by suspending mobile-phone and internet services in the province.

implement economic and political reforms during this period. The reform strategies as well as their outcomes, however, differed substantially across countries. This sample thus offers sufficient variation in the reform programs, both in the economic and political domain.

## 4 Data

The analysis is carried out with 29 post-communist countries.<sup>4</sup> The political and economic reforms we consider started in the early 1990s. Correspondingly, our data cover the years 1990 to 2008. We use 2008 as the cut-off year to ensure that we capture the reform period but avoid including the current economic and financial crisis.

We only consider spillovers among post-communist countries and thus ignore the rest of the world. This is due to the fact that, at least during the early phase of political and economic changes in these countries, the experience of other similar countries is more likely to be relevant than the experience of established democracies and market economies. In essence, this approach is equivalent to assuming that the political-cultural distance between Eastern and Western European countries was sufficiently large during most of this period to make the spillovers negligible. Furthermore, while the political and economic systems were changing dramatically in Eastern Europe during this period, the situation in the West remained relatively stable. Therefore, inasmuch as the changes in the East were affected by observing the practice in the West, such spillovers are unlikely to change much over time.

To capture the countries' progress in implementing market-oriented reforms, we use the average of the eight progress-in-transition indicator compiled and published annually by the European Bank for Reconstruction and Development (EBRD).<sup>5</sup> We exploit the World Bank Development Indicators 2009 as the source of all

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<sup>4</sup>Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Monte Negro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

<sup>5</sup> These indicators measure each country's progress in the following fields: price liberalization, foreign exchange and trade liberalization, small scale privatization, large scale privatization, enterprise reform, competition policy, banking reform, and security markets and non-banking financial institutions. Each indicators ranges from 1 (unreformed centrally-planned economy) to 4+ (liberal market economy). As is common in this literature, we replace plus and minus distinctions by adding and subtracting 0.33 (so that 4+ becomes 4.33 while 4- is 3.67). We do not use the more recently available EBRD indicators of infrastructure reform, only the eight original indicators measuring progress in Washington-consensus reform (liberalization, stabilization and privatization).

macroeconomic variables, except for unemployment rates which we obtained from the EBRD Transition Reports (various issues). We use the average Freedom House democracy index<sup>6</sup> and Kaufmann and al.'s (2009) governance indicators to take account of the progress in political and institutional transitions. Finally, we take account of periods of war using the Correlates of War (2010) dataset.

## 5 Methodology

Our theoretical model predicts that informational spillovers between countries should decline with distance, which, furthermore, can be interpreted both as geographical or cultural proximity. We therefore use a gravity-model approach, relating spillovers in market-oriented and political/institutional reforms between two countries to the stock of reforms already implemented in both countries, the distance between them as well as common cultural and historical legacy.

The gravity model, which has found wide application in trade literature, takes its inspiration from the theory of gravity in physics. The basic formula for the force of gravity is as follows:<sup>7</sup>

$$F_{ij} = G \frac{m_i m_j}{d_{ij}^2}$$

The force of gravity,  $F$ , between two entities  $i$  and  $j$  is thus proportional to the masses of the two entities,  $m_i$  and  $m_j$ , the distance between them,  $d_{ij}$ , and the gravitational constant,  $G$ . Applied to the study of economic phenomena in our specific analytical context, the gravity model takes the following form (omitting time subscripts for simplicity):

$$\Delta Y_i = \frac{AY_i Y_j}{(d_{ij} cult_{ij})^2}$$

where  $Y_i$  stands for the variable of interest in a given country such as the stock of democracy or economic reform.  $\Delta Y_i$  stands for the first difference of this variable which we seek to explain by relating it to economic or political interaction between the two countries. The terms in the denominator,  $d_{ij}$  and  $cult_{ij}$ , capture the geographical and

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<sup>6</sup>Specifically, this index is the average of the Freedom House measures of political freedoms and civil liberties, rescaled so that higher values correspond to more democracy. It ranges between 1 (autocracy) to 7 (fully free).

