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Uncertainty, informational spillovers and policy reform: A gravity model approach

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Uncertainty, informational spillovers and policy reform: A gravity model approach

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Political and economic changes tend to occur in waves, in a pattern sometimes described as the domino effect: changes initiated in one country spread to other 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 19th and early 20th century, decolonization following the end of the 2nd World War, democratizations in Latin America in the late 1980s and in Eastern Europe in the early 1990s, and most recently the so-called Arab Spring in the Middle East and the Occupy movement in Western countries.[1] On the economic front, we can observe similar waves, such as the liberalization and privatization waves during the late 1980s and throughout the 1990s. Reform spillovers can be observed also with respect to less dramatic changes. The ban on smoking in restaurants and bars, adopted in Ireland in 2004, has since spread to most 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.[2]

We argue that reform waves, such as the preceding examples, are fuelled by *informational spillovers*. The outcome of a reform is inherently uncertain. Reversing an already-implemented reform, furthermore, is costly. Uncertainty about the 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* (Fernandez and Rodrik, 1991, see also Alesina and Drazen, 1991). Individuals (and governments), however, can infer important signals about the likely outcome of the reform by observing similar reforms elsewhere. If the reform turns out to have positive repercussions in one country, other countries become more likely to implement the same reform; a negative outcome in one country can stop the reform in its tracks in other countries too.

To illustrate how this phenomenon might work, we formulate a simple theoretical model of political economy of reform with inter-country informational spillovers. The model yields testable predictions which we then subject to an empirical analysis. We look at the post-communist transitions in Central and Eastern Europe (with our data spanning the period from the beginning of reforms in these countries

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receive a signal about the outcome of the full reform early on. Depending on the signal, fu

reform was relatively smooth, certainly when compared to the subsequent events in Romania and Libya. Had the initial country experienced a great deal of bloodshed, it is very well possible that no reform wave would have taken place in either region.[8]

Consider country i with a continuum of risk-averse individuals. We do not model the interaction between the government and citizens explicitly. Instead, we assume that the government seeks to maximize its utility (which may include ideological motives as well as the outcome of the reform is worse than the status quo, the reform can be reversed in the third

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

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 rather than the first period.

Postponing the reform is costly: it results in the negative status-quo payoff being incurred for one additional period. This is captured by the 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 expectation of the reform's outcome in the next two periods. If the informational spillovers from the other countries are significant, they help 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 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 be implemented in a big-bang fashion. However, this strategy can be optimal only if the cost of maintaining the status quo for one additional period is not very high.

Informational spillovers such as those discussed in the model above are likely to be one reason why political or economic changes occur 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 the popular protests and then to engage in negotiations with the opposition in the 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 Polish or Hungarian 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 the relatively low cost of political change in Tunisia in the spring of 2011 is likely to have encouraged the protests to be replicated throughout the Middle East. It is also not surprising that the remaining authoritarian regimes, such as North Korea and China, have sought to suppress the spread of information about the changes in the Middle East.[10]

Similarly, the countries that initiated economic reforms relatively late benefited from the experience of Poland and Hungary whose reforms started 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: it may have contributed to the decision of the subsequent reformers to shy away from piecemeal reform.

Last but not least, the experience of other countries can help also with respect to selecting the toolkit for facilitating change. The use of 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.[11]

We therefore hypothesize, in line with our model, that the progress in political and economic reform should be related to the stock of similar reforms implemented previously in other countries.[12] The intensity of informational spillovers, furthermore, is also likely to depend on the extent the two countries are similar: we expect the spillovers to be higher for geographically as well as culturally close countries.

We test these predictions on a sample of post-communist counties during the 1990s and 2000s. We focus on these countries because virtually all of them at least attempted to 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 reform progress, both in the economic and political domains.

Flows of information between two countries, of course, are difficult if not impossible to observe. Instead, we can utilize either outcomes (such as inflation, unemployment or growth) or actual policies. We choose the latter even though our model is formulated with outcomes in mind, as qualitative assessment of outcomes of economic or political reforms is context

ρπ 4ÈÅ ÇÏÖÅÒÎ ÍÅÎÔ ÏÆ .ÏÒÔÈ +ÏÒÅÁ ×ÁÓ ÒÅÐÏÒÔÅÄ ÔÏ ÈÁÖÅ ÂÁÎÎÅÄ ÉÔÓ dependent. Inflation and unemployment immediately in the wake of liberalization can be a sign of the reform being successful, while in a different context they can symbolize failure. Similarly, absence of political protest can indicate expansion of political freedoms and democracy, or intensification of repression.

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Our analysis considers political and economic reforms that started in the post-communist countries of Eastern Europe and the former Soviet Union in the early 1990s.[13]

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$F_{ij,t}$ now stands for the informational flow or spillovers from country *j* to country *i* at time *t*. This depends on the stock of policies implemented in both countries in the preceding period, *t-1*. Specifically, in line with our theoretical model, we expect the informational spillover to be proportional to the stock of policies in country *j* and inversely proportional to the distance between them.

