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Competing Risks Analysis and Deposit Insurance Governance

Convergence

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Abstract

Working draft. Comments welcome.

Why do policies often seem to converge across countries at the same time? This question has been studied extensively in the diffusion literature. However, past research has not examined complex choice environments, especially where there are many alternatives. My paper aims to fill this gap in the literature. I show how Fine and Gray Competing Risks Event History Analysis can be used to tease apart the causes of policy convergence. I apply the method to an examination of the reasons why, from the mid-1990s to 2007, many countries created independent deposit insurers. I find an interaction between international recommendations and regional peers' choices, particularly in the European Union. However, convergence appears to slow under the particular conditions of a banking crisis, regardless of how well independence was promoted. Possibly due to electoral incentives democracies seem to have been more likely to create independent insurers. Ultimately, I demonstrate how competing risks analysis can help enable future research on policy choices, complementing methods previously applied in political economy.

Keywords: international policy diffusion, competing risks analysis, delegation, banking crisis, IMF, deposit insurance

Why do policies often seem to converge across countries at the same time? Do the circumstances of individual countries just happen to incline policymakers to make the same choices? Or are countries concurrently

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influenced by common external experiences, such as trade relations, the involvement of international organisations, and so on? These questions have been addressed empirically many times before on a range of policies such as pensions (Brooks, 2005), stock exchanges (Weber, Davis and Lounsbury, 2009), bilateral trade agreements (Elkins, Guzman and Simmons, 2006), and regulatory independence (Gilardi, 2005). All of these studies have looked at ‘either/or’ policy choices made in isolation. But how can we determine the reasons for policy convergence when (a) there are multiple policy alternatives to choose from and (b) choices on different, but necessarily related issues are made simultaneously? The case of deposit insurance (DI) illustrates the difficulty of understanding policy convergence: deposit insurers can be run by at least three types of actors—the ministry of finance (MoF), the central bank (CB), or an independent agency.¹

Considering that governance choices were a factor in many countries’ initial decisions to adopt deposit insurance, how can we determine why countries nonetheless converged on independent governance beginning in the mid-1990s? This is an especially thorny issue since governance choices were almost always part of decisions to create deposit insurance for the first time. Such problems have not been addressed empirically in the political economy literature, especially diffusion research, though they plague any attempt to examine the causes of variations between new policies and institutions. In this paper I aim to push the methodological boundaries of current policy convergence research by examining DI governance choices.

The current boundaries are defined by the policy diffusion literature’s event history analysis (EHA) “toolkit” (see Brooks, 2005, Elkins, Guzman and Simmons, 2006, Gilardi, 2005, Lee and Strang, 2006, Shipan and Volden, 2008, Strang and Tuma, 1993, Weber, Davis and Lounsbury, 2009). The toolkit is focused on single transitions, i.e. why a choice is made or not, and is particularly strong for examining effects in cross-sectional time-series data (Box-Steffensmeier and Jones, 2004). Though successfully applied to many policy areas, some of which I cited above, it is inadequate when examining decisions that involve more than one mutually exclusive alternative, such as deposit insurance governance. Governance choices were also attached to decisions to create insurance in the first place. Given EHA’s limitations, how can we identify the reasons for choosing a specific governance style from those influencing decisions to create deposit insurance in general?² Some initial work has tried to tackle situations with multiple choices made in isolation (see Brooks, 2007,

¹I treat central bank control as distinct from the other two. It shares characteristics with both independent and MoF control. Generically, it can be independent from political decision-makers, but also tends to be a well established institution with significant financial resources like the ministry of finance. I do not examine central bank controlled deposit insurance in detail. I only treat it as a competing risk (see below). Results from estimation models with central bank governance as the choice of interest are available from me upon request.

²Other authors, particularly Demirgüç-Kunt, Kane and Laeven (2008), have looked at why countries create explicit deposit insurance, with any type of governance using Single Transition EHA. In this paper I corroborate many of their findings. They also examined the reasons that DI was administered “officially” or privately. Some of their results, crisis for example, don’t directly match my findings. However, their coding of official administration differs significantly from mine.