<sup>7</sup> See Baldwin and Taglioni (2005).

cultural distance between the countries.  $A$ , finally, is a constant term. Note that our formulation of the gravity differs from its most common application in economics, the gravity model of trade, in that the dependent variable is the change of variable of interest (economic or political reform) in one country rather than a bilateral flow such as trade between two countries.

The actual regressions that we estimate take the following linearized form:

$$\Delta Y_{it} = \alpha + \beta_1 Y_{it-1} + \beta_2 Y_{jt-1} + \beta_3 Y_{jt-1} * Distance_{ij} + \beta_4 Y_{jt-1} * Contiguity_{ij} + \beta_5 Y_{jt-1} * SmCntry_{ij} + \beta_6 * Distance_{ij} + \beta_7 * Contiguity_{ij} + \beta_8 * SmCntry_{ij} + \beta_9 War_{it} + \beta_{10} War_{jt} + \eta_i + \nu_t + \varepsilon_{it}$$

where the following variables are included:

$Y_{it}$  – progress democratization, economic reform or economic performance in the ‘home’ country (first country in the pair), with  $\Delta Y_{it}$  being the annual change of this variable, that is, the variable of interest;

$Y_j$  – level of democratization, economic reform or economic performance in the other country;

$Distance_{ij}$  – distance between country  $i$  and  $j$ ;

$Contiguity_{ij}$  – dummy variable controlling for the presence of a common border between the two countries;

$SmCntry_{ij}$  – dummy variable for the countries that used to belong to be part of the same country in the past (Soviet Union, Yugoslavia or Czechoslovakia)

$War_{it}$ ,  $War_{jt}$  – dummies distinguishing observations when country  $i$  or country  $j$ , respectively, was affected by a military conflict

$\eta_i$ ,  $\nu_t$  – fixed effects for countries (first country in the pair) and years

We consider two types of reform: political liberalization (democratization) and economic liberalization. In addition to indexes of reform, we also test for spillovers in economic performance (economic growth and inflation) which can reflect spillovers in reform. We consider both economic reform and economic performance because a-priori it is not clear whether the spillovers should be observed in somewhat arbitrary (and potentially subjective) indexes or in the variables that reflect the actual and tangible outcomes of economic liberalization. Furthermore, when considering economic reform, we look both at the aggregate index and its individual component sub-indexes.

The dependent variable is thus the change in the measure of interest in country  $i$  at time  $t$ . This we relate to the lagged level of the respective variable in the same country and its lagged levels in all other countries. Furthermore, we interact the levels of the index in the other country with distance and dummies for contiguity (sharing a common land border) and historical legacy (belonging to the same country in the past, which, in this group of countries, applies to the former member states of the Soviet Union, Czechoslovakia and Yugoslavia). It is this set of interaction terms that we expect to capture spillovers: reform and democratization spillovers should increase with the stock of reform in the other countries, decline with distance and they should be higher for countries that share a common border and/or those that have common historical legacies. In other words, we expect  $\beta_2$  to be positive,  $\beta_3$  negative, and  $\beta_4$  and  $\beta_5$  both positive.

For the sake of methodological consistency, we also include the distance and dummies for contiguity and same country on their own. Nevertheless, there is little reason to expect them to be significant or to have a particular sign: it is only in their interaction with the stock of reform or democratization that they become meaningful. We also include dummies reflecting whether either country was involved in a military conflict (internal or external) during year  $t$ . Finally, all regressions contain country-specific fixed effects. Year dummies are included when so indicated in the Tables below.

We estimate similar regressions for economic growth and inflation. However, given that growth and inflation rates already are flow rather than level variables, the dependent variables are not first-differenced.

## 6 Results

We test for spillovers in democratization (Table 1), economic reform, where we consider both the overall progress (Table 2) and progress in the eight sub-areas distinguished by the EBRD (Table 3), economic growth (Table 4) and inflation (Table 5). The results reveal an interesting pattern.

The past level of own democratization and reform is always strongly significant and has a negative effect on further progress. The negative sign stems from the fact that both indexes are bound from above. Therefore countries that have already achieved a

relatively high degree of economic or political freedom should experience lower incremental progress. On the other hand, the past level of own economic growth and inflation display positive effects: economic performance is strongly persistent.

