

## **POLICY AS MYTH AND CEREMONY?**

### **THE GLOBAL SPREAD OF STOCK EXCHANGES, 1980 - 2005**

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**ABSTRACT**

We examine the antecedents and consequences of creating a national stock exchange among developing countries, a core technology of financial globalization. We study local conditions and global institutional pressures in the rapid spread of exchanges since the 1980s, and examine how conditions at the point of adoption affected their subsequent vibrancy. Little prior research connects the process of diffusion with the operational performance of adopted policies. We find that international coercion was associated with more ceremonial adoption, but contrary to expectations common in institutional research, contagion processes via peer groups and normative emulation of prestigious actors enhanced vibrancy.

## POLICY AS MYTH AND CEREMONY?

### THE GLOBAL SPREAD OF STOCK EXCHANGES, 1980 - 2005

Economic globalization provides a generative context to consider the policy implications of organizational theory and research. Globalization creates both opportunities and challenges for countries on the periphery of the world economy. The central question for policymakers is what structures and institutions they should adopt to promote economic and social vibrancy. Notably, there have been waves of alternative theories and associated packages of reforms that have swept over the globe in recent decades. Observing this process of global diffusion (and often abandonment) of policies and practices, Meyer et al (1997) extended analyses of myth and ceremony at the organization level to the nation-state in their “world society” approach. A core idea in this work is that coercion and mimicry of peers or competitors, typically based in a substrate of network ties, are often prompts to adoption (Henisz, Zelner, & Guillén, 2005; e.g., Polillo & Guillén, 2005). Yet the study of adoption has been largely *decoupled* from the study of effectiveness. After states adopt these practices, what happens next? We know who adopts and why, but we have much less sense of when an adopted practice works as expected, and how conditions at the time of adoption influence effectiveness.

This is an instance where findings at the organizational level may apply at the country level. Some practices may work more or less as predicted, or their implementation may improve over time with learning, as with the multi-divisional form (Williamson, 1975). Other practices may be adopted in earnest but fail to live up to their promise, such as TQM in many organizations (Zbaracki, 1998). Some practices are adopted cynically, with little intention of following through, as in the case of many corporations announcing stock buy-back plans that they never implement (Westphal & Zajac, 2001). Still other practices may be adopted

ceremonially, as a gesture of compliance, yet nonetheless create real change: companies might create an office of equal employment opportunity as a symbol to fend off lawsuits, but once in place such offices actually do things that change employment outcomes (Sutton & Dobbin, 1996). The implication of these studies is that *why* one adopts may affect *how* one adopts, and how effectively.

This paper is one of the first to simultaneously examine the causes and consequences of adoption. We draw on the world society variant of new institutional theory (Meyer et al., 1997) to examine the spread of stock exchanges around the world and their effectiveness in terms of their growth in size (equities listed and market capitalization). Stock exchanges spread widely around the world during the 1980s and 1990s. In 1980, 59 countries had an exchange but over the next 25 years, 56 more opened their first indigenous stock exchange (see figure 1 and table 1). Stock exchanges provide a particularly useful context for our study because they were adopted out of quite diverse motivations and experienced great variation in subsequent success. Exchanges in former Soviet bloc countries were typically created as mechanisms for mass privatization (see e.g., Spicer, 2002); other countries such as Guatemala and Uganda created them de novo. It is also clear that some exchanges thrived, while others floundered. Trading at the Swaziland Stock Exchange, founded by a former World Bank executive in 1990, was limited to a total of 50 transactions for the five listed equities in 2000, while the Shanghai Stock Exchange rapidly achieved valuations that rivaled those of the world's largest developed economies. Levels of economic growth and development, however, are no guarantee of success: even stock markets created in mature industrial economies need not survive (e.g., the Neuer Markt, "Germany's Nasdaq," closed within a few years of its opening).

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Figure 1 and Table 1 here  
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We ask two questions: Why did some countries rather than others adopt their initial post-War stock exchange between 1980 and 2005? And what made for success? Our contributions are two. First, we seek to draw out the implications for international policymakers of new institutional theory. Second, we contribute to the study of institutions by examining how the sources and consequences of new practices are linked, an under-theorized and under-researched problematic. Empirically, we find that practices adopted through a process of mimesis were more likely to thrive, while “coercive adoptions” were less likely.

The paper is organized as follows. In the next section, we review existing arguments and evidence on stock markets and economic development and describe the diverse motivations for policy adoption. We then develop hypotheses about how a country’s intra-national features and institutional endowment, as well as inter-national diffusion processes, affect the creation of a stock exchange by a country and the subsequent vibrancy of these exchanges. After describing data and methods, we then report on findings of sources and outcomes of stock exchange adoption. Lastly, we discuss implications for neo-institutional theory and for policymakers.

## **STOCK MARKETS AND ECONOMIC DEVELOPMENT**

Stock exchanges are a central component of the contemporary global economy, as cross-border financial flows have vastly expanded and equities in emerging markets have attracted substantial attention from globally-oriented institutional investors. But this is a relatively recent phenomenon. Formal stock exchanges in the immediate post-War era were largely limited to countries with sufficiently large incomes to generate domestic savings. Of the 49 countries with stock exchanges in 1950, 24 were located in Europe, while 13 were current or former British colonies such as the US, Canada, and Australia (Goetzmann & Jorion, 1999). Stock exchanges, in short, were largely limited to wealthy countries in the global North.

With little indigenous savings on which to draw and limited infrastructure for channeling foreign capital, stock markets played little role in developing economies prior to the mid-1980s. Rather, capital for economic development came from other sources, according to the dominant theories of development at the time (McMichael, 1996). In the 1950s and 1960s, state-to-state foreign aid was the dominant form of capital flow from advanced industrial countries to developing economies (Armijo, 1999). During the 1970s, long-term lending by banks to governments in developing countries increased dramatically and nearly matched the level of foreign aid. Aggressive bank lending ended abruptly in 1982, when Mexico suspended external debt service and signaled the beginning of a debt crisis across the developing world (Manzocchi, 1999). The rest of the 1980s has been called the “lost decade” in development, as private financial flows to developing economies contracted substantially.

In response to the perceived failures of the development project and to the 1980s debt crisis, the *globalization project* (McMichael, 1996) promulgated a market-based strategy of economic development. Rather than relying on aid or bank-to-state lending, the new model relied on private investment flows to the private sector in developing economies. The IMF and World Bank facilitated the spread of this model as part of a package of “structural adjustment” reforms during the 1980s, as did Antoine Van Agtmael (1984), an economist at the International Finance Corporation who coined the phrase “emerging markets” as an appealing alternative to “third world.” Initially, portfolio investment in low-income countries was inconsequential. In the late 1980s, however, portfolio investment in the newly-christened emerging markets began to flow in earnest, as investors were attracted by the returns available from high-growth economies. The late 1980s and early 1990s saw a wave of market liberalizations to allow foreign investors to buy domestic equities (Bekaert, Harvey, & Lundblad, 2005), and by the mid-1990s, the trickle of foreign investment became a torrent as emerging market funds became a staple in the portfolio of

institutional investors in advanced economies. The World Bank (1997: 16) reported that “in 1986 there were 19 emerging market country funds and 9 regional or global market funds. By 1995 there were over 500 country funds and nearly 800 regional and global funds. The combined assets of all closed- and open-end emerging market funds increased from \$1.9 billion in 1986 to \$10.3 billion in 1989 to \$132 billion at the middle of 1996.”

The new theory of development is reflected in the World Bank’s *World Development Report* for 2000. The theory, in brief, is that the creation of “well-regulated” financial markets open to foreign investors provides the surest path to rapid economic development. At the receiving end, businesses in low-income countries gain direct access to the enormous stocks of private capital generated in industrialized countries. Rather than having to rely on aid and loans mediated by political organizations, they receive capital directly from private investors. Bypassing potentially inefficient or corrupt government structures frees local entrepreneurial potential and accelerates economic growth. This encourages policymakers and corporate managers to make future-oriented decisions about the governance of their economic system. It also offers a unique opportunity for capital-deprived developing countries that can convince investors about the future prospect of their economy. Rather than wait for domestic capital to form in a slow process, they can borrow from or sell equity to foreign savers to speed development and join the global economy much more quickly. Moreover, stock markets generate a wealth of intelligence through the operation of the price system, which helps guide decisions of both managers and investors. The benefits to investors are rooted in prospective growth rates unattainable in advanced economies, and the high returns to match the risks involved.

The “financial market theory of development” has found support in several academic studies (for a concise review of the evidence, see the World Bank’s *World Development Report* 2000, chapter 3). Filer, Hanousek and Campos (1999), for instance, report that stock market

activity enhances economic growth in low and middle income countries, consistent with a number of studies by Ross Levine and his co-authors on the beneficial effects of financial development (Levine, 1998). But if stock markets are so manifestly beneficial, the appropriate question is perhaps not “Why have they spread so quickly in the recent past?” but “Why do only half the world’s economies have them?” The financial market theory of development implies that stock markets will enhance economic growth *to the extent that* they are embedded in an institutional matrix that ensures that their signals guide decision-makers toward growth opportunities. But countries vary substantially in the extent to which they provide a hospitable climate for financial markets. Thus, the critical question for understanding the *uneven* spread and performance of stock exchanges is, What are the conditions that facilitate or inhibit the creation and development of stock exchanges *in particular countries?*

### **THE POLICY PROCESS OF CREATING AN EXCHANGE**

We regard the creation and development of a stock exchange as a country-level policy decision. This is to emphasize that while government policymakers are essential to the creation of a stock exchange, the process involves other agencies and interest groups and thus requires private and state actors to work in concert (e.g., Lindblom & Woodhouse, 1993). These actors create political impetus and a legal basis, but also supply private capital and develop market infrastructure for the operation of an exchange. We thus treat “having a stock exchange” as an attribute of a country that emerges from a distributed policy making and implementation process involving a wide set of participants. We use the term “policymakers” to refer to this larger group.

Our theoretical model assumes that distributed policy making at the country level is broadly analogous to distributed decision making in organizations. The rationale for this is straightforward and follows from how institutional theorists have depicted collective decision-



making processes. States are a particular type of organization. Their policies reflect a resolution of conflicts among the diverse interests of their constituents inside and out. Indeed, some foundational works on organizations were written by political scientists drawing explicitly on models of coalitional politics (Cyert & March, 1963; March & Simon, 1958), and Graham Allison's widely-read account of the Cuban Missile Crisis builds directly on this model of organizations (Allison, 1971). Dozens of subsequent studies in political science followed Allison in applying organization theory to the operations of states (see Davis and Powell, 1990 for a review). Insights from open-systems models of organizations also apply. States and other organizations face an environment of other organizations with which they are more or less interdependent, as well as internal and external pressures for legitimacy. States learn from the experiences of other states that have dealt with similar problems, and their leadership may explicitly draw on successful alters. Thus, there is reason to expect that findings at the organization level will provide insight into country-level policy.

### **Policy Adoption**

Creating a new stock market requires that policy makers have the motivation to pursue this change and the skill to realize it. There are many potential triggers for creating a stock exchange, which broadly relate to attributes of the country and to conditions external to it. Internal country attributes include a country's level of economic development, political system and ideology, and its prior institutional endowment, all of which are believed to motivate and enable internally focused policy makers to adopt solutions consistent with these factors. Recent research shows a number of such "internal" features to be associated with more vibrant stock markets, and thus suggests several prompts to adoption. One study directly examined the correlates of having an exchange in December 1998 (Clayton, Jorgenson, & Kavajecz, 2006). Countries with a common-law tradition, as opposed to those with a civil law tradition, tend to

have superior protections for minority shareholders and were thus more likely to have markets in the first place (cf La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998, 1999a, 1999b).

Countries with bigger economies, as well as those with greater openness to trade and investment flows, were more likely to have an exchange than those with smaller and more closed economies.

Of course such cross-sectional findings are subject to a number of limitations. Many of the exchanges examined had been in operation for decades, if not centuries, and there is a great potential for reverse causality, with the creation of markets preceding openness to trade and investment as well as, presumably, economic growth. Moreover, many features associated with larger stock markets are fixed or, at the minimum, slow to change. We do not observe widespread shifts from civil law to common-law, from Protestantism to Catholicism, or from being a former French colony to being a former British colony. To explain the recent surge of adoptions requires a more dynamic and more contextual account of the policy process.

A number of country-level practices and policies rooted in economic and political liberalism spread rapidly during roughly the same time period as stock exchanges, and research documents that diffusion --- relying on the prior experiences of other adopters -- is behind much of these dynamics. Anecdotes and systematic evidence suggest that policymakers quite consciously assess the expectations and prior policy choices of other countries and of global elites when contemplating policy changes (Simmons, Dobbin, & Garrett, 2006). When considering the implementation of reforms—such as privatization of government-owned industries, or public-sector downsizing—policymakers rely on templates of the international professional policy elite, site visits, bilateral meetings, membership in common associations, benchmarking of “best practices,” and explicit emulation of the strategies of successful and prestigious predecessors. Other countries, professional communities and prominent international

agencies, such as the IMF or World Bank, influence the motivation and the skill of policy implementation: Policy makers are concerned about the legitimacy of their decisions in the eyes international as much as local audiences, and they draw on knowledge and resources outside as well as inside their country. Recent sociological work has distinguished a number of mechanisms at work behind diffusion (Lee & Strang, 2006). Each highlights different rationales for policy adoption and different prospects for success based on the international context of policy making.