Unfortunately, we do not observe the actual informational spillovers from country *j* to country *i*. Instead, we only observe the actual progress in policy reform in *i* that results, in part, from these spillovers:

[illegible] (10)

That is, we observe the policy change in country *i* in period *t*, which is a function of the unobserved (latent) informational spillovers from the remaining *n-1* countries. We also know that each of those spillovers is itself a function of the country's own policies.[17] Thus, we approximate the gravity relation in equation (9) by

[illegible] (11)

In other words, we assume that the progress in policy reform in country *i* is proportional to the lagged policies in *i* and *j* and inversely proportional to the distance (geographic, cultural and historical) between *i* and *j*. Linearizing this relation by taking logs of both sides and using lower case letters to denote logs, we get

$$\Delta y_{i,t} = \alpha + \beta_1 y_{i,t-1} + \beta_2 y_{j,t-1} + \beta_3 * d_{ij} + \beta_4 * contiguity_{ij} + \beta_5 * samecountry_{ij}. \quad (12)$$

The dependent variable is the log-difference in the index of policies (see below) in country *i* during period *t*. We consider three measures of distance/proximity: geographical distance, common-border dummy and a dummy for belonging to the same country in the past (former Soviet Union, Yugoslavia and Czechoslovakia). Clearly, sharing common border or having common history should make the flow of information easier. We further augment this equation to include interactions between distance and reforms, to allow for the effect of reform in country *j* to vary with distance, and, finally, add dummies to account for military conflicts and country and year fixed effects. Our baseline regression becomes

$$\Delta y_{i,t} = \alpha + \beta_1 y_{i,t-1} + \beta_2 y_{j,t-1} + \beta_3 * d_{ij} + \beta_4 * contiguity_{ij} + \beta_5 * samecountry_{ij}$$

[17] In line with our model, we assume that the informational spillover occurs with a lag rather than contemporaneously. Therefore, we do not need to consider the possibility of simultaneous determination of

$+ \beta_6 y$

three distance measures as well as the corresponding interaction terms. Overall, the results show strong support for our theoretical prediction in case of democratization and somewhat weaker support in case of economic liberalization. The lagged level of the reform index in country *j* is not consistently positive, indicating that spillovers, if any, indeed depend on distance. The coefficient for geographical distance (on its own, not interacted with a policy index) is negative, significantly so in the regressions for democracy. This can be interpreted as suggesting that countries that are relatively remote (i.e. those that are far from other countries in the sample) tend to reform their policies more slowly. The interaction between geographical distance and either reform index is negative, again significantly when we consider democracy: the impact of political liberalization in other countries declines with distance. The common border dummy is positive and significant in the regression for democracy while the same-country dummy is positive and significant for either index. Hence, countries that share borders or historical legacies with other countries tend to reform faster, especially with respect to democratization. This is similar to the negative effect of distance: countries that are relativ

and Eastern Europe. Since measuring the flow of information between two countries is difficult if not impossible, we instead relate progress in reform (political and economic alike) in one country to reforms implemented in other countries previously, and the distance to those countries. We find strong support for the presence of spillovers in reform, especially when considering democratization. We also confirm spillovers in economic liberalization, although here the results are somewhat weaker and less clear-cut. Our findings are thus in line with those of Meseguer (2006) and Gassebner et al. (2011), who find spillovers with respect to economic reform, Kelejian et al. (2013) and Faber and Gerritse (2012) whose analyses confirms spillovers in institutional development or Becker et al. (2009) who find them with respect to corruption. We believe nonetheless that we are the first to consider political changes. Interestingly, given the predominant emphasis on economic reform in the previous literature, our results suggest that spillovers are even more important in the political domain than with respect to economic policies.

Our findings suggest that the experience of other countries plays an important role in mobilizing support and maintaining the 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 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 about the eventual outcome and thus reduces the underlying collective action problem. The recent events in the Middle East demonstrate this very clearly. Learning from the experience of others thus is an important way of breaking the status-quo bias.

Besides informational spillovers, other external factors can play an important role too. The World Bank, European Bank for Reconstruction and Development and the International Monetary Fund encouraged economic reforms in the post-communist countries by making participation in their programs conditional on satisfactory performance in economic policy making. The prospect of European Union membership, likewise, served as an important external driver of economic and political changes. Such external factors can complement and strengthen the role played by informational spillovers.

An important contribution of our paper, in our view, is that we analyze neighborhood and local effects in the context of a gravity model rather than the more commonly used spatial autoregressive model. Using the gravity model allows us to consider bilateral relationships between countries and to account for multiple types of distance (geography *and* contiguity *and* culture). It also makes it possible to consider whether the effect of other countries' or regions' characteristics depends on distance. In other words, we account for local effects with three or more terms (the other country's characteristic, distance or multiple distance measures, and the various interaction terms) where the spatial model would use only one (spatial lag weighted by distance: geography *or* contiguity *or* culture). While the spatial model has proven very useful in the past, we believe it is important to provide an alternative.

Table 1 Spillovers with respect to Democratization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$y_{i,t:}$
$y_{i,t-1}$	-.2967***	-.2962***	-.2961***	-.29689***	-.25492***		
	(.0556)	(.0556)	(.0555)	(.05560)	(.00929)		
y							

Table 2 Spillovers with respect to Economic Reform

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$\Delta y_{i,t:}$	$y_{i,t:}$
$y_{i,t-1}$	-.3990***	-.3991***	-.3982***	-.39755***	-.44215***		
	(.0473)	(.0471)	(.0471)	(.04694)	(.01087)		
y							

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