The effect of the past level of democracy in other countries is positive, although it only appears significant when we also control for year fixed effects. This suggests that progress in democratization in other countries indeed encourages democratization in the home country. In contrast, the pattern observed for the index of economic reform is mixed: it appears positive in the regressions with country fixed effects only but turns negative when include year fixed effects. Growth and inflation in the other countries also appear to have positive effects on economic performance in the home country.

What is especially interesting is the effect of the progress in reform in other countries interacted with distance and with dummies for common border and common historical legacy. The pattern that we observe for democratization is in line with our expectations: the effect of democratization interacted with distance is negative, suggesting that the positive spillover effect from democracy in other countries indeed diminishes with distance. Common border does not appear to facilitate spillovers while the effect of common legacy (belonging to the same country in the past) is positive and significant. Hence, we obtain strong evidence of spillovers in democratization which decline with geographic distance and increase with cultural/historical proximity.

The pattern observed for the index of economic reform, however, is the opposite: the spillovers appear to increase with geographic distance, contrary to our expectations. Looking at the individual sub-indexes, we find the expected pattern (spillovers declining with distance) for enterprise reform, competition policy and security markets, and the opposite pattern for large-scale privatization, price liberalization and trade liberalization (with the coefficients estimated for the remaining two sub-indexes being insignificant). Hence, unlike with democratization, we cannot confirm the predictions of our model for economic liberalization.

We find no evidence of spillovers in growth with respect to geographic distance. Inflation in the other country, on the other hand, displays spillovers declining with geographic distance: inflation in nearby countries matters more than inflation far away. Therefore, while we find little support for our model's predictions with respect to the index of market-oriented reform, we do find such support with respect to inflation:

countries' success in stabilizing and reigning in inflation seems to be helped by inflation stabilizations in nearby countries.

As a robustness check, we also replicated our analysis by splitting the sample into Central and Eastern European countries and the former Soviet Union. In this way, we only consider potential spillovers within relatively homogenous groups. The results (available upon request), however, are very similar to those obtained with the full sample.

## 7 Conclusions

We address the question of what drives the apparent waves of political and economic changes that have been observed repeatedly throughout history. We argue that the mechanism behind such waves goes beyond mere fads, whereby the proponents of change seek to mimic the policies implemented in other countries. Rather, we argue that the reform waves reflect learning and resolution of uncertainty about the outcome of reforms, a phenomenon which we dub informational spillovers. Observing the outcome of reforms implemented elsewhere reduces uncertainty and thus helps voters and policy makers make better informed decisions.

To this effect, we formulate a simple model of reform spillovers. The model demonstrates that countries can reduce uncertainty about the reform outcome by observing the experience of other countries that implemented the same or similar reform earlier. This, in turn, should help reduce the status-quo bias highlighted in the previous literature.

We test our model's predictions on a sample of countries that implemented political and economic reforms during the 1990s and 2000s: the formerly communist countries in Central and Eastern Europe. We find strong support for the presence of spillovers in political reform when considering democratization. In contrast, the data offer limited support for reform spillovers in economic liberalization. Specifically, we find no evidence of reform spillovers when using an index of progress in economic liberalization but we do find support for spillovers when looking at inflation. Inasmuch as inflation reflects progress in liberalization and stabilization, the latter finding supports our theoretical model.



These results suggest that the experience of other countries indeed plays an important role in mobilizing support and maintaining momentum for reform. The fact that spillovers appear especially important with respect to political reform should not come as surprising. The success of political reform crucially hinges on the ability of the reformers to garner and maintain popular support for their cause. This is a standard collective action problem: while many would benefit from the changes, few are willing to risk life and limb to make change happen if the outcome is highly uncertain. Observing successful democratizations in other countries helps reduce the uncertainty and thus reduces the underlying collective action problem.