Simmons, Dobbin, and Garrett (2006) describe four mechanisms of international diffusion: coercion, competition, learning, and emulation. *Coercion* occurs when powerful outsiders (states or other actors) impose their models on policymakers of dependent countries. Both the motivation and the knowledge for adopting the policy come from outside the country. In the case of economic policy, the IMF is particularly implicated in more-or-less coercive efforts at policy reform. This suggests that states are more likely to adopt a policy to the extent that they are dependent on coercive actors favoring that policy and that their internal motivation and skill for adoption is limited. *Competition* occurs when states adopt a policy thought to provide an advantage relative to competitors, or to avoid a disadvantage. The motive for adoption is social comparison coupled with rivalry; rivalry to some extent impedes the direct transfer of knowledge and resources. This suggests that states are prone to adopting practices that their economic competitors have previously implemented. *Learning* implies that policy makers seek to learn not only from their own experience but also from that of others. They attend particularly to the actions of proximate alters, such as peers with whom they enjoy close contact and regularly share information. This proximity enables the transfer of ideas and knowledge, which internalizes both the motivation and skill for policy change. Learning is indicated when adoption follows from prior adoptions by those in closest proximity (e.g., geographic, cultural, or economic). While the concept of learning is sometimes more narrowly applied to mimicking

practices that have already proven successful (vicarious learning), most learning theorists point out that this is overly restrictive and ignores adaptive learning from proximate others prior to observable successes or when success is ambiguous and complex (Levitt & March, 1996; Levy, 1994). And finally *emulation* occurs when states adopt policies because they are normatively appropriate, with less regard for expected benefits. In emulation, policy makers look to prestigious others and follow the advice of elite professional communities in order to maintain their own status, even in the absence of detailed insight and resources for implementation. These four mechanisms are notably similar to the three mechanisms of isomorphism in neoinstitutional accounts at the organization level: coercive, mimetic (which encompasses competition and learning), and normative (DiMaggio & Powell, 1983).

### **Policy Implementation**

The neoinstitutional literature further suggests that different reasons for adoption imply different levels of success at implementation. Broadly, *coercion* should be followed by the least effective implementation, while *learning* should lead to the most effective implementation, with *competition* and *emulation* prompting more mixed levels of success. These differences derive from the different extent to which motivation and skills for developing the adopted practice are internalized and embedded in the local setting. This internalization is needed for the *ongoing* activities that are required for success beyond formal elements of the practice. The earliest work in this stream indicated that early adopters of a practice were in some sense sincere, while late adopters were engaged in unreflective mimicry; thus, earlier adopters might implement practices more forcefully than the mimics (e.g., Tolbert & Zucker, 1983). But the success of late adopters can be quite variable. On the one hand, late adopters may be mere mimics, adopting an innovation because everyone else has and it has become taken for granted. On the other hand,

later adopters can learn from the experiences of early adopters and contemporary adopters and thereby implement policies more successfully.

Research on the spread of innovations among organizations supports the notion that both can be true. In a study of hospitals, Westphal, Gulati, and Shortell (1997) find that late adopters of TQM tended to implement the set of elements that had become most prevalent and that such conformity was associated with reduced efficiency but increased legitimacy. Kostova and Roth (2002) find that among international subsidiaries of a multinational, units located in places where quality practices were widespread implemented such practices more fully, while units more dependent on the parent company showed weaker implementation. They also found ceremonial adoption—adopting the practices without believing in their value—was prevalent in units facing regulatory pressures, indicating that coercion might lead to behavior without commitment. And Lounsbury (2001) showed that the majority of recycling programs adopted by universities were symbolic efforts that were under-resourced and staffed with ecologically-ambivalent custodians, but that under conditions where local student movements were mobilized, substantive recycling programs were created and staffed with full-time, ecologically-committed managers. In the context of diffusion across countries, Zelner, Henisz & Holburn (2007) argue that the implementation of the private ownership of electricity generation requires effort subsequent to the initial adoption stage and that partial re-negotiations can be linked to local politics.

### **Policy Adoption and Implementation**

While institutional theorists have mostly focused on the formal adoption of practices, the more limited literature on implementation suggests that as a key insight that the “success” of policies and practices – their subsequent implementation, maintenance and further development – is intrinsically linked to the conditions of initial adoption. Initial conditions – the different motivations and skills at the time – provide a form of imprinting that shapes subsequent

development and performance (Lounsbury & Ventresca, 2002; Stinchcombe, 1965). Coercion is likely to lead to ceremonial adoption because neither motivations nor skills are locally embedded in the process; learning, particularly through ties to prior adopters, is likely to lead to more substantive adoption as motivations are internal and continuing flows of knowledge and experience allow the further development and refinement of the practice; and competition and emulation will be followed by more equivocal levels of implementation as both are based on strong internal motivations for adoption but limited access to fine-grained skill and know-how.

In the case of creating post-War stock exchanges, all adopters are effectively late adopters. Stock exchanges have existed since the 17<sup>th</sup> century, and were quite widespread among Western economies by the early years of the 20<sup>th</sup>. Almost by definition, then, those that remained were on the periphery or semi-periphery of the global economy. And by definition, the basic success of the practice was already proven. The creation of an exchange, like other national policy changes, can occur for diverse reasons and under diverse circumstances. The subsequent vibrancy of the market depends on the country's ability to fully implement, refine and further develop the market, and we can expect this subsequent success to vary depending on the motivations and skills at the time of adoption. Adoption may be part of a package of reforms aimed at attracting foreign investment—motivated and informed by the experience of neighbors or competitors—or it may be a perfunctory response to external pressures—one reform among several on a checklist aimed at documenting compliance with specific demands from third parties. In the first instance, we might expect the exchange to receive ongoing support, while in the second support may be perfunctory.

There are two boundary conditions to note about this account. First, the motivations of various policymakers are not directly observable, but by observing both the antecedents of adoption and its anticipated consequences, we can more effectively draw inferences about the

distinction between “sincere” and “ceremonial” adoption that has been central to the neoinstitutional perspective. Second, the success of a stock market is not entirely under the control of policymakers. Even true believers in the efficacy of markets cannot command a stock exchange to grow (although, conversely, it is possible to sabotage markets). In the section that follows, we consider each of these factors in hypothesizing the forces facilitating the creation and implementation of stock exchanges after 1980.

### **HYPOTHESES: THE CREATION AND VIBRANCY OF STOCK MARKETS**

In the sections that follow, we focus first on the intra-national factors promoting the creation and vibrancy of exchanges and second on the inter-national factors. In each case, we pair hypotheses about the antecedents of adoption with the effects of these antecedents on subsequent market growth.

#### **Prior Economic Development and Institutional Endowment**

Stock exchanges require a minimum level of national economic development to be feasible and economically useful. Both the size of the economy and the development of financial and economic infrastructure are relevant. Clayton et al. (2006) find that GDP per capita is significantly related to the presence of an exchange in 1998, and we anticipate that—although economic growth is potentially both a cause and a consequence of having an exchange – larger and wealthier economies are more likely to create an exchange than smaller and poorer ones. Countries with greater prior financial development are also more likely to create exchanges, as the development of the banking sector both supports and complements the operation of stock markets (Levine & Zervos, 1998). Thus, countries with more expansive domestic credit are more likely to create exchanges. And economies that are already more open to trade are more likely to create exchanges. Clayton et al. (2006) find that measures of “economic freedom”

compiled by the Heritage Foundation—particularly openness to trade and foreign investment—are correlated with the presence of an exchange. We therefore expect prior economic openness to be related to subsequent creation of exchanges. Although we do not derive formal hypotheses on these, we do include them as essential control measures.

The extent to which an exchange, once opened, becomes economically significant has also received attention in recent years (see La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000, for a review). Some of the exchanges created since 1980 have remained miniscule relative to the size of the economy (the market capitalization of all of Kazakhstan's public companies was roughly 0.2% of GDP in 1998) while others became quite significant (the equivalent figure for Trinidad and Tobago was 61.5%). Given the varying motivations behind adoption, it is important from a policy perspective to then investigate whether differences in the conditions of adoption relate to differences in exchange performance.

Scholars in the international comparative research tradition emphasize the importance of a country's existing institutional background for its subsequent economic development. A historically evolved institutional matrix of cultural and political arrangements enables some but constrains other development directions (North, 1990). Researchers in corporate finance have identified a set of institutions particularly relevant in the context of financial markets, including a country's predominant religion; colonial legacies such as laws, language and the education of national elites; and its political system (La Porta & Lopez-de-Silanes, 1998; La Porta et al., 1998, 2000). The common rationale behind these factors is based on the logic that stock markets are more compatible with domestic institutions that support open participation and arms-length economic relationships.

A commercial culture derived from Protestantism, a democratic political system, and the legal and cultural protection of investors is therefore expected to foster the creation of market



institutions (La Porta et al., 2000). The link between economic organization and religion goes back to Weber (1958[1904]), who argued that particular strains of Protestantism facilitated the development of capitalism in the West following the Reformation. Protestantism has been positively associated with the viability of existing capital markets within nations – arguably because the relatively less hierarchical nature of Protestant tradition facilitates horizontal ties useful for market transactions (La Porta et al., 1999b). The comprehensive influence of colonial powers exports institutional factors from the metropolitan countries to former colonies. Note that colonial legacy encompasses but goes beyond the discussion of legal systems (La Porta et al., 1999b). Not only laws, but also the training of local elites in metropolitan countries, administrative structures, and traditions shaped in the transition to statehood shape a country's subsequent policy orientation towards markets and private investment.

Given the rather different economic policy orientations of Britain and France in the colonial area (Dobbin, 1994), we would expect former British colonies to be more prone to create stock market-based economic systems, while former French colonies should be less inclined and pursue more statist paths to development. Finally, financial markets are thought to be less amenable to direct influence by political authorities. Rulers whose ideology is founded on authoritarian or socialist ideas should be suspicious of uncontrolled flows of capital in private hands and use their power to create different governance structures. Conversely, more democratic and less left-leaning regimes are expected to support the transparency and the potential dispersion of economic participation of public trading, as a check against the concentration of economic power and information. Because of their pervasiveness and relative permanence, we expect these factors to have a parallel influence on adoption and performance.

*Hypothesis 1: A country's historical conditions favoring investor-based systems (Protestantism, British colonial influence, political democracy, non-socialist ideology) will increase the likelihood of stock exchange adoption.*

*Hypothesis 1a: Stock exchanges in countries favoring investor-based systems (characterized by Protestantism, British colonial influence, political democracy, non-socialist ideology) will be relatively larger than those in countries not favoring investor-based systems.*

### **Mechanisms of Diffusion**

Although internal conditions of economic and financial development, as well as an existing institutional endowment, are implicated in the creation and vibrancy of stock exchanges, they are not themselves sufficient to explain the dynamics of adoption. The spread of new exchanges, like the spreads of privatization, financial openness, and democracy, all followed a classic S-shaped diffusion curve characteristic of contagion processes (Simmons et al., 2006). Whether through coercion, observation, or direct contact, it is evident that each of these practices was adopted as part of an interdependent process among countries, not the product of isolated decision-making by national policymakers. Based on prior research at the organizational level, we should also expect exchanges to continue to be marked in their performance by the initial external conditions at the time of adoption (Lounsbury & Ventresca, 2002; Stinchcombe, 1965). Below, we derive hypotheses from each of four mechanisms of global diffusion identified by Simmons et al. (2006): coercion, competition, learning, and emulation. We hypothesize first the antecedents to exchange adoption and then the expected effect of these initial conditions on subsequent exchange performance. As we noted previously, while motivations and skills at the time of adoption may be impossible to measure directly, observation of subsequent success can serve as indicators about a key claim of neoinstitutional theory: whether symbolic or perfunctory adoption is likely to lead to weak implementation, as market success cannot be mandated; and whether “sincere” adoption is more likely to be followed by strong implementation.

**Coercion.** Coercion occurs when dependent states adopt practices due to pressures emanating from the global core and its agencies (Chase-Dunn, Kawano, & Brewer, 2000; Strang, 1990). With the ascent of a neoliberal approach to economic governance, the creation of local

stock markets is in line with the belief system of powerful actors at the core of the global economic system. Company shares traded on an exchange can be bought and sold in a swift and inexpensive manner compared to foreign direct investments. This is particularly attractive to the growing number of institutional investors in core countries, especially in the United States, that need market infrastructures to access assets and rents in peripheral countries (Useem, 1996). Stock markets also promise to reduce the direct influence of local political elites over the choice of investments, the degree of control and the ease of exit.

A country's immediate financial dependency on international agencies and core countries provides the structural linkage for coercive power and is expected to increase the influence of the global elite in imposing policies at the local level. Financial aid and credits disbursed and administered by international development agencies, such as the World Bank (WB) and the International Monetary Fund (IMF) are particularly potent in this regard (International Monetary Fund, 1997; McMichael, 1996). The World Bank and the IMF provide not only money but also economic policy advice and program assistance. They do so as instruments of core states and global elites who define the agencies' goals and policies and supply the resources necessary for their operation (Brune, Garrett, & Kogut, 2004; Gowan, 1999). Lending at concessional rates plays a particular role in the transfer of policy agendas. Concessional aid involves loans that are disbursed at discounted interest rates but are tied to the implementation of specific development programs and policies stipulated by the IMF or World Bank, such as "structural adjustment" programs aimed at changing a country's financial and fiscal systems. The dependency on international agencies for aid has been shown to have a significant impact on the adoption of organizations and policies in line with the institutional paradigms at the core (Henisz et al., 2005; Polillo & Guillén, 2005).

*Hypothesis 2: The more financially dependent a country is on concessional aid from the IMF and the World Bank, the more likely it is to create a stock exchange.*

But it is also clear that practices resulting from coercive pressures are more likely to reflect ceremonial compliance as motivations, skills and resources for making them thrive do not become distributed in the local setting that sustains subsequent development (cf. Kostova & Roth, 2002). Agencies such as the IMF cannot demand that a market grow big. The sustained vibrancy of exchanges requires more comprehensive institutional alignments that are beyond the scope of the policy interventions under the control of international policymakers. Notably, IMF programs are project-based, with a specified scope usually centered on legal and governmental action, and with monitoring mechanisms that are limited to compliance with the formal conditions attached to episodic concessional lending (Vreeland, 2003). IMF programs may thus be successfully implemented, but continued growth of markets requires sustained changes in beliefs and motivations of multiple market stakeholders. Just as corporations create weak equal employment offices in order to visibly signal compliance with coercive pressures (Edelman, 1992), so states dependent on aid may signal their compliance with the adoption of structures that are more symbolic than substantive and relatively de-coupled from other elements of the country's institutions. This makes the creation of "perfunctory" exchanges more likely.