## References

- Alesina, A., Drazen, A. (1991). Why are stabilizations delayed? *American Economic Review* 81 (5), 1170-1188.
- Baliamoune-Lutz, M. (2009) 'Entrepreneurship and Reforms in Developing Countries' UNU-Wider, World Institute for Development Economic Research RP. No. 2009/04
- Brezis, E. S. and Verdier, T. (2003) 'Political institutions and economic reforms in Central and Eastern Europe: a snowball effect' *Economic Systems* 27 (2003) 289-311
- Brueckner J, K. (2000) 'Welfare reform and race to the bottom: theory and evidence'. *Southern Economic Journal* 66(3), 505-25.
- Campos, N.F., Horvath, R. (2006) 'Reform Redux: Measurement, Determinants and Reversals' IZA DP No. 2093
- Dewatripont , M and Roland, G (1992a) 'The virtues of Gradualism and Legitimacy in the transition to market economy' *The Economic Journal*, Volume 102, issue 411 ( March 1992), 291-300.
- Dewatripont , M and Roland, G (1992b) 'Economic Reform and Dynamic Political Constraints' *The Review of Economic Studies*, Vol. 59, No. 4 (Oct., 1992), pp. 703-730
- Dewatripont , M and Roland, G (1995) 'The Design of Reform Packages under Uncertainty' *The American Economic Review*, Vol. 85, No. 5 (Dec., 1995), pp. 1207-1223
- Gassebner, M., Gaston, N. and Lamla, M. (2011) 'The inverse domino effect: Are economic reforms contagious?' *International Economic Review* 52 (1), 183-200.
- Gelos, G. and Sahay, R. (2000) 'Financial market spillovers in transition economies' IMF Working Paper series, WP/00/71, April 2000
- Grimalda G. and Meschi E. (2008) 'Accounting for inequality in transition economies: an empirical assessment of globalization: institutional reforms and regionalization' CSGR Working Paper 243/08
- Henisz ,W. J.,Zelner , B.A. and Guillén M. F. (2005) 'The Worldwide Diffusion of Market-Oriented Infrastructure Reform, 1977-1999
- Kelejian, H. H., Murrell, P and Shepotylo, O. (2008) 'Spatial Spillovers in the Development

- of Institutions'; University of Maryland, Department Working Paper 07-001.
- Oliveira Martins, J. and Macedo, J. B. (2008) 'Growth, Reform indicators and Policy complementarities' 484. *Economics of Transition* Volume 16(2) 2008, 141–164
- Oliveira Martins, J. and Price, T (2000), 'Policy Interdependence during Economic Transition' OECD Economics Department Working Papers No. 253
- Ouyang (2009) 'Economic Growth, Industrial development and Inter-Regional Spillovers from FDI: Evidence from China' Syracuse University Working Paper

Table 1 Spillovers in Democratization

|                                              | (2)                       | (4)                       | (2)                       | (4)                       |
|----------------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                                              | $\Delta$ Democracy        | $\Delta$ Democracy        | $\Delta$ Democracy        | $\Delta$ Democracy        |
| Democracy <sub>i,t-1</sub>                   | -.366954***<br>(0.00406)  | -.304165***<br>(0.00438)  | -.367148***<br>(0.00407)  | -.304295***<br>(0.00438)  |
| Democracy <sub>j,t-1</sub>                   | 0.00191<br>(0.00468)      | .0176791***<br>(0.00441)  | -0.00016<br>(0.00480)     | .0160214***<br>(0.00452)  |
| Democracy <sub>j,t-1</sub><br>* distance     | -7.62e-06***<br>-1.61E-06 | -7.42e-06***<br>-1.50E-06 | -7.01e-06***<br>-1.64E-06 | -6.89e-06***<br>-1.53E-06 |
| Democracy <sub>j,t-1</sub><br>* contiguity   | -0.00048<br>(0.00675)     | -0.00581<br>(0.00631)     | -0.00285<br>(0.00686)     | -0.00763<br>(0.00641)     |
| Democracy <sub>j,t-1</sub><br>* same country |                           |                           | .0196272*<br>(0.01044)    | .0172322*<br>(0.00976)    |
| Contiguity                                   | -0.00040<br>(0.00427)     | 0.00375<br>(0.00399)      | 0.00070<br>(0.00434)      | 0.00493<br>(0.00406)      |
| Distance                                     | 3.73e-06***<br>-1.06E-06  | 4.23e-06***<br>-9.91E-07  | 3.45e-06***<br>-1.08E-06  | 3.93e-06***<br>-1.01E-06  |
| Same country                                 |                           |                           | -0.01101<br>(0.00737)     | -.0115537*<br>(0.00689)   |
| War i                                        | -.0705208***<br>(0.00276) | -.0613046***<br>(0.00280) | -.0704774***<br>(0.00276) | -.0612554***<br>(0.00280) |
| War j                                        | -.0081149***<br>(0.00254) | -0.0000261<br>(0.00254)   | -.0078464***<br>(0.00255) | 0.0003305<br>(0.00255)    |
| Constant                                     | .2283489***<br>(0.00495)  | .2817865***<br>(0.00489)  | .2295776***<br>(0.00499)  | .2828946***<br>(0.00493)  |
| R <sup>2</sup> (overall)                     |                           |                           | 0.393                     | 0.472                     |
| Number                                       | 14744                     | 14744                     | 14744                     | 14744                     |
| Countries                                    | 29                        | 29                        | 29                        | 29                        |
| Country_FE                                   | Y                         | Y                         | Y                         | Y                         |
| Year_FE                                      | N                         | Y                         | N                         | Y                         |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 2 Spillovers in Reform

|                          | (1)                       | (3)                       | (1)                       | (3)                      |
|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|
|                          | $\Delta$ Reform           | $\Delta$ Reform           | $\Delta$ Reform           | $\Delta$ Reform          |
| Reform <sub>i,t-1</sub>  | -.1683442***<br>(0.00364) | -.2396315***<br>(0.00617) | -.1685045***<br>(0.00364) | -.239645***<br>(0.00617) |
| Reform <sub>i,t-1</sub>  | .0112931**<br>(0.00473)   | -.0097774**<br>(0.00458)  | .0125533***<br>(0.00484)  | -.0080532*<br>(0.00468)  |
| Reform <sub>i,t-1</sub>  | 3.84e-06**                | 4.27e-06***               | 3.48e-06**                | 3.71e-06**               |
| * distance               | -1.56E-06                 | -1.47E-06                 | -1.59E-06                 | -1.50E-06                |
| Reform <sub>i,t-1</sub>  | 0.0065455<br>(0.00664)    | 0.0095283<br>(0.00625)    | 0.0083685<br>(0.00684)    | .0123225*<br>(0.00643)   |
| * contiguity             |                           |                           |                           |                          |
| Reform <sub>i,t-1</sub>  |                           |                           | -0.0097207<br>(0.00954)   | -.0167137*<br>(0.00898)  |
| * same country           |                           |                           |                           |                          |
| Contiguity               | -0.001937<br>(0.00347)    | -0.0042597<br>(0.00326)   | -0.0023838<br>(0.00357)   | -.0055695*<br>(0.00336)  |
| Distance                 | -1.19E-06<br>-8.16E-07    | -1.86e-06**<br>-7.68E-07  | -1.11E-06<br>-8.30E-07    | -1.62e-06**<br>-7.81E-07 |
| Same country             |                           |                           | 0.0027927<br>(0.00545)    | .0084661*<br>(0.00513)   |
| War i                    | -.0464183***<br>(0.00256) | -.0608959***<br>(0.00253) | -.0465004***<br>(0.00256) | -.061092***<br>(0.00253) |
| War j                    | .0143264***<br>(0.00234)  | -0.0001553<br>(0.00228)   | .014275***<br>(0.00235)   | -0.0004753<br>(0.00229)  |
| Constant                 | .1009642***<br>(0.00389)  | .0450791***<br>(0.00408)  | .1005725***<br>(0.00391)  | .0442721***<br>(0.00410) |
| R <sup>2</sup> (overall) |                           |                           | 0.206                     | 0.298                    |
| Number                   | 14744                     | 14744                     | 14744                     | 14744                    |
| Countries                | 29                        | 29                        | 29                        | 29                       |
| Country_FE               | Y                         | Y                         | Y                         | Y                        |
| Year_FE                  | N                         | Y                         | N                         | Y                        |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 3 Spillovers in Reform: Sub-indexes