*Hypothesis 2a: Stock exchanges adopted in the wake of IMF/World Bank aid will be relatively smaller than those adopted without such aid.*

**Competition.** A second mechanism of diffusion is competition. Policymakers are driven in part by the actions of other states with which they compete in the global economy. Consider, for instance, the global garment industry: although Mauritius, Cambodia, and Honduras may share little in terms of language, history, and culture, policymakers are acutely aware that these countries are competitors when it comes to providing finished garments for the branded clothing industry, and each may attend to their competitive position relative to the others. (Cambodia, for

instance, competes based on its high level of compliance on labor standards.) Burt (1987) casts competition as (structural) equivalence in network terms: adopting the actions of those sharing similar relations with third parties. The underlying mechanism is one of seeking an edge in contests between rivals that could replace each other in performing a role (Mizruchi, 1993). In the case of economic infrastructure, competition is often over trade relationships. Thus, the most relevant competitors are those that trade with the same third parties. Prior research finds support for this argument; for instance, Polillo and Guillén (2005) find that states were more likely to adopt central bank independence to the extent that trade competitors had previously done so. If the creation of an exchange makes a country a more attractive partner for trade and investment, then moves by states are likely to be followed by countermoves among their competitors.

*Hypothesis 3: The more a country's competitors in trade have adopted stock exchanges, the more likely it is to create a stock exchange.*

Policy adoption due to competition is more ambiguous in its effects than adoption through coercion. If practices and policies are simply designed to reflexively keep up with rival countries and to match their moves, their implementers may lack the insight and capabilities for effective implementation. And to the extent that rivals refrain from sharing knowledge, insights from competitors' adoptions may be limited to easily observable features. Adoption may be mostly symbolic, and the resulting exchanges are likely to be relatively small. On the other hand, if adoption is central to ongoing competitive rivalry and rival countries are effective in their implementation, the ongoing monitoring of competitors and rivalry can be expected to pull the focal country towards enlarging the exchange as a more sustained activity. Based on this ambivalent treatment of competitive mimicry in institutional theory, we alternatively hypothesize that,

*Hypothesis 3a: Stock exchanges adopted through mimicry of competitors will be relatively smaller than those adopted for other motivations.*

*Hypothesis 3b: Stock exchanges adopted through mimicry of competitors will be relatively bigger than those adopted for other motivations.*

**Learning.** A third mechanism of diffusion is learning—that is, drawing on the experiences of others, particularly those seen to be successful pioneers and relevant peers. In contrast to competition-driven adoption, which typically occurs through external observation, learning relies on proximity and direct channels of communication. Proximate others are more salient, more observable, and a more trusted source of information about appropriate conduct (Davis & Greve, 1997; Greve, 1998). It should be noted that knowledge contagion and learning can occur from both successful and unsuccessful experiences by others. As a result, ideas and policies are likely to diffuse through networks of proximate countries. The relevant measure of proximity is of course context specific. In the international economic policy sphere, learning processes are particularly heightened by shared regional identities and by trade ties. Regional proximity subsumes several drivers of contagion, including the information effect of geographic proximity; similar historical and cultural experiences that increase the relevance and attention to communication of experiences; and routine policy consultations in regional intergovernmental treaty organizations. The adoption of stock exchanges by geographically proximate states can therefore be expected to increase the focal country’s likelihood of adoption. Trade ties similarly are a conduit for the spread of information and practices (Henisz et al., 2005; Waters, 1995).<sup>1</sup>

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<sup>1</sup> We note here that proximity is intended as an observable proxy for the degree of communication among policymakers in a country and its alters. It is impossible to observe the actual relevant communication among policymakers, but our expectation is that closer proximity (in geopolitical space or through trade) is associated with a greater volume of relevant communication. Note that Polillo & Guillén (2005) and Henisz et al. (2005) use trade ties to prior adopters as a proxy of normative rather than informational learning influence. However, their rationale is based on group cohesion leading to normative consensus pressures and consequently their measure uses the cumulative adoption by trade partners. In contrast, our interest is in the effect of recent adoption events among late adopters so that arguments at the aggregate level are less salient. Moreover, normative emulation is based on seeking credibility in the eyes of actors with normative authority, and it is unclear that such normative authority can be attributed to every trade partner. Hence any interpretation of trade cohesion as only about emulation confounds normative influence with more generic information flows between countries. Following Waters (1995), we treat trade-based proximity more agnostically as facilitating interaction, information exchange and learning, and reserve emulation arguments for a country’s connectedness to specific actors that more clearly possess normative authority.

*Hypothesis 4: The more a country's regional neighbors and trade partners have adopted stock exchanges, the more likely it is to create a stock exchange.*

Exchanges adopted out of learning are likely to be those implemented most successfully. The motivation for adoption is based on interest in and engagement with the practice rather than externally induced compliance. Ongoing contact with prior adopters allows for ongoing vicarious learning and exchange of useful information. Moreover, country level ties based on direct trade and regional proximity foster a multiplexity of ties between the various government, investor, business and policy communities that are critical for effective implementation and exchange performance. Thus, to the extent that learning was the mechanism at play in proximity-based adoption we can expect more successful and sustained implementation and performance.

*Hypothesis 4a: Stock exchanges adopted in the wake of adoptions by regional neighbors and trade partners will be relatively larger than those adopted without such prior adoptions.*

**Emulation.** A final explanation for the purposeful creation of new institutions in states is central to the world society perspective (Meyer et al., 1997). Just as organizations may adopt practices for ceremonial purposes rather than out of technical requirements (Meyer & Rowan, 1977), developing countries might adopt policies and corresponding organizations for reasons of *global* legitimacy. The technical functionality of policies is secondary in this perspective, and replaced with a symbolic function of emulating the prescriptions of high status elites. The motivation for adoption is to appeal to the normative expectations of prominent external audiences, not to solve local problems, and knowledge is based more on general broad ideologies than on deep insight. A considerable number of studies have documented such processes in the global diffusion of policies, institutions and organizations, from environmental protection (Frank, Hironaka, & Schofer, 2000) and democracy (Wejnert, 2005) to policy orientations such as economic liberalism (Simmons & Elkins, 2004) and the specific practices of deregulation

(Henisz et al., 2005), intergovernmental investment treaties (Elkins, Guzman, & Simmons, 2006), and central bank independence (Polillo & Guillén, 2005). To wit, countries may create exchanges because they are seen as generally appropriate by high status evaluators that represent the membership of the “society of nations”.

The transnational “world stage” around the issues of economic development is akin to an increasingly structured organizational field at the national level, and this increasing structuration gives rise to isomorphic processes (DiMaggio & Powell, 1983). In the field of economic development policy, a nexus of actors develops field-wide norms for institutional design and development policies with limited regard to local conditions. Development discourse shaped in dominant Western countries at the core of the global political economy serves as a template for how nations should manage their economies. Professional development consultants and economists in transnational “epistemic communities” frame the debate and rationalize institutional solutions (Fourcade-Gourinchas, 2001; Haas, 1992). Policy makers in developing countries are peripheral and less prestigious participants in this world community. Faced with the society of nations and global elites as arbiters of their conduct, they manage legitimacy by implementing templates theorized by global professional elites and used by high-status countries.

If more peripheral countries create financial markets in an effort to maintain legitimacy and gain prestige, two factors can be expected to explain the uneven adoption through emulation by more peripheral countries. First, a country’s closeness to the core of the world economic system increases its visibility and hence the scrutiny under which its policies are put by global elites. Moreover, closeness to the core increases a country’s desire to conform with core actors’ institutional norms in an effort to attain the status of a member of the core. Greater integration into the core of the capitalist system, in terms of a country’s position in international economic and political networks have been shown to further the diffusion of other policies emanating from



the core (Polillo & Guillén, 2005; van Rossem, 1996; Wejnert, 2005). It is noteworthy that almost all capitalist countries conventionally designated as “core” and many designated as “semi-peripheral” had created exchanges well before the 1980s, so that the further spread of exchanges in the 1980s and 1990s amounts to an expansion of a core institution to more peripheral countries, with a parallel creation of more advanced financial institutions, such as options exchanges, at the core. The process of normative emulation among late adopters therefore resembles middle-status conformity processes (Phillips & Zuckerman, 2001) – countries closer to core and in the middle of the world system distribution face higher expectations to live up to their position and have stronger desire to associate with the core through symbolic actions.

A second fulcrum of normative exposure is the extent to which local participants in policy making are part of global professional networks. Professional epistemic communities play a key role in normative institutional pressures (DiMaggio & Powell, 1983; Haas, 1992). For example, an epistemic community of U.S. trained economists is often credited with promoting economic liberalization in Latin America when they gained local footholds (Murillo, 2002; Simmons et al., 2006). Variation in countries’ policy adoption is due varying exposure of countries to these professionals, to varying structural access of global professionals to local policy makers.

*Hypothesis 5: Controlling for other internal, coercive, and mimetic factors, countries are more likely to create a stock exchange to the extent that they are subject to normative pressures through greater centrality in world economic system and ties to the global financial community.*

Institutional research portrays adoption out of emulation as prone to being decoupled from implementation for several reasons. First, the legitimacy benefits of adoption are likely to accrue to states regardless of the vigor of their subsequent implementation (cf. Westphal &

Zajac, 1998). Second, the practices developed by high-status actors may not be workable or functional for emulators that occupy a different structural position. They may lack the requisite skill to move beyond ritualistic emulation because knowledge, for example is based on generic ideologies rather than fine-grained insight. “Whereas conventional logic-of-development arguments suggest that countries will adopt certain programs when they are developmentally ready for them, world polity theorists have found that countries embrace new norms for symbolic reasons even when they cannot begin to put them into practice...Even in the realm of economic policy, countries may adopt new global norms before they are really ready” (Simmons et al., 2006: 800-801). While those policy makers proximate to prior adopters are likely to have continued direct communication relevant to locally successful implementation, those that adopt out of emulation of high status others are more prone to adoption without knowledge relevant to their local setting and with a primary motivation of symbolic legitimacy.

*Hypothesis 5a: Controlling for geographic and trade proximity to prior adopters, stock exchanges adopted by more central countries and those tied into the epistemic financial community will be relatively smaller than those adopted by other countries.*

Although it may seem counter-intuitive that the exchanges of more central countries would be relatively smaller, it is important to emphasize that the population contemplated here is only those that did not have an exchange prior to 1980. Obviously core economies (such as OECD members) and some countries in the semi-periphery already had created exchanges by then. Our argument is that exchanges will be smaller among those countries that are more central is *relative to other late adopters*, who according to neoinstitutional theory are particularly prone to legitimacy-based adoption of practices (Tolbert and Zucker, 1983).

## METHOD

### Population and Sample

The “at risk” population of our study is any country that existed in 1980 or subsequently and did not have a stock exchange as of 1980. We excluded communist countries in the Soviet bloc from the risk set prior to 1989. The list of countries was compiled from the United Nations directory of countries and the CIA’s World Factbook. By 1980, 59 countries had established one or more exchanges, which excludes these countries from the risk set. Additional countries enter the risk set when they become formally independent and exit the risk set when they are dissolved or create an exchange. Excluding exchanges created prior to 1980 raises issues of left-censoring. However, restricting the study period is justified for theoretical and empirical reasons. It was only with the shift to economic liberalism the early 1980s that stock markets came to play the role for economic policy that are at the heart of our arguments. Not surprisingly then, the 1980s and 1990s capture the rapid increase in adoption events (see figure 1). Only 14 exchanges were created in the 20 years from 1960 to 1980, despite the fact that numerous countries gained independence during this period. By contrast, 53 countries opened exchanges in the 20 years from 1980 to 2000, nearly doubling the number of countries with exchanges. The period from 1980 to 2005 therefore captures the phenomenon of theoretical interest: temporal processes of global policy diffusion. To assess whether our results were affected by left censoring, we also tested a two stage selection model (Heckman, 1979). The first stage model estimates the chance that a country already has an exchange in 1980<sup>2</sup> and we then inserted the inverse Mill’s ratio

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<sup>2</sup> We included population, GDP per capita, years since independence and dummy variables for world-system position (van Rossem, 1996) and region (UN classification) in this estimation. The pseudo R<sup>2</sup> of this selection equation was 0.63.

from this model as a control into the adoption model. The control variable itself was not statistically significant and all substantive effects remained unchanged.

### **Dependent Variables**

***Stock market creation.*** Our first dependent variable is the time of establishing a country's first stock exchange. We ignore the subsequent creation of additional exchanges as well as the existence of commodity exchanges.<sup>3</sup> If an exchange existed on a country's territory prior to independence, the country was excluded from the risk set. The date of establishment of an exchange is the first trading day as reported in the *Handbook of World Stock Derivatives and Commodity Exchanges*. We checked entries in the handbook for each year of its publication and cross-referenced exchange web pages and regional associations to verify complete coverage and to obtain the exact dates. This is because founding events are sometimes reported only with some delay in the *Handbook* and because new exchanges could potentially close or merge shortly after their founding. None of the exchanges in our sample closed or was moved as part of regional consolidation. This and all other variables are described in greater detail in Appendix A.

***Stock market vibrancy.*** Our second set of dependent variables addresses the vibrancy of those stock markets that were created between 1980 and 2005. These data came from the 2007 *World Development Indicator* (WDI) dataset, a compilation of information from various sources published by the World Bank. We measured the number of domestic companies listed at the exchange and their combined market capitalization as a percentage of the country's GDP. Market capitalization is the share price of all listed firms times the number of their shares outstanding. The two measures capture different aspects of market performance. The number of traded companies indicates the attractiveness of listing shares on the exchange for companies as well as

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<sup>3</sup> In almost every case, the first stock exchange remains the only one during this period. The most notable exceptions are the Ukraine (with five exchanges, one of which accounts for 95% of turnover) and Russia, with 60 registered stock exchanges.

the investment choices available to investors. If the goal of market creation is to stimulate indigenous entrepreneurship and promote market governance of economic assets, then the number of companies listing on the exchange is an apt indicator of vibrancy<sup>4</sup>. Market capitalization, on the other hand, captures what overall portion of a country's economy is governed by financial markets. A country could have many small companies listed on the exchange while large sectors of the economy remain closely held or under state control. If the intention of the market is to link the real economy to the world's financial system, then market capitalization relative to GDP is a good measure of vibrancy, and is the most commonly used metric in the studies following LaPorta et al. (La Porta & Lopez-de-Silanes, 1998; La Porta et al., 1999a)<sup>5</sup>.