|                          | (1)                                   | (3)                                   | (1)                           | (3)                              |
|--------------------------|---------------------------------------|---------------------------------------|-------------------------------|----------------------------------|
|                          | $\Delta$ Large-scale<br>Privatization | $\Delta$ Small-scale<br>Privatization | $\Delta$ Enterprise<br>Reform | $\Delta$ Price<br>Liberalization |
| Reform <sub>i,t-1</sub>  | -.2340667***<br>(0.00591)             | -.2356291***<br>(0.00538)             | -.3652138***<br>(0.00672)     | -.3870619***<br>(0.00653)        |
| Reform <sub>i,t-1</sub>  | -.0099068*<br>(0.00533)               | -0.00563<br>(0.00533)                 | 0.00785<br>(0.00569)          | -.0254382***<br>(0.00809)        |
| Reform <sub>i,t-1</sub>  | 4.57e-06***                           | 2.66E-06                              | -3.74e-06*                    | .0000106***                      |
| * distance               | -1.73E-06                             | -1.69E-06                             | -1.99E-06                     | -2.50E-06                        |
| Reform <sub>i,t-1</sub>  | 0.00343<br>(0.00756)                  | .0173446**<br>(0.00733)               | -0.00142<br>(0.00839)         | .0402587***<br>(0.01097)         |
| * contiguity             | -0.00017<br>(0.01013)                 | -.0321782***<br>(0.01123)             | 0.00005<br>(0.01068)          | -.0745549***<br>(0.01774)        |
| Reform <sub>i,t-1</sub>  | -0.00017<br>(0.01013)                 | -.0321782***<br>(0.01123)             | 0.00005<br>(0.01068)          | -.0745549***<br>(0.01774)        |
| * same country           | -0.00139<br>(0.00401)                 | -.0113723**<br>(0.00536)              | 0.00043<br>(0.00309)          | -.0302362***<br>(0.00889)        |
| Contiguity               | -0.00139<br>(0.00401)                 | -.0113723**<br>(0.00536)              | 0.00043<br>(0.00309)          | -.0302362***<br>(0.00889)        |
| Distance                 | -1.74e-06*<br>-9.05E-07               | -1.75E-06<br>-1.25E-06                | 9.49E-07<br>-7.23E-07         | -8.01e-06***<br>-2.07E-06        |
| Same country             | 0.00028<br>(0.00573)                  | .0233743***<br>(0.00891)              | -0.00034<br>(0.00460)         | .0600623***<br>(0.01508)         |
| War i                    | -.0595872***<br>(0.00358)             | -.0844862***<br>(0.00373)             | -.0504838***<br>(0.00296)     | -.0938655***<br>(0.00520)        |
| War j                    | 0.00022<br>(0.00322)                  | -0.00109<br>(0.00333)                 | -0.00005<br>(0.00267)         | -0.00398<br>(0.00465)            |
| Constant                 | .0179117***<br>(0.00555)              | .0762429***<br>(0.00624)              | -0.0072455<br>(0.00458)       | .1995523***<br>(0.00910)         |
| R <sup>2</sup> (overall) |                                       |                                       |                               |                                  |
| Number                   | 14744                                 | 14744                                 | 14744                         | 14744                            |
| Countries                | 29                                    | 29                                    | 29                            | 29                               |
| Country_FE               | Y                                     | Y                                     | Y                             | Y                                |
| Year_FE                  | Y                                     | Y                                     | Y                             | Y                                |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 3 Spillovers in Reform: Sub-indexes (continued)