### **Independent Variables**

*National institutional endowment.* We used several indicators of the compatibility of historical domestic institutions with stock exchanges: the percentage of a country's population of Protestant religion in 1980 (La Porta et al., 1999b), a dummy variable for countries which were French colonies or protectorates prior to independence (coded from the *World Factbook*), the level of political democracy and whether the ideology of the government was left leaning (both from the *Polity IV* database). We also tested an opposite coding for British colonial history, and a coding for the origin of a country's legal system (British common law, French civil law, see La Porta et al., 1998). As expected, countries that were former British colonies consistently showed

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<sup>4</sup> Factors other than institutional processes affect the supply of companies that could potentially list on an exchange, most prominently the size and stage of economic development of a country. In the reported models we control for country size and economic and financial development, effectively scaling the variable by these variables. As a robustness check, we also replicated the reported models with a dependent variable of the number of companies listed normalized by a country's GDP and omitting the GDP/capita control. This specification yielded consistent results.

<sup>5</sup> Trading volume, another potential indicator of vibrancy, was not reported consistently enough by the exchanges in our sample and could not be used as an outcome measure. Foreign portfolio investments in equities, which could be construed as a less immediate indicator of the exchange's success in attracting foreign capital, was also not reported consistently enough for countries in this sample.

an opposite pattern to former French colonies. Legal traditions followed a similar pattern but produced weaker effects. Colonial history and legal tradition are so highly correlated that we could not include both in our analysis at the same time.

***Dependence on international aid.*** We measure aid dependency as the concessional aid received from the IMF and World Bank divided by the country's GDP (*WDI* database). Concessional aid is disbursed at a lower interest rate but is tied to the implementation of specific development programs and policies stipulated by the IMF or World Bank. We treat concessional aid as a proximate channel of influence for global policy making communities located in international financial institutions. As concessional aid is mainly available to poorer and highly indebted countries, we did, however, also explore whether the factors that *qualify* a country to receive this form of aid fully explain the creation and performance of stock markets, net of *receiving* aid. We implemented a selection model for receiving aid that included economic development, balance of payments, credit and regional variables, and entered the selection term in the main diffusion and performance models<sup>6</sup>. The selection term was marginally significant but the coefficient and significance of the aid variable remained unchanged relative to the models reported. This supports our view that the actual receipt of aid constitutes a specific channel of influence for international policy diffusion beyond the general economic conditions of countries.

***Inter-country competition.*** We measured the degree to which countries are influenced by their competitors' adoption behavior using countries' position in the international trade network. We measured inter-country competition based on a country pair's similarities in their pattern of trade. Conceptually, the variable reflects competition due to countries' structural equivalence in the world trade system and is calculated as the normalized correlation between the import and

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<sup>6</sup> We included population, GDP/capita, financial reserves in months of exports, total debt/GDP, total domestic credit/GDP, trade/GDP, and dummies for world-system position (van Rossem, 1996) and region (UN regions) in the selection equation. The pseudo-R<sup>2</sup> of the selection equation was 0.52.

export shares of two countries across trade partners, as used by Lee and Strang, 2006. Inter-country competition serves as the weight for the influence that a prior adoption event in the other country exerts on the focal country. Annual trade data came from the United Nations COMTRADE database. We updated the measure of trade competition every five years and prior adoption events annually, resulting in an annually updated variable.

Our measure of competition differs from others developed by Guler, Guillén & Macpherson (2002) and Polillo & Guillén (2005) that are based on the concept of role equivalence, in that we use trade data at the county-aggregate instead of the product category level. For a general discussion of structural vs. role equivalence see, e.g., Mizruchi (1993). Guler, Guillén & Macpherson (2002) suggest that their measure provides a more precise approximation of inter-country competition because it combines information about product categories and the direction of trade while structural equivalence measures only take into account competition for access to aggregate country-level markets. The tradeoff is that reliable product-level reporting of trade is less common for many low income countries, especially during the early years included in our study. While our measure is therefore more coarse-grained, it allowed us to include a larger number of the mostly less developed countries in our risk set.

***Inter-country learning.*** We measured two sources of contagion processes that map onto different dimensions of proximity among countries. The first measure is the number of recent adoption events in a country's region, with regions as defined by the World Bank. These regional groupings are widely used in reporting and analyses in the international economic policy community and approximate regional reference groups and data reporting as well as geographic proximity. We focused on recent adopters because recent events have been shown to be most

salient and relevant in diffusion processes (Strang & Tuma, 1993)<sup>7</sup>. We controlled for the cumulative percentage of prior adopters in the region and the total size of the regional risk set. The second measure used proximity in trade networks to weigh adoption events. Following the “Cohesion in Trade” measure developed by Guillén and colleagues (Guler et al., 2002; Polillo & Guillén, 2005: 1784), we capture inter-country learning processes by using bilateral trade data to measure the ratio of imports and exports from the influencing country to all imports and exports received by the influenced country on an annual basis. Annual trade data is from the United Nations COMTRADE database. Our measure weighs previous adoptions of a stock exchange by trade ties with adopters.

***Normative emulation.*** We tested three indicators of normative world society mechanisms. First, we created a binary variable for a country being home to the headquarter of one or more international professional financial associations (IPFAs). IPFAs are associations of public and private finance professionals and organizations, as listed in the *Yearbook of International Associations*. Headquarter locations in one of the generally more peripheral countries in the risk set suggests that this country has greater exposure to international financial expert communities and their normative discourse. Similar to concessional aid, we treat IPFAs as providing proximate channels of influence. The existence of a local IPFA is likely itself influenced by the host country’s economic and financial development and the global spread of development finance as a field, and can hence not be treated as fully exogenous. We therefore interpret our findings for this variable strictly in terms of a proximate diffusion mechanism rather than as a broad causal factor. Second, we used a country’s overall position in the world system in

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<sup>7</sup> We use a count of regional adoption events in past years in the reported analyses. We performed several robustness checks on this specification. We tested alternative variables with 3, 5, 10 and 15 year windows. Using 3 and 5 year windows yielded the same pattern of results as reported in this paper. The direction of the coefficient remained consistent but its statistical significance dropped for the 10 and 15 year windows. We also tested 3, 5, 10 and 15 year window variables in which the weight of adoption events exponentially decreased with time. All four of these “time



1993, as reported by van Rossem (1996). Van Rossem used a block modeling approach to collapse five types of inter-country ties (imports, exports, diplomatic, arms trade, troops) into four categories: core, semi-periphery, periphery1 and periphery2. We used core as the base category and collapsed both periphery clusters into one because many periphery 2 members are dependent territories that are excluded from our analysis. While world system position is likely to change slowly and 1993 falls in the middle of our sampling period, we also created an annual variable of a country's position. We focused on the global trade network as the most relevant tie for economic policy and calculated a country's closeness centrality in the world trade system from annual input-output matrices of imports and exports. Closeness centrality reflects the established pattern that countries closer to the core are connected more directly to more others. Consistent with van Rossem (1996: 512) we counted bilateral trade as a tie if either exports to or imports from the other country amounted to at least 1 per cent of the focal country's GDP. We used annually standardized centrality measures to control for changes in the number of countries participating in global trade.

### **Control Variables**

We controlled for the absolute size of a country with the natural logarithm of its population. We also controlled for GNP per capita (at current international prices) as a measure of a country's wealth and availability of capital. We used the natural logarithm of GNP per capita. We used GDP growth to control for economic dynamism. We included several measures of a country's prior financial development, balance of payments position, and economic openness. We used the natural logarithm of domestic credit over GDP as a proxy of financial development. Capital account balance scaled by GDP can be seen as indicative of a country's role in international capital flows, and total trade over GDP (logged) captures how integrated a

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fade" variables yielded results highly consistent with the variable reported here, supporting the importance attached

country is in the global economy. We also included dummy variables for former Soviet countries and a time dummy for the 1990s to control for potentially unique dynamics in these countries and time period<sup>8</sup>. In the models for exchange vibrancy, we additionally controlled for whether access was liberalized to foreign investors, using the data on the “official equity market liberalization date” collected by Bekaert et al (2005).

### **Analyses**

We used semi-parametric Cox proportional hazards models with robust standard errors to estimate countries’ “transition rates,” that is, the rates at which they move from non-adopter to adopter. The unit of observation is the country-year. Time to adoption is measured from January 1, 1980 (the beginning of our sample period) or from the point at which a country first became independent, if this was after 1980. We replicated the analyses reported here using Cox models with two alternative specifications for correlated errors within country: clustering by country and shared frailty models. All substantive results were robust across these specifications.

We used population averaged Generalized Estimating Equations (Zeger & Liang, 1986) with robust standard errors to predict exchange vibrancy and specified all models with AR(1) temporal autocorrelation. We specified a logarithmic link function (family negative binomial) for the number of companies listed on the exchange, and replicated this analysis using a measure that normalized the number of companies by country GDP. We specified a logarithmic link function (family Gaussian) for market capitalization. We measured global institutional variables at the time when the exchange was created to account for conditions at the time of adoption. We measured national-level control variables concurrently to account for changing national

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to recent events in the diffusion literature.

<sup>8</sup> We performed robustness checks for alternative controls: Urbanization as a proxy for industrial development, bank lending as an alternative proxy for financial development, gross capital formation as a proxy for development progress, inward FDI as a proxy for economic openness and a status as an ‘offshore financial center’ as designated by the IMF ([www.imf.org/external/np/ofca/ofca.asp](http://www.imf.org/external/np/ofca/ofca.asp)) or the BIS ([www.fsforum.org/publications/r\\_0004b.htm](http://www.fsforum.org/publications/r_0004b.htm)). The

conditions for exchange vibrancy. The number of observations for our analyses of vibrancy is limited to the 56 adopters. These analyses allow inferences only about the vibrancy of exchanges created between 1980 and 2005 and does not speak to broader economic performance differences between adopters and non-adopters.

One methodological challenge in international diffusion research, known as *Galton's Problem*, is to distinguish true cross-national influence due to interdependence between countries from common exogenous shocks or correlated country-level factors. Inadequate modeling of simultaneous interdependence tends to misestimate the relative importance of common shocks and between-country processes (Anselin, 2006; Franzese & Hays, 2007, 2008). This is a matter of both relative measurement and proper specification of spatial autocorrelation. To address the common problem of underestimating interdependence, Franzese & Hays (2007, 2008) proposed the use of spatial autoregressive (SAR) models based on specifying a proximity matrix  $W$  ( $N \times N$  countries in our case) on theoretical grounds and taking into account systematic and stochastic spatial components. We present SAR models that replicate the analyses for exchange performance using Franzese and Hays' approach in addition to the GEE implementation. We note that our data structure is more complex than the basic SAR case. Our data contains multiple spatial dimensions (region, trade cohesion, trade competition) and the two trade-based measures of proximity are also time-varying. While the general SAR approach has very recently been generalized to this data structure in the form of multiparametric spatiotemporal autoregressive (m-STAR) models (Franzese, Hays, & Kachi, 2008), the reliability of this approach has not been evaluated. Spatial lag models may also generalize but to our knowledge have not been tested for hazard rate models (Franzese, personal communication), which would be desirable to report fully parallel analyses of adoption and performance as suggested by our hypotheses. In light of these

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coefficient pattern and significance of all substantive variables remained consistent with any one of those variables.

issues, we present separate spatial lag models of exchange performance as a validation for the main analysis, estimating separate models for each spatial dimension. We use time-varying proximity matrices for the two trade variables. The spatial autocorrelation parameter in these models represents ongoing inter-country influence at time  $t$ , while the coefficients of the context conditions at the time of exchange creation can be interpreted as the effect of founding conditions at  $t_0$ . In an exploratory m-STAR replication of these analyses, we found that the three spatial dimensions were consistently jointly significant and the main substantive findings were confirmed. However, the magnitude of each dimensions' spatial lag coefficient varied across specifications and maximum likelihood estimates for exchange liberalization could not be obtained without the omission of some variables. This points to limitations in our data (sample size, correlation among spatial dimensions) so that SAR models cannot well attribute concurrent interdependence to the dimensions of region, trade cohesion and trade competition (Franzese & Hays, 2008: 40). Hence, we present single-parameter SAR models as robustness checks.

## RESULTS

Table 2 reports pooled summary descriptive statistics and correlations for countries in the risk set. As table 2 shows, correlations are generally low to moderate. Table 3 shows estimates of adoption models. We report models for only control variables; variables corresponding to each hypothesis; and combined models with all predictors included. The estimates shown are based on a consistent sample of 75 at-risk countries for which data on all included variables were available. We replicated this analysis with varying numbers of countries depending on data availability (75 – 113 countries, 869 – 1916 country years). These analyses confirmed the results shown in table 3, and suggest that the findings are robust across different country sets. Table 4

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To maximize degrees of freedom, we did not include these potential controls in the estimations shown in this paper.

shows the results of analyses of the vibrancy of the exchange for the different modeling frameworks. Panel 4a shows models for the number of companies listed on the exchange, and panel 4b shows models for market capitalization. We again show models for a set of 52 adopting countries for which most variables were available and for 34 countries for which we could obtain data for all variables. Panel 4c shows an additional analysis of equity market liberalization, whether foreigners are granted unrestricted access to the market (Bekaert et al., 2005). Only 4 of the 56 exchanges were formally liberalized from inception (Lebanon, Namibia, Poland and Romania), so that the subsequent opening of the market to foreign investors can be seen as a proxy for “extent of implementation” -- fully implementing the neoliberal economic policy logic behind the global diffusion of exchanges in the study period. Model 4c was specified as a GEE with a probit link function (family binary) with AR(1) temporal autocorrelation. We used LeSage’s (1999) Bayesian Probit to implement the probit analysis in a spatial autocorrelation framework.