|                          | (1)                              | (3)                              | (1)                       | (3)                          |
|--------------------------|----------------------------------|----------------------------------|---------------------------|------------------------------|
|                          | $\Delta$ Trade<br>Liberalization | $\Delta$ Competit-<br>ion Policy | $\Delta$ Banking          | $\Delta$ Security<br>Markets |
| Reform <sub>i,t-1</sub>  | -.3096531***<br>(0.00582)        | -.2716599***<br>(0.00643)        | -.3036424***<br>(0.00641) | -.2901597***<br>(0.00642)    |
| Reform <sub>i,t-1</sub>  | -.0174528***<br>(0.00587)        | 0.00845<br>(0.00604)             | -0.00221<br>(0.00555)     | .0103465*<br>(0.00584)       |
| Reform <sub>i,t-1</sub>  | 7.27e-06***                      | -3.67e-06*                       | 6.72E-07                  | -4.96e-06**                  |
| * distance               | -1.87E-06                        | -2.11E-06                        | -1.84E-06                 | -2.03E-06                    |
| Reform <sub>i,t-1</sub>  | .0187031**<br>(0.00819)          | -0.00517<br>(0.00899)            | .012995*<br>(0.00786)     | 0.00645<br>(0.00847)         |
| * contiguity             | -0.02007<br>(0.01246)            | -0.00057<br>(0.01092)            | -0.01213<br>(0.01037)     | -0.01524<br>(0.01098)        |
| Reform <sub>i,t-1</sub>  | -0.02007<br>(0.01246)            | -0.00057<br>(0.01092)            | -0.01213<br>(0.01037)     | -0.01524<br>(0.01098)        |
| * same country           | -0.012157**<br>(0.00598)         | 0.00132<br>(0.00308)             | -0.00438<br>(0.00352)     | -0.00176<br>(0.00304)        |
| Contiguity               | -4.76e-06***<br>(0.00598)        | 8.71E-07<br>(0.00308)            | -2.50E-07<br>(0.00352)    | 1.17E-06<br>(0.00304)        |
| Distance                 | -1.46E-06                        | -7.00E-07                        | -8.04E-07                 | -7.10E-07                    |
| Same country             | 0.01445<br>(0.00999)             | 0.00013<br>(0.00408)             | 0.00477<br>(0.00541)      | 0.00424<br>(0.00431)         |
| War i                    | -.1325912***<br>(0.00472)        | -.0228324***<br>(0.00289)        | -.0569697***<br>(0.00335) | -0.00089<br>(0.00307)        |
| War j                    | -0.00110<br>(0.00425)            | 0.00060<br>(0.00257)             | 0.00004<br>(0.00302)      | 0.00024<br>(0.00269)         |
| Constant                 | .1488233***<br>(0.00776)         | -.0254791***<br>(0.00448)        | 0.0002817<br>(0.00518)    | -.0291103***<br>(0.00468)    |
| R <sup>2</sup> (overall) |                                  |                                  |                           |                              |
| Number                   | 14744                            | 14744                            | 14744                     | 14744                        |
| Countries                | 29                               | 29                               | 29                        | 29                           |
| Country_FE               | Y                                | Y                                | Y                         | Y                            |
| Year_FE                  | Y                                | Y                                | Y                         | Y                            |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 4 Spillovers in Economic Growth