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Tables 2 – 4 here  
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Table 3 shows that French colonial legacy reduces the likelihood that a country creates an exchange, while Table 4 suggests that exchanges created by these countries tend to have fewer listed companies. We find no link between the level of Protestantism, the level of democracy, or the ideology of a country’s rulers and the propensity to create an exchange. We do, however, find a tentative negative association between Protestant religion and the number of companies listed, while conversely there were indications of a positive relationship between Protestantism and subsequent market size. The pattern of results for colonial legacy and to a lesser extent for Protestantism are consistent with Hypothesis 1 and 1a, that a country’s prior institutional legacy influenced both its likelihood of creating an exchange and the exchange’s performance. In robustness checks not reported here, we find a mirror pattern for exchanges created by former

British colonies, as expected by prior research on historical institutions. Note that even a more complete implementation of a neoliberal policy through formal market liberalization does not eradicate this effect of common history.

Hypotheses 2 and 2a led us to expect that coercive policy diffusion, in the form of dependence on concessional IMF and WB aid, would be positively associated with the creation of an exchange but negatively associated with the exchange's vibrancy. Table 3 confirms H2 and show a robust positive effect of aid on adoption. Panel 4a shows support for H2a, especially once spatial autocorrelation is taken into account. The negative effect on the number of companies listed is consistent across all statistically significant specifications. The receipt of concessional aid at the time of exchange creation also reduces market capitalization once spatial autocorrelation is modeled, at least in the smaller sample of countries with complete data (panel 4b, models 6, 9, 12)<sup>9</sup>. It does not affect liberalization, which may indicate that the coercive influence of international agencies is limited to the adoption of a specific formal program. Overall, this pattern shows good support for predictions associated with coercive mechanisms of diffusion.

Hypothesis 3, relating to competitive diffusion mechanisms, is supported – the creation of exchanges by role equivalent others increases the chance of adoption (table 3). Hypotheses 3a and 3b presented alternative rationales that link competitive diffusion vibrancy. We find a marginal positive effect of trade competition at the point of founding on market capitalization in the SAR implementation (panel 4b, models 6, 9, 12), and a more consistent effect of contemporary trade competition-based autocorrelation in the models of market capitalization and liberalization. This pattern suggests that competitive adoption fosters policy implementation more through continued rivalry than through the initial imprinting process.

Table 3 shows that regional contagion processes promote the creation of exchanges while trade ties do not. Table 4 further suggests that adoption influenced by regional contagion or the behavior of trade partners at the outset increases the chance of more complete implementation of the policy logic (liberalization) and is associated with higher market capitalization and more listed companies in subsequent years. In addition, the significant autocorrelation parameter in all models using regional or trade cohesion-based proximity weights supports the notion of ongoing influence between countries tied through either dimension. This pattern lends general support to the learning view of peer diffusion articulated in hypotheses 4 and 4a. Contagion through regional and trade ties may facilitate substantive implementation of the innovation, counter to much of the received wisdom in neoinstitutional theory. The strong spatial autocorrelation effects suggest that this is due to focal adopters continuing to learn from nearby adopters as much as to imprinting at founding (Davis & Greve, 1997; Greve, 1998). Proximate adopters may also enhance performance of a focal country via investment spillovers (Henderson & Cockburn, 1996)<sup>10</sup>.

Hypotheses 5 and 5a predicted that normative and status-based emulation processes, as a result of world system position and exposure to professional communities, prompt policy adoption but hinder subsequent vibrancy. We find support for H5 – countries with international professional finance associations and a more central position in the world trade network are more

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<sup>9</sup> In additional exploratory analyses, we also found concessional aid to reduce subsequent foreign portfolio investment flows. These analyses are available from the authors upon request.

<sup>10</sup> From our high level data, we cannot conclusively attribute regional and trade contagion to learning mechanisms. The rationale for attributing learning processes to regional and trade cohesion is mainly based on the existing literature reviewed above. A narrower test would be to examine whether learning-based imitation takes into account the performance of the observed practice. The limitation for this approach in our sample of late adopters is that the policy itself is already proven to be successful, so that the relevant dimension of learning is not so much the generic success of the practice but fine grained access to proximate information. In addition, learning can occur from the success or failure of others when it comes to implementation. Empirically, with our use one year time lags in our models, the performance of another country's exchange cannot be observed by the adopter at the time of a its own decision. We tested if perhaps a prior adopter's general economic performance (growth in GDP or GDP/capita) improved the adoption or performance models, but, similar to Lee and Strang (2006), found no simple effect.

likely to create a stock market. However, contrary to H5a, adoption influenced by the presence of finance associations is positively associated with both the number of companies listed, market capitalization, and market liberalization, all of which suggests that exposure to global professional communities enhances policy implementation. This may suggest that professional communities not only play the normative function so clearly emphasized in the neo-institutional literature (DiMaggio & Powell, 1983; Simmons et al., 2006) but in the international realm also provide non-state-based channels for ongoing diffusing practical knowledge about institutions that conform to their ideology.

Semi-peripheral countries are less likely to create an exchange (compared to the baseline category of those at the core) but when they do, they tend to have a larger number of listed companies and to be more likely to liberalize their exchange. Peripheral countries that adopt an exchange show a similar effect. More generally, normative emulation by countries more connected to the core global elite appears to go beyond purely ceremonial adoption and towards more complete conformity with high status actors, because adoption is based on a deeper internalization of normative policy logics diffusing from the core. As a result, policy makers neither seek to de-couple formal practices from contrasting internal beliefs nor do they lack the capabilities to implement them.

## **DISCUSSION AND CONCLUSION**

This paper was motivated by two questions: First, what is the role of international institutional diffusion processes in the adoption of economic policies and the organizational infrastructures associated with them? And second, does institutionally-triggered adoption make for bad policy? That is, does international diffusion generally lead to ‘merely ceremonial’ adoption of a policy? Most international institutional research has thus far been content with



studying adoption and paid little attention to questions of operational performance. We studied the creation and vibrancy of national stock markets since the 1980s as a critical component of the organizational infrastructure for market-based approaches to economic policy.

The answer to the first question is that institutional processes at the global level did indeed play an important role in diffusing stock markets to countries at the periphery of the capitalist ‘world society’ during this period. We found evidence for international coercive, competitive, learning and emulation processes. The answer to the second question is perhaps more provocative. Only international development aid seemed to match the pattern expected for ceremonial adoption: IMF and World Bank aid is a conduit for the creation of stock markets and is associated with these markets being less vibrant. However, linkages to international finance experts and regional and trade-based contagion appear to enhance the robustness of exchange implementation and performance. These findings have implications for international policy implementation and for institutional research.

***Implications For Policy Research.*** There are two pragmatic policy-related questions that this study addresses. The first is, does it matter – are the statistical effects we found of sufficient magnitude to inform policy decisions? The second is, what is the practical implication – what advice, however tentative, would one give to those concerned with national and international economic development? In regard to the first question, it should be noted that our study is designed to draw inferences about implementation effectiveness of formally adopted practices. Hence, we are reluctant to speculate about the counterfactual of whether, for example, countries that created more ceremonial exchanges would be worse or better off economically had they not created an exchange at all or pursued alternative paths towards financial development. We performed one exploratory analysis of the difference in FDI inflows between adopters and non-adopters in our risk set but found no statistically significant difference net of the control

variables included in this study. This is clearly an area of ongoing research (see e.g., Levine & Zervos, 1998; Filer et al., 1999).

As to the magnitude of differences within countries that created exchanges, a 1% of GDP increase in concessional aid increases the adoption rate by 21% (table 3, panel 3a, model 11) and reduces the expected number of firms listed by about 4 per year over the following years (table 4, panel 4a, model 3). It is important to bear in mind, though, that only 18 countries received concessional aid amounting to more than 5% of GDP at some point in time (6 of which created an exchange in the aftermath). The substantive significance of this effect can also be understood in comparison to other predictors. The adoption rate of former French colonies is 92% lower, while each prior regional adoption event increases the adoption rate by 165% and subsequent market capitalization by 2% of GDP per year. The presence of an IPFA increases the adoption rate by 155% and the number of companies listed by 5 and subsequent market capitalization by 3% of GDP per year. We emphasize the relative size of these effects because of two caveats for a more literal interpretation: the size of each effect varies depending on the specification and countries included in our models, and the interpretation of coefficients in time-series models of exchange vibrancy is less straight-forward than in standard regression models.

What can national policy makers do to enhance the effectiveness of formally adopted development policies? One implication of our findings is that it is difficult for countries to overcome historical path dependent development paths, and the most promising path to development may lead through the selective adoption of policy innovations that fit an existing system (see also e.g., Biggart & Guillén, 1999). A second implication is that in order to reap expected benefits, local policy makers should address informal as well as formal policy aspects, for example by supporting the development of internationally connected professional elites and by engaging in multi-lateral and regional initiatives. What can international policy makers do to

build more effective institutional frameworks in countries away from the core of the global political economy? Our analyses suggest that (1) efforts should be directed at building indigenous expertise and linkages to pools of international expert communities, because normative acceptance and continued access to knowledge and resources after initial adoption are necessary for further development of markets; and that (2) coercive mechanisms, such as program-contingent aid from international development agencies, may be more successful when these external policy interventions are “robust”: where acceptance and implementation of the desired practice involves a broader set of actors domestically and within a country’s peer group so that a self-sustaining dynamic is more likely. The successful adoption of specific practices, such as financial markets, requires supporting changes across the country’s entire institutional matrix and its external web of relationships. It is on this end of informal and distributed parts of the policy processes that program-based and externally monitored interventions by development agencies may lead to ceremonial rather than expansive implementation. It is informative in this regard to contrast our findings with those of Brune, Garrett and Kogut (2004), who find that IMF concessional aid was associated with more extensive privatization programs in terms of volume and valuation. The difference between our largely negative findings and the study by Brune et al suggests that the Washington Consensus approach to financial development is limited by its focus on episodic formal state programs (privatization, exchange liberalization, exchange creation) but fails to effectively foster the development of informal and distributed institutions that involve the private sector (fewer companies listed, portion of economy governed by market). Building the robust institutional matrix requires the creation of less formal and diverse structural linkages, as well as sustained attention of policy makers beyond concessional lending episodes.

***Implications For Neo-Institutional Research.*** This study sheds light on how institutional mechanisms of diffusion relate to the subsequent performance of a formally adopted practice or

policy. While crude neo-institutional accounts often assume that innovations adopted as a result of institutional pressures are only symbolic and hence automatically less substantive, recent research has begun more nuanced examinations of the conditions under which formally adopted practices remain solely ceremonial or are also substantively implemented (Lounsbury, 2001; Westphal & Zajac, 2001; Zelner et al., 2007). This line of research has often pointed to post-adoption factors, such as ongoing monitoring of compliance, changing interests of the adopters and the degree of structural inertia. Our study suggests that institutional mechanisms at the point of adoption may also influence subsequent vibrancy. We find that coercive institutional pressures which trigger adoption are associated with more ceremonial, poorly performing exchanges, while peer influence and normative emulation enable more vibrant exchange activity.

The pattern we observed at the country level is akin to imprinting at the time of founding for organizations (Stinchcombe, 1965). If new organizations are influenced by the social context of their founding, new national practices and policies are influenced by their world society context. Subsequent development is partly path dependent. The specifics of institutional diffusion processes, far from being only about immediate legitimation, may be more relevant for longer term and substantive outcomes than often presumed. Our study is one of the first to examine and refine conventional expectations around institutional adoption in the global sphere. Our findings suggest that more “micro-institutional” studies into the process of international policy diffusion and the formal adoption of national policies and practices is needed to further disentangle various mechanism (see e.g., Woods, 2006, for a recent example). In combination with high level studies such as ours, this research may enhance the practical relevance of neo-institutional theory for international policy makers.

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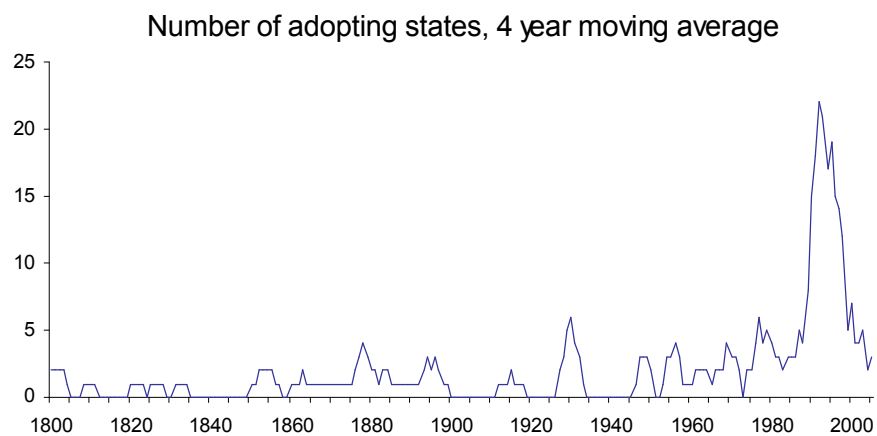
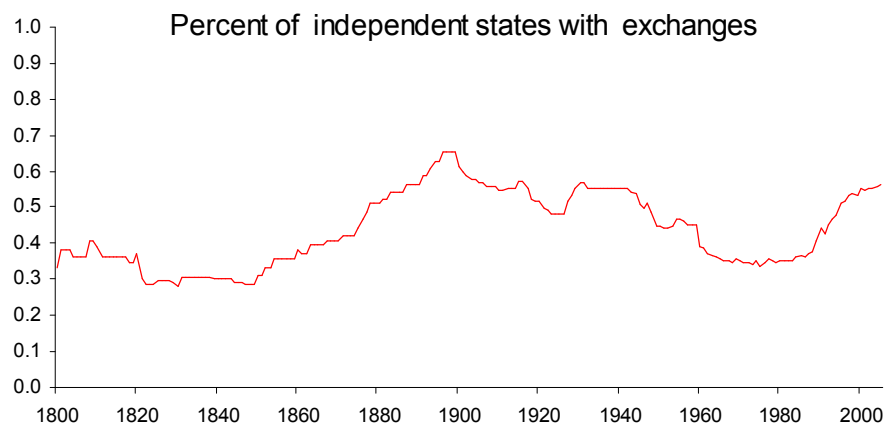
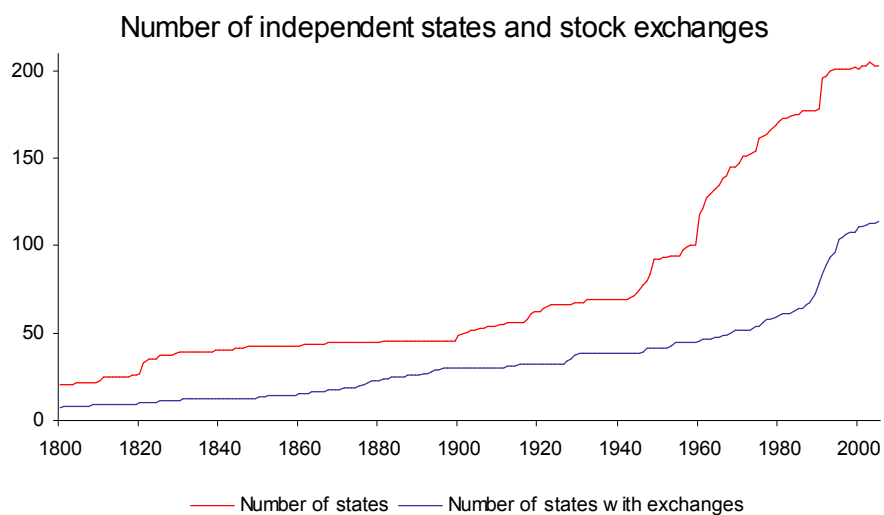
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**FIGURE 1:**  
**Prevalence of Stock Markets Among Independent Modern Countries, 1800 - 2005**



**TABLE 1:**  
**Countries That Created Stock Markets Between 1960 and 2005**

<b>Year</b>	<b>Countries</b>
1960	Nigeria
1961	Taiwan
1962	-
1963	-
1964	Malaysia
1965	-
1966	Iran
1967	-
1968	Jamaica
1969	Ecuador, Tunisia
1970	-
1971	-
1972	-
1973	-
1974	Cote d'Ivoire, Thailand
1975	-
1976	Jordan, Costa Rica
1977	Indonesia, Paraguay
1978	-
1979	Bolivia
1980	Fiji
1981	Trinidad and Tobago
1982	-
1983	-
1984	Saudi Arabia, Kuwait
1985	Iceland
1986	-
1987	Bahrain, Barbados
1988	Oman
1989	Ghana, Mauritius, Guatemala, Yugoslavia
1990	Honduras, China, Soviet Union, Malta, Swaziland, Panama, Hungary
1991	Croatia, Poland, Bulgaria
1992	Czechoslovakia, Ukraine, Namibia, Lithuania, Mongolia, El Salvador
1993	Armenia, Latvia, Bhutan, Cyprus
1994	Botswana, Uzbekistan, Nepal
1995	Kyrgyz Republic, Malawi, Moldova, Zambia, Macedonia, Romania, Estonia
1996	Lebanon
1997	Uganda, Kazakhstan, Qatar
1998	Tanzania
1999	Georgia
2000	United Arab Emirates, Papua New Guinea, Azerbaijan, Vietnam, Bahamas
2001	-
2002	Maldives
2003	Guyana
2004	-
2005	Cape Verde

**TABLE 2:**  
**Descriptive Statistics and Pairwise Correlations**

	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1 Number of companies listed (a)	149.72	562.89	1.00	5825.00																									
2 Market capitalization [% GDP] (a)	23.72	32.13	0.00	229.23	-0.07																								
3 Exchange liberalized to foreigners (a)	0.254	0.436	0.00	1.00	0.16	0.01																							
4 Ln(Population)	7.715	2.022	2.48	14.08	0.24	-0.27	0.03																						
5 Ln(GDP/capita)	7.021	1.344	4.14	10.88	-0.03	0.51	0.20	-0.40																					
6 GDP Growth (%)	2.857	7.374	-51.03	106.28	0.02	0.09	0.05	0.00	0.03																				
7 Time strata (1990s = 1)	0.444	0.497	0.00	1.00	-0.04	-0.25	-0.09	0.06	0.02	-0.06																			
8 Former Soviet block	0.133	0.339	0.00	1.00	0.18	-0.29	0.14	0.23	0.11	-0.10	0.20																		
9 Trade openness [Ln(Trade/GDP)]	4.337	0.572	0.43	5.64	-0.09	0.16	0.10	-0.56	0.47	0.07	0.00	0.12																	
10 Capital account balance / GDP	0.171	0.731	-2.97	20.24	-0.04	-0.05	0.03	-0.09	-0.08	0.05	0.05	-0.07	0.04																
11 Ln(Domestic Credit / GDP)	2.907	0.970	-4.61	5.54	-0.05	0.37	0.11	-0.41	0.58	0.02	-0.09	-0.15	0.41	0.01															
12 Protestant religion [% of population in 1980)	12.946	19.706	0.00	96.60	-0.09	0.11	0.20	-0.41	0.12	-0.02	-0.03	-0.16	0.17	0.01	0.14														
13 Former French colony or protectorate	0.187	0.390	0.00	1.00	-0.04	-0.03	0.15	0.22	-0.29	0.01	-0.04	-0.19	-0.25	-0.03	-0.17	-0.13													
14 Level of democracy	-1.147	6.944	-10.00	10.00	0.07	-0.20	0.27	-0.16	0.16	-0.01	0.19	0.29	0.23	0.07	0.19	0.26	-0.18												
15 Ideology of ruling party (left leaning)	0.381	1.452	-2.00	2.00	0.04	-0.05	-0.01	0.23	-0.20	-0.04	-0.08	0.02	-0.12	0.07	-0.11	-0.18	0.08	-0.24											
16 IMF/WB concessional aid / GDP	0.502	1.175	-1.18	18.79	-0.05	-0.14	-0.09	0.11	-0.37	0.07	-0.02	-0.06	-0.10	0.14	-0.21	-0.08	0.06	0.03	0.04										
17 Prior adoptions, weighted by trade competition	26.74	11.11	-5.44	52.01	0.01	0.12	0.00	0.17	0.02	0.05	-0.02	0.13	0.03	0.01	0.05	-0.09	0.04	0.16	-0.05	0.08									
18 Prior adoptions within region (1 year window)	0.655	1.252	0.00	8.00	-0.07	-0.17	-0.13	0.14	0.02	-0.18	0.39	0.34	-0.02	-0.02	-0.11	-0.10	-0.03	0.12	-0.03	-0.07	-0.05								
19 Regional cumulative adoption [%]	0.419	0.233	0.00	0.85	0.22	0.04	0.28	0.06	0.40	0.09	0.17	0.41	0.21	-0.02	0.20	-0.14	-0.20	0.31	-0.04	-0.08	0.22	0.08							
20 Number of nations in regional risk set	27.35	13.80	0.00	46.00	-0.13	0.05	0.11	0.15	-0.35	0.04	-0.06	-0.35	-0.23	0.02	-0.26	-0.09	0.30	-0.14	-0.01	0.22	-0.02	0.02	-0.55						
21 Prior adoptions, weighted by trade cohesion	0.104	0.108	0.00	0.80	-0.08	-0.11	-0.05	-0.15	0.01	-0.06	0.00	-0.12	0.03	-0.03	0.03	0.18	0.05	0.13	-0.10	-0.07	0.05	-0.07	-0.10	-0.04					
22 World-system position: Core	0.021	0.144	0.00	1.00	0.08	0.09	-0.08	0.31	0.08	0.03	0.01	0.04	-0.11	-0.04	0.16	-0.10	-0.07	-0.11	0.03	-0.07	0.04	0.02	0.12	-0.11	-0.09				
23 World-system position: Semi-periphery	0.054	0.226	0.00	1.00	0.37	-0.13	0.27	0.23	0.15	-0.06	0.06	0.29	-0.03	-0.05	-0.03	-0.14	-0.02	0.05	0.09	-0.10	0.05	0.15	0.23	-0.11	-0.10	-0.04			
24 World-system position: Periphery	0.920	0.272	0.00	1.00	-0.35	0.05	-0.16	-0.37	-0.17	0.03	-0.05	-0.27	0.10	0.06	-0.07	0.18	0.07	0.03	-0.10	0.12	-0.07	-0.16	-0.26	0.16	0.13	-0.52	-0.84		
25 International Professional Finance Association	0.161	0.368	0.00	1.00	-0.12	0.13	-0.01	0.08	0.18	0.02	0.05	0.00	0.15	-0.03	0.16	0.03	-0.04	0.14	-0.16	-0.01	0.02	0.02	0.07	-0.03	-0.08	0.09	-0.05	0.01	
26 World-system position: Centrality in trade network	58.87	9.48	0.00	91.53	0.23	0.01	0.23	0.37	0.21	0.14	0.07	0.14	-0.04	-0.07	0.11	-0.14	-0.04	0.07	-0.02	-0.08	0.19	-0.03	0.34	-0.05	-0.19	0.32	0.23	-0.35	0.18

N = 132 countries, 2090 - 3313 country-years depending on variable, except for (a), outcome variables for adopters only, 55 countries, 588 - 775 country-years

**TABLE 3:**  
**Cox Proportional Hazard Models of Exchange Adoption**

	Time to Adoption, 75 Country Sample										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Ln(Population)	0.157 (0.179)	0.143 (0.169)	0.233 (0.196)	0.164 (0.185)	0.163 (0.174)	-0.018 (0.165)	-0.033 (0.164)	-0.017 (0.232)	-0.339 (0.298)	-0.258 (0.299)	-0.791 (0.495)
Ln(GDP/capita)	0.372** (0.150)	0.359** (0.153)	0.421*** (0.141)	0.445*** (0.153)	0.443*** (0.148)	0.156 (0.137)	0.137 (0.145)	0.352** (0.172)	0.086 (0.229)	0.163 (0.185)	-0.255 (0.336)
GDP Growth (%)	0.018 (0.028)	0.02 (0.024)	0.016 (0.025)	0.021 (0.030)	0.025 (0.030)	0.047 (0.029)	0.047 (0.029)	0.017 (0.027)	0.01 (0.028)	0.054* (0.030)	0.063** (0.031)
Time strata (1990s = 1)	1.546 (0.954)	1.461 (0.966)	1.256 (0.965)	1.539 (0.946)	1.596* (0.963)	0.573 (1.016)	0.642 (1.011)	1.730* (0.933)	1.830** (0.926)	0.581 (1.079)	0.952 (1.194)
Former Soviet block	1.651*** (0.439)	1.156*** (0.424)	1.020** (0.464)	1.766*** (0.441)	1.573*** (0.449)	-1.077 (0.878)	-1.067 (0.888)	1.894*** (0.425)	1.848*** (0.445)	-1.737** (0.802)	-1.446* (0.871)
Trade openness [Ln(Trade/GDP)]	0.461 (0.458)	0.09 (0.458)	0.17 (0.480)	0.406 (0.477)	0.447 (0.432)	0.256 (0.427)	0.213 (0.432)	0.017 (0.451)	-0.262 (0.458)	-0.738 (0.525)	-1.215* (0.723)
Capital account balance / GDP	-0.527 (0.813)	-0.35 (0.413)	-0.444 (0.555)	-0.556 (0.841)	-0.601 (0.916)	-0.683 (1.047)	-0.728 (1.077)	-0.529 (0.803)	-0.593 (0.841)	-0.891 (0.894)	-0.961 (0.917)
Ln(Domestic Credit / GDP)	0.198 (0.237)	0.153 (0.198)	0.1 (0.129)	0.193 (0.239)	0.206 (0.207)	0.082 (0.111)	0.085 (0.111)	0.084 (0.251)	0.042 (0.187)	-0.274 (0.187)	-0.277 (0.257)
Protestant religion [% of population in 1980]		0.015* (0.008)	0.007 (0.009)							0.001 (0.009)	-0.002 (0.012)
Former French colony or protectorate		-2.668** (1.091)	-2.449** (1.107)							-2.610** (1.125)	-2.434* (1.292)
Level of democracy			0.041 (0.032)								0.009 (0.039)
Ideology of ruling party (left leaning)			-0.125 (0.125)								-0.14 (0.177)
IMF/WB concessional aid / GDP				0.178*** (0.043)						0.172*** (0.045)	0.193*** (0.053)
Prior adoptions, weighted by trade competition, t-1					0.025 (0.016)						0.037** (0.018)
Adoption events within region, t-1						0.683*** (0.202)	0.668*** (0.203)			0.914*** (0.203)	0.974*** (0.209)
Regional cumulative adoption [%], t-1						2.073 (1.341)	1.911 (1.386)			3.328** (1.435)	2.253 (1.535)
Number of nations in regional risk set, t-1						-0.054** (0.025)	-0.057** (0.025)			-0.057** (0.024)	-0.063** (0.032)
Prior adoptions, weighted by trade cohesion, t-1							-1.336 (1.968)				1.284 (2.796)
World-system position: Semi-periphery								-2.187** (0.911)	-2.175** (0.961)	-4.258*** (1.334)	-5.026** (2.423)
World-system position: Periphery								-1.505 (0.920)	-1.263 (0.919)	-1.776 (1.131)	-1.424 (1.552)
International Professional Finance Association								0.683* (0.404)	0.725* (0.397)	0.456 (0.531)	0.939* (0.563)
World-system position: Centrality in trade network									0.081* (0.046)		0.148** (0.065)
Observations	869	869	869	869	869	869	869	869	869	869	869
Countries	75	75	75	75	75	75	75	75	75	75	75
Adoptions	35	35	35	35	35	35	35	35	35	35	35
Log likelihood	-108.5	-99.79	-98.02	-106.51	-107.23	-96.94	-96.74	-105.27	-104.34	-82.77	-78.83
Wald chi2	44.88	60.82	69	50.78	50.37	57.73	60.06	71.37	84.11	123.19	145.4
Pseudo R2	0.12	0.19	0.21	0.14	0.13	0.21	0.22	0.15	0.15	0.33	0.36
Robust standard errors in parentheses											
* significant at 10%; ** significant at 5%; *** significant at 1%											