|                          | (7)                       | (9)                       | (7)                       | (9)                       |
|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                          | Growth                    | Growth                    | Growth                    | Growth                    |
| Growth <sub>i,t-1</sub>  | .4830076***<br>(0.00701)  | .4018085***<br>(0.00748)  | .4805672***<br>(0.00701)  | .401884***<br>(0.00747)   |
| Growth <sub>i,t-1</sub>  | .0596379***<br>(0.01219)  | -0.00467<br>(0.01141)     | .0806019***<br>(0.01268)  | 0.00864<br>(0.01193)      |
| Growth <sub>i,t-1</sub>  | 7.33e-06*                 | 1.02E-06                  | 7.50E-07                  | -2.66E-06                 |
| * distance               | -4.37E-06                 | -3.96E-06                 | -4.50E-06                 | -4.08E-06                 |
| Growth <sub>i,t-1</sub>  | .0349821*<br>(0.01886)    | 0.02159<br>(0.01707)      | .0710457***<br>(0.01978)  | .0430332**<br>(0.01796)   |
| * contiguity             |                           |                           |                           |                           |
| Growth <sub>i,t-1</sub>  |                           |                           | -.143549***<br>(0.02398)  | -.0830067***<br>(0.02186) |
| * same country           |                           |                           |                           |                           |
| Contiguity               | -0.12162<br>(0.18994)     | -0.02360<br>(0.17163)     | -0.20973<br>(0.19695)     | -0.05405<br>(0.17815)     |
| Distance                 | -0.00004<br>(0.00005)     | -1.91E-07<br>(0.00004)    | -0.00003<br>(0.00005)     | 1.41E-06<br>(0.00004)     |
| Same country             |                           |                           | 0.46500<br>(0.28866)      | 0.15295<br>(0.26118)      |
| Wari                     | -12.98904***<br>(0.31646) | -10.46142***<br>(0.29358) | -13.08161***<br>(0.31644) | -10.52839***<br>(0.29397) |
| Warj                     | -1.930652***<br>(0.28965) | -0.00425<br>(0.26720)     | -1.958197***<br>(0.28950) | -0.02498<br>(0.26733)     |
| Constant                 | 3.363923***<br>(0.32272)  | -3.08177***<br>(0.50367)  | 3.347727***<br>(0.32254)  | -3.082103***<br>(0.50352) |
| R <sup>2</sup> (overall) |                           |                           |                           |                           |
| Number                   | 13318                     | 13318                     | 13318                     | 13318                     |
| Countries                | 29                        | 29                        | 29                        | 29                        |
| Country_FE               | Y                         | Y                         | Y                         | Y                         |
| Year_FE                  | N                         | Y                         | N                         | Y                         |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 5 Spillovers in Inflation

|                                              | (8)                       | (10)                     | (8)                       | (10)                     |
|----------------------------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
|                                              | Inflation                 | Inflation                | Inflation                 | Inflation                |
| Inflation <sub>i,t-1</sub>                   | .5562112***<br>(0.00657)  | .400628***<br>(0.00725)  | .5559508***<br>(0.00657)  | .4012915***<br>(0.00726) |
| Inflation <sub>j,t-1</sub>                   | .140716***<br>(0.01072)   | 0.0096345<br>(0.00960)   | .1458149***<br>(0.01094)  | 0.01357<br>(0.00982)     |
| Inflation <sub>j,t-1</sub><br>* distance     | -.0000132***<br>-3.62E-06 | -4.66E-06<br>-3.07E-06   | -.0000148***<br>-3.69E-06 | -5.70e-06*<br>-3.12E-06  |
| Inflation <sub>j,t-1</sub><br>* contiguity   | -0.01988<br>(0.01572)     | 0.00648<br>(0.01326)     | -0.00965<br>(0.01642)     | 0.01383<br>(0.01386)     |
| Inflation <sub>j,t-1</sub><br>* same country |                           |                          | -.0439645**<br>(0.02191)  | -.0326323*<br>(0.01859)  |
| Contiguity                                   | -0.00222<br>(0.05697)     | -0.02368<br>(0.04805)    | -0.04598<br>(0.05951)     | -0.05071<br>(0.05023)    |
| Distance                                     | 0.00001<br>(0.00001)      | 0.00001<br>(0.00001)     | 0.00002<br>(0.00001)      | 0.00001<br>(0.00001)     |
|                                              |                           |                          | .189608**<br>(0.07471)    | .1160557*<br>(0.06327)   |
| Wari                                         | 1.712604***<br>(0.05029)  | .8285991***<br>(0.04485) | 1.715818***<br>(0.05031)  | .8310368***<br>(0.04487) |
| Warj                                         | .7074714***<br>(0.04590)  | 0.00908<br>(0.04051)     | .709661***<br>(0.04601)   | 0.01167<br>(0.04061)     |
| Constant                                     | -0.00745<br>(0.06354)     | 1.57816***<br>(0.08140)  | -0.02544<br>(0.06393)     | 1.571317***<br>(0.08152) |
| R <sup>2</sup> (overall)                     |                           |                          |                           |                          |
| Number                                       | 12691                     | 12691                    | 12691                     | 12691                    |
| Countries                                    | 29                        | 29                       | 29                        | 29                       |
| Country_FE                                   | Y                         | Y                        | Y                         | Y                        |
| Year_FE                                      | N                         | Y                        | N                         | Y                        |

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%