**TABLE 4:**  
**GEE Panel Regression And SAR Spatial Models of Performance of Newly Created Exchanges**

Panel 4a. Domestic Companies Listed	GEE Population Averaged			Spatial Lag SAR (Region)			Spatial Lag SAR (Trade Cohesion)			Spatial Lag SAR (Trade Competition)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Equity market liberalized to foreigners	0.138 (0.248)	0.046 (0.258)	-0.170** (0.077)	0.339*** (0.107)	0.068 (0.121)	-0.047 (0.147)	0.253*** (0.078)	0.005 (0.083)	-0.058 (0.093)	0.390*** (0.103)	0.009 (0.180)	-0.139 (0.248)
Years since exchange creation	0.105*** (0.021)	0.117*** (0.023)	0.109*** (0.028)	0.051*** (0.010)	0.061** (0.013)	0.054*** (0.014)	0.043*** (0.008)	0.054*** (0.009)	0.043*** (0.014)	0.066*** (0.012)	0.120*** (0.019)	0.102 (0.069)
Ln(Population)	0.322*** (0.069)	0.323*** (0.113)	0.324 (0.243)	0.241*** (0.034)	0.271*** (0.059)	0.346*** (0.098)	0.223*** (0.031)	0.223*** (0.039)	0.215*** (0.048)	0.343*** (0.041)	0.502*** (0.086)	0.508 (0.358)
Ln(GDP/capita)	0.247** (0.117)	0.196* (0.116)	0.326 (0.203)	0.093* (0.050)	0.038* (0.059)	0.085 (0.084)	0.120*** (0.039)	0.076* (0.039)	0.063 (0.050)	0.184*** (0.057)	0.174** (0.086)	0.149 (0.163)
GDP Growth (%)	0.011 (0.011)	0.011 (0.010)	-0.008 (0.008)	0.015 (0.009)	0.021** (0.009)	0.005 (0.011)	0.015** (0.007)	0.018*** (0.006)	0.004 (0.008)	0.024** (0.010)	0.040*** (0.014)	0.009 (0.019)
Time strata (1990s = 1)	0.165*** (0.057)	0.182*** (0.061)	0.208** (0.083)	0.280*** (0.098)	0.259** (0.101)	0.156 (0.106)	0.136* (0.071)	0.143** (0.069)	0.091 (0.070)	0.211** (0.107)	0.316** (0.153)	0.208 (0.219)
Former Soviet block	0.319 (0.274)	0.248 (0.289)	0.197 (0.346)	0.249*** (0.091)	0.139 (0.196)	-0.179 (0.248)	0.318*** (0.080)	-0.037 (0.134)	-0.191 (0.178)	0.490*** (0.104)	-0.088 (0.299)	-0.468 (0.477)
Trade openness [Ln(Trade/GDP)]	-0.142 (0.289)	-0.182 (0.281)	-0.447 (0.447)	-0.079 (0.157)	-0.090 (0.161)	-0.068 (0.222)	0.050 (0.119)	0.049 (0.107)	-0.098 (0.167)	0.076 (0.145)	0.114 (0.162)	-0.227 (0.379)
Capital account balance / GDP	0.013 (0.059)	-0.016 (0.067)	0.105** (0.046)	-0.461** (0.207)	-0.491** (0.208)	-0.750*** (0.210)	-0.400*** (0.150)	-0.415*** (0.142)	-0.586*** (0.203)	-0.616*** (0.220)	-0.931** (0.313)	-1.388 (0.937)
Ln(Domestic Credit / GDP)	0.082 (0.052)	0.083 (0.060)	0.126*** (0.027)	0.147** (0.068)	0.089* (0.073)	0.229*** (0.089)	0.143*** (0.051)	0.047 (0.050)	0.159* (0.082)	0.220*** (0.064)	0.103 (0.110)	0.376 (0.278)
Protestant religion [% of population in 1980]	-0.010** (0.005)	-0.008* (0.004)	-0.005 (0.006)	-0.006*** (0.002)	-0.002 (0.002)	0.003 (0.003)	-0.007*** (0.002)	-0.003 (0.002)	0.001 (0.002)	-0.012*** (0.002)	-0.005* (0.004)	0.002 (0.004)
Former French colony or protectorate	-1.202*** (0.331)	-1.514*** (0.407)	-0.477 (0.676)	-1.568*** (0.335)	-1.627*** (0.331)	-1.033* (0.612)	-0.935*** (0.238)	-0.868*** (0.226)	-0.869** (0.448)	-1.440*** (0.309)	-1.955*** (0.478)	-2.065 (1.702)
IMF/WB concessional aid / GDP, t0		-0.530** (0.223)	-0.362* (0.215)		-0.466*** (0.123)	-0.543*** (0.141)		-0.269*** (0.084)	-0.342*** (0.128)		-0.606*** (0.181)	-0.807 (0.561)
Prior adoptions, weighted by trade competition, t0			-0.004 (0.009)			-0.005 (0.005)			-0.002 (0.003)			-0.005 (0.008)
Adoptions within region, t0		-0.053 (0.058)	-0.068 (0.129)		-0.026 (0.025)	0.038 (0.037)		0.017 (0.017)	0.052* (0.031)		0.037 (0.036)	0.125 (0.095)
Regional cumulative adoption [%], t0		1.436** (0.561)	1.512* (0.849)		0.745** (0.310)	0.813** (0.380)		0.714*** (0.211)	0.661*** (0.251)		1.603*** (0.472)	1.564 (1.157)
Number of nations in regional risk set, t0		-0.021 (0.019)	-0.013 (0.029)		0.001 (0.007)	0.015* (0.009)		-0.008* (0.004)	0.007 (0.005)		-0.018* (0.010)	0.016 (0.017)
Prior adoptions, weighted by trade cohesion, t0			1.176 (2.032)			1.533* (0.906)			1.051* (0.618)			2.482 (2.200)
World-system position: Semi-periphery, t0		1.255** (0.636)	1.764** (0.857)		1.148*** (0.253)	2.239*** (0.331)		0.633*** (0.172)	1.235*** (0.296)		1.427*** (0.384)	2.933 (1.909)
World-system position: Periphery, t0		0.274 (0.589)	0.467 (0.705)		0.289 (0.257)	0.574** (0.284)		0.054 (0.172)	0.345** (0.169)		0.128 (0.363)	0.835 (0.673)
International Professional Finance Association, t0		0.456* (0.234)	0.790** (0.357)		0.373*** (0.106)	0.580*** (0.127)		0.216*** (0.073)	0.418*** (0.149)		0.489*** (0.157)	0.989 (0.656)
World-system position: Centrality in trade network, t0			0.005 (0.041)			0.005 (0.017)			0.018 (0.012)			0.044 (0.037)
Spatial AR				0.559*** (0.136)	0.496*** (0.056)	0.383*** (0.065)	0.374*** (0.008)	0.374*** (0.008)	0.374*** (0.168)	0.037 (0.055)	0.402*** (0.084)	0.475 (0.937)
Observations	581	581	371	581	581	371	581	581	371	581	581	371
Countries	51	51	34	51	51	34	51	51	34	51	51	34
Wald chi2   Log likelihood	164.54	235.31	434.34	-715.37	-685.14	-409.96	-763.57	-715.92	-419.71	-763.91	-716.45	-419.80
R square				0.418	0.498	0.522	0.390	0.467	0.538	0.395	0.477	0.536

Standard errors in parentheses. Robust standard errors for GEE regressions.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

AR(1) temporal error structure specified. Spatial autoregressive models ("spatial lag" models, Franzese & Hays, 2007) use region, trade cohesion and trade competition as respective W weights

Panel 4b. Market capitalization	GEE Population Averaged			Spatial Lag SAR (Region)			Spatial Lag SAR (Trade Cohesion)			Spatial Lag SAR (Trade Competition)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Equity market liberalized to foreigners	0.196 (0.167)	-0.001 (0.192)	-0.170** (0.077)	-0.109 (0.116)	-0.304** (0.130)	-0.328** (0.166)	0.12178 (0.079)	-0.177** (0.087)	-0.209** (0.101)	0.042 (0.028)	-0.057** (0.028)	-0.067 (0.049)
Years since exchange creation	0.134*** (0.026)	0.154*** (0.027)	0.109*** (0.028)	0.063*** (0.013)	0.093*** (0.013)	0.111*** (0.017)	0.054*** (0.009)	0.083*** (0.009)	0.086*** (0.012)	0.018*** (0.003)	0.026*** (0.003)	0.026* (0.015)
Ln(Population)	0.09 (0.098)	0.027 (0.144)	0.324 (0.243)	0.180*** (0.019)	0.205*** (0.020)	0.407*** (0.115)	0.141*** (0.019)	0.134*** (0.013)	0.246*** (0.059)	0.049*** (0.003)	0.044*** (0.005)	0.078* (0.047)
Ln(GDP/capita)	0.550*** (0.169)	0.467*** (0.160)	0.326 (0.203)	0.366*** (0.050)	0.395*** (0.053)	0.490*** (0.105)	0.346*** (0.032)	0.328*** (0.037)	0.353*** (0.055)	0.122*** (0.014)	0.107*** (0.013)	0.113* (0.062)
GDP Growth (%)	0.027* (0.016)	0.029* (0.015)	-0.008 (0.008)	0.036*** (0.011)	0.038*** (0.011)	0.007 (0.013)	0.020*** (0.008)	0.023*** (0.007)	0.003 (0.009)	0.007*** (0.003)	0.007*** (0.002)	0.001 (0.003)
Time strata (1990s = 1)	0.135 (0.086)	0.149* (0.085)	0.208** (0.083)	0.204* (0.108)	0.285*** (0.109)	0.135 (0.120)	0.04017 (0.075)	0.163** (0.073)	0.075 (0.077)	0.012 (0.026)	0.051** (0.024)	0.021 (0.028)
Former Soviet block	-1.136*** (0.328)	-1.480*** (0.490)	0.197 (0.346)	-0.343** (0.149)	-0.163 (0.212)	0.522* (0.286)	-0.783*** (0.082)	-0.472*** (0.149)	0.104 (0.180)	-0.275*** (0.031)	-0.154*** (0.048)	0.023 (0.060)
Trade openness [Ln(Trade/GDP)]	0.504* (0.298)	0.29 (0.272)	-0.447 (0.447)	0.724*** (0.035)	0.545*** (0.121)	0.997*** (0.249)	0.596*** (0.058)	0.375*** (0.080)	0.599*** (0.132)	0.209*** (0.017)	0.123*** (0.027)	0.193* (0.112)
Capital account balance / GDP	-0.206 (0.198)	-0.231 (0.205)	0.105** (0.046)	-0.138 (0.232)	-0.290 (0.235)	0.071 (0.230)	0.014448 (0.164)	-0.183 (0.158)	0.031 (0.151)	0.005 (0.057)	-0.059 (0.051)	0.008 (0.048)
Ln(Domestic Credit / GDP)	0.084 (0.108)	0.064 (0.093)	0.126*** (0.027)	0.147** (0.072)	0.255*** (0.079)	0.186* (0.096)	0.06237 (0.052)	0.159*** (0.053)	0.108* (0.068)	0.021 (0.018)	0.051*** (0.017)	0.034 (0.027)
Protestant religion [% of population in 1980]	0.008 (0.011)	0.014 (0.009)	-0.005 (0.006)	0.005** (0.002)	0.004 (0.003)	0.010*** (0.003)	0.000631 (0.002)	0.000 (0.002)	0.005*** (0.002)	0.000 (0.001)	0.000 (0.001)	0.002 (0.001)
Former French colony or protectorate	-0.100 (0.365)	-0.252 (0.323)	-0.477 (0.676)	-0.576 (0.361)	-0.641* (0.371)	-0.735 (0.764)	-0.205 (0.254)	-0.219 (0.250)	-0.462 (0.491)	-0.073 (0.089)	-0.073 (0.081)	-0.155 (0.176)
IMF/WB concessional aid / GDP, t0		-0.058 (0.321)	-0.362 (0.260)		-0.075 (0.135)	-0.512*** (0.157)		-0.018 (0.091)	-0.327*** (0.107)		-0.006 (0.029)	-0.103* (0.063)
Prior adoptions, weighted by trade competition, t0			-0.004 (0.009)			0.010* (0.006)			0.009*** (0.004)			0.002* (0.002)
Adoptions within region, t0		0.132* (0.075)	0.169* (0.100)		0.035* (0.021)	0.054* (0.031)		0.047*** (0.018)	0.010* (0.006)		0.015*** (0.006)	0.003 (0.006)
Regional cumulative adoption [%], t0		1.250* (0.642)	1.512* (0.849)		0.294 (0.331)	1.336*** (0.430)		0.495*** (0.225)	1.044*** (0.254)		0.160** (0.073)	0.334* (0.195)
Number of nations in regional risk set, t0		0.023 (0.017)	0.072 (0.026)		0.022*** (0.007)	0.075*** (0.010)		0.021*** (0.005)	0.053*** (0.006)		0.007*** (0.002)	0.016* (0.009)
Prior adoptions, weighted by trade cohesion, t0			1.176 (2.032)			7.958*** (1.133)			5.331*** (0.679)			1.696* (0.915)
World-system position: Semi-periphery, t0		0.107 (0.503)	1.764** (0.857)		0.346 (0.249)	0.542 (0.368)		0.184 (0.166)	0.265 (0.229)		0.061 (0.054)	0.094 (0.088)
World-system position: Periphery, t0		-0.028 (0.601)	0.467 (0.705)		0.307 (0.205)	0.068 (0.316)		0.123 (0.138)	0.048 (0.205)		0.042 (0.045)	0.026 (0.066)
International Professional Finance Association, t0		0.518** (0.233)	0.790** (0.357)		0.448*** (0.119)	0.722*** (0.146)		0.356*** (0.081)	0.548*** (0.116)		0.116*** (0.026)	0.175* (0.096)
World-system position: Centrality in trade network, t0			0.005 (0.041)			-0.011 (0.019)			0.002 (0.012)			0.001 (0.004)
Spatial AR				0.541*** (0.052)	0.421*** (0.047)	0.265*** (0.078)	0.374*** (0.010)	0.374*** (0.010)	0.374** (0.068)	0.781*** (0.006)	0.797*** (0.007)	0.800*** (0.104)
Observations	520	520	371	520	520	371	520	520	371	520	520	371
Countries	49	49	34	49	49	34	49	49	34	49	49	34
Wald chi2   Log likelihood	129.84	206.49	434.34	-691.42	-674.39	-400.96	-731.96	-691.85	-405.52	-728.27	-687.69	-401.93
R squared				0.456	0.541	0.632	0.487	0.555	0.643	0.477	0.556	0.645

Standard errors in parentheses. Robust standard errors for GEE models.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

AR(1) temporal error structure specified; Spatial autoregressive models ("spatial lag" models, Franzese & Hays, 2007) use region, trade cohesion and trade competition as respective W weights



Panel 4c. Market Liberalization	GEE Population Averaged Probit			SAR (Baysean Probit) (Region)			SAR Baysean Probit (Trade Cohesion)			SAR Baysean Probit (Trade Competition)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Equity market liberalized to foreigners												
Years since exchange creation	0.102*** (0.027)	0.134*** (0.034)	0.120*** (0.031)	0.064*** (0.016)	0.143*** (0.025)	0.114*** (0.028)	0.053*** (0.010)	0.082*** (0.011)	0.062*** (0.012)	0.135*** (0.030)	0.214*** (0.030)	0.164*** (0.034)
Ln(Population)	0.134 (0.127)	0.207 (0.186)	0.725 (0.444)	0.356*** (0.066)	0.474*** (0.106)	1.541*** (0.219)	0.143*** (0.032)	0.162*** (0.052)	0.608*** (0.101)	0.383*** (0.101)	0.433*** (0.151)	1.648*** (0.299)
Ln(GDP/capita)	0.136 (0.110)	0.146 (0.118)	0.713** (0.306)	0.274*** (0.084)	0.245** (0.112)	1.210*** (0.182)	0.152*** (0.045)	0.100** (0.054)	0.443*** (0.099)	0.407*** (0.140)	0.242** (0.151)	1.190*** (0.262)
GDP Growth (%)	-0.011** (0.005)	-0.01 (0.007)	-0.032*** (0.008)	0.015 (0.016)	0.016 (0.019)	-0.063** (0.030)	0.005 (0.007)	0.006 (0.008)	-0.027** (0.013)	0.014 (0.021)	0.016 (0.023)	-0.074*** (0.036)
Time strata (1990s = 1)	0.104*** (0.024)	0.141*** (0.037)	0.209*** (0.042)	0.607*** (0.145)	0.828*** (0.171)	0.918*** (0.209)	0.132* (0.082)	0.243** (0.093)	0.272*** (0.110)	0.312 (0.252)	0.605** (0.261)	0.697** (0.285)
Former Soviet block	0.606 (0.389)	-0.143 (0.468)	-1.224 (0.980)	0.155 (0.148)	0.355 (0.381)	1.187** (0.541)	0.375*** (0.088)	0.515*** (0.195)	0.660*** (0.264)	0.962*** (0.286)	1.368*** (0.509)	1.718*** (0.831)
Trade openness [Ln(Trade/GDP)]	0.333* (0.190)	0.36 (0.248)	1.389*** (0.393)	0.668*** (0.244)	0.283 (0.273)	2.689*** (0.523)	0.352*** (0.123)	0.113 (0.123)	1.151*** (0.234)	0.954*** (0.344)	0.371 (0.360)	3.055*** (0.707)
Capital account balance / GDP	0.018 (0.018)	0.016 (0.024)	-0.006 (0.069)	0.115 (0.361)	-0.266 (0.408)	-0.336 (0.471)	0.192 (0.177)	-0.053 (0.188)	-0.155 (0.222)	0.523 (0.527)	-0.100 (0.551)	-0.465 (0.607)
Ln(Domestic Credit / GDP)	-0.144 (0.146)	-0.041* (0.024)	-0.071** (0.029)	-0.122 (0.111)	0.030 (0.149)	-0.574** (0.237)	-0.081* (0.056)	0.004 (0.064)	-0.182** (0.117)	-0.202 (0.178)	0.020 (0.177)	-0.456 (0.290)
Protestant religion [% of population in 1980]	0.020** (0.009)	0.026** (0.010)	0.015 (0.012)	0.025*** (0.004)	0.028*** (0.004)	0.024*** (0.005)	0.013*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.034*** (0.006)	0.029*** (0.006)	0.028*** (0.007)
Former French colony or protectorate	1.884* (1.059)	1.518 (0.951)	-5.573*** (1.114)	3.152*** (0.584)	2.012*** (0.526)	-1.586 (1.501)	1.193*** (0.230)	0.867*** (0.233)	-0.864* (0.605)	3.244*** (0.783)	2.321*** (0.749)	-2.682* (1.749)
IMF/WB concessional aid / GDP, t0		-0.036 (0.024)	0.698* (0.411)		-0.233 (0.258)	-0.002 (0.321)		-0.077 (0.117)	-0.011 (0.159)		-0.251 (0.308)	-0.055 (0.392)
Prior adoptions, weighted by trade competition, t0			-0.024 (0.018)			0.011 (0.011)			0.004 (0.005)			0.010 (0.014)
Adoptions within region, t0		0.126 (0.091)	0.591** (0.285)		0.042 (0.044)	-0.318*** (0.071)		-0.003 (0.022)	0.123*** (0.036)		-0.002 (0.063)	0.325*** (0.105)
Regional cumulative adoption [%], t0		2.100** (1.005)	2.921* (0.0714**)		1.997*** (0.603)	3.764*** (0.772)		1.454*** (0.310)	1.933*** (0.361)		3.842*** (0.820)	5.169*** (1.083)
Number of nations in regional risk set, t0		0.063** (0.024)	0.071** (0.033)		0.032*** (0.013)	0.072*** (0.018)		0.024 (0.006)	0.034*** (0.008)		0.065*** (0.016)	0.095*** (0.024)
Prior adoptions, weighted by trade cohesion, t0			3.118 (4.037)			7.178*** (1.934)			2.245** (1.062)			5.529** (2.863)
World-system position: Semi-periphery, t0		2.059** (0.805)	4.180*** (1.312)		2.444*** (0.488)	3.479*** (0.807)		0.971 (0.217)	1.711*** (0.378)		2.549*** (0.630)	4.690*** (1.092)
World-system position: Periphery, t0		0.899 (0.845)	0.772 (0.909)		1.629*** (0.489)	0.377 (0.668)		0.549*** (0.223)	0.311 (0.305)		1.408** (0.648)	0.868 (0.845)
International Professional Finance Association, t0		0.842** (0.428)	0.301 (0.596)		0.600*** (0.210)	0.176* (0.173)		0.268*** (0.103)	0.012 (0.130)		0.708*** (0.276)	0.060*** (0.415)
World-system position: Centrality in trade network, t0			-0.089 (0.075)			-0.172*** (0.140)			-0.064*** (0.019)			-0.175 (0.055)
Spatial AR				0.794*** (0.030)	0.483*** (0.074)	0.513*** (0.075)	0.500*** (0.000)	0.500* (0.000)	0.500*** (0.000)	0.486*** (0.018)	0.473*** (0.019)	0.470*** (0.024)
Observations	606	606	371	606	606	371	606	606	371	606	606	371
Countries	52	52	34	52	52	34	52	52	34	52	52	34
Pseudo R square				0.57	0.90	0.95	0.66	0.84	0.90	0.57	0.79	0.86
Wald chi2	47.71	222.5	1413.92									

Standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

AR(1) temporal error structure specified. Probit autoregressive models use Bayesian procedure (LeSage, 1999)

## APPENDIX A: Variable Descriptions

Variable	Measurement	Data Sources
Creation of first domestic stock exchange	The date adoption is the first day of trading on a new exchange. Excluded: options exchanges, exchanges without legal provision for trading equities, countries where exchanges existed prior to independence.	<i>Handbook of world stock, derivatives and commodity exchanges</i> 1992-2006, 1992: Blackwell; 1998-1999: International Financial Publishers; 2000 on: MondoVisione, online
Number of domestic companies listed	Domestically incorporated companies listed on the country's stock exchanges at the end of the year. Excludes bonds, investment companies, mutual funds, or other collective investment vehicles. Excludes foreign companies.	<i>Word Development Indicators</i> Database 2007, Primary sources: <i>Standard &amp; Poor's, Emerging Stock Markets Factbook</i>
Market capitalization in % of GDP	Share price times the number of shares outstanding for all listed domestic companies. GDP is at market prices in current US\$.	<i>Word Development Indicators</i> Database 2007, Primary sources: <i>Standard &amp; Poor's, Emerging Stock Markets Factbook</i> ; GNP: <i>World Bank and OECD GDP estimates</i> .
Exchange liberalized to foreign investors	Formal (regulative) liberalization of equity markets, defined as giving "foreign investors the [unrestricted] opportunity to invest in domestic equity securities" (Baekert et al., 2005: 4). Binary variable.	Dates as reported in appendix A of Baekert et al. (2005); supplemented for additional countries from country chronologies available online: <a href="http://www.duke.edu/~charvey/Country_risk/couindex.htm">http://www.duke.edu/~charvey/Country_risk/couindex.htm</a>
Population	Natural logarithm of a country's population.	<i>Word Development Indicators</i> Database 2007
GDP per capita	Gross National Product at current US\$ prices divided by mid-year population.	<i>Word Development Indicators</i> Database 2007
GDP growth	Percentage annual growth in GDP.	<i>Word Development Indicators</i> Database 2007
Time strata	Dummy variable coded as 1 if year $\geq 1990$ and $< 2001$ , 0 otherwise.	
Former Soviet bloc	Countries include newly independent states of the former Soviet Union, and its sphere of influence, inc. members of the Warsaw Pact, Cuba, Mongolia, North Korea and Vietnam.	CIA World Factbook, own coding.
Trade openness, Foreign trade / GDP	Ratio is the sum of exports and imports of goods and services measured as a share of gross domestic product.	<i>Word Development Indicators</i> Database 2007
Capital account balance / GDP	Total credits less debits for capital transfers and non-produced non-financial assets divided by gross domestic product. IMF/balance of payments definition.	<i>Word Development Indicators</i> Database 2007
Domestic credit / GDP	Domestic provided to the private sector divided by gross domestic product. Credit to private sector includes loans, purchases of non-equity securities, trade credits and other repayable accounts receivables.	<i>Word Development Indicators</i> Database 2007
% of population of Protestant religion	Percentage of total population in 1980 that is member of a Protestant Christian church.	LaPorta et al. 1999, data appendix (primary sources: UN, CIA)

French colonial history	Country was part of the French colonial empire or a French protectorate prior to independence. If several colonial powers occupied a territory, we coded the latest before full independence.	CIA World Factbook, 2006, own coding
Level of political democracy	A country's score on the democracy scale minus its score on the authoritarian scale in the Polity IV database. The 10 point scales are composites taking into account constitutional and actual checks and balances and access political participation.	Polity IV (2004) Database at University of Maryland's Center for International Development and Conflict Management: <a href="http://www.cidcm.umd.edu/polity/">http://www.cidcm.umd.edu/polity/</a>
Ideology of country rulers	Ideology (left, center, right) of the country's largest party in government and its executive leader. Left ideology coded as 1, right ideology as -1, both scales added.	Polity IV (2004) Database at University of Maryland's Center for International Development and Conflict Management: <a href="http://www.cidcm.umd.edu/polity/">http://www.cidcm.umd.edu/polity/</a>
Concessional IMF and WB aid / GDP	Disbursements of loans and credits at a concessional rate by the IMF or World Bank. Concessional loans are commonly linked to structural and policy reforms, unlike non-concessional finance that principally meet balance of payment needs. GDP as above.	<i>WDI</i> database (World Bank Global Development Finance data)
Adoptions by competing nations	Competition is the correlation between the aggregate import and export shares of each pair of countries across all trade partners. Country level data; see Lee & Strang (2006).	United Nations COMTRADE database.
Adoptions by nations in same region	Number of adoption events in the region in the past 3 years. Regions coded as defined by the World Bank. Adoption events as above.	<i>WDI</i> database for region coding.
Regional cumulative adoption	Percent of countries with a stock exchange in a region. Regions coded as defined by the World Bank. Adoption events as above.	<i>WDI</i> database for region coding.
Size of regional risk set	Number of countries in the regional risk set. Countries enter with independence and exit through dissolution or the creation of an exchange.	<i>WDI</i> database for region coding.
Adoptions by nations w cohesive trade relationships	Trade cohesion is the ratio of imports from the influencing country to all imports received by the influenced country; see Polillo & Guillén (2005).	United Nations COMTRADE database.
World system position	Binary coding as core, semi-periphery, periphery based on van Rossem's (1996: 515) categorization based on trade and political ties. Periphery included periphery 1 and 2 in van Rossem. Cross-sectional variable for 1993.	Van Rossem (1996)
International Professional Finance Association (IFA)	Presence of one or more international professional financial associations headquartered in a country, e.g., World Federation of Exchanges, Ass. of Arab Finance Professionals, Fin. Executives International.	<i>Yearbook of International Associations</i> . Annual 1980-2005. Union of International Associations.
World system trade centrality	Standardized closeness centrality in network of international trade flows. Trade ties = volume of imports + exports with another country as % of focal country GDP if is $\geq 1\%$ of GDP.	<i>Trade Analysis System</i> ; Webstract database (World Bank, IMF data), Years: 1980-2004