Jones and Branton, 2005). In this paper I aim to expand the application of the EHA toolkit by showing how Fine and Gray (1999) Competing Risks Event History Analysis (FG-CREHA) can be used to examine complex choice environments. It is already widely used in epidemiology (see Pintilie, 2007, Bakoyannis and Touloumi, 2011) and is relatively easy to implement.³

In section 1 I show how from the mid-1990s countries converged on independent DI. I use a data set of 174 countries and territories from the 1930s to 2007.⁴ In section 2 I lay out competing hypotheses for why countries adopted certain actors to run their first explicit insurers. The first set of hypotheses focuses on domestic factors and assumes policymakers had fairly solid information about what type of DI governance would achieve their goals. The second set assumes that decision-makers rely on information provided by international actors in the form of “best practice” recommendations. Section 3 discusses how FG-CREHA is preferable for examining these hypotheses. Finally, in section 4 I discuss the results. I find an interaction between international recommendations and regional peers’ choices that influences a country’s chances of creating an independent insurer, particularly in the European Union. However, convergence appears to slow under the particular conditions of a banking crisis, regardless of how well independence was promoted. Possibly due to electoral incentives democracies seem to have been more likely to create independent insurers. Ultimately, I demonstrate how competing risks analysis can help enable future research on policy choices, complementing methods previously applied in political economy.

1 Identifying a Potential Diffusion Process

For much of the 20th century deposit insurance as an explicit program was adopted intermittently. The adoption rate, however, has increased over the past 30 years. In this section I establish the fact that independent deposit insurance, separate from explicit DI in general, went from being an intermittently adopted governance type to being the dominant international trend. The finding indicates that diffusion processes may have played a significant role in causing individual countries to choose the same governance structure around the same time (see Simmons and Elkins, 2004). As such, the finding motivates me to focus on a diffusion approach for understanding DI governance choices.

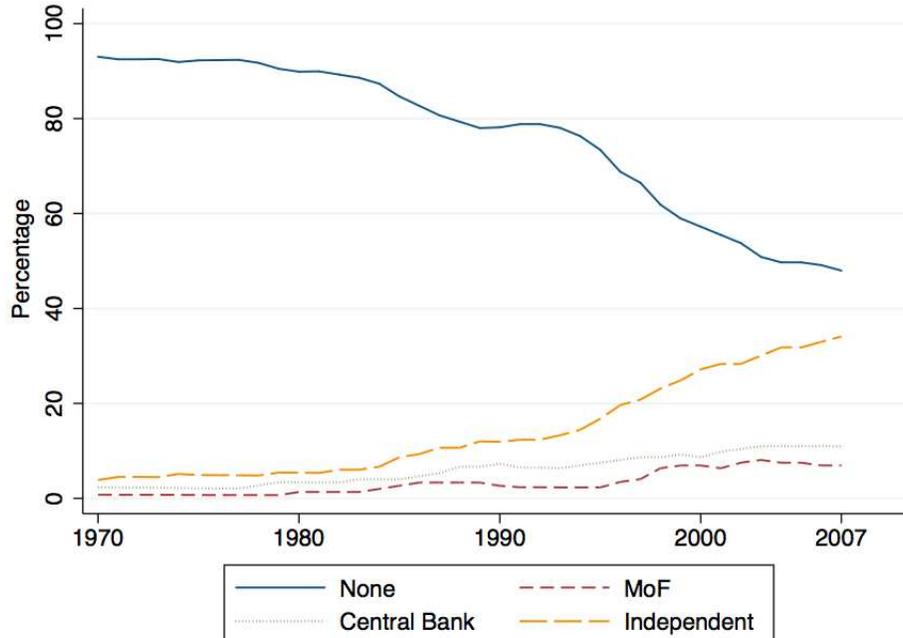
The United States began one of the first national systems of explicit DI in the early 1930s (Grossman, 1992, 801). The system was operationally independent,⁵ and from the 1930s to the 1980s it worked fairly

³It can be implemented in Stata 11 or higher with the `stcrreg` command and R’s `timereg` package.

⁴Due to covariate data availability I narrowed the sample to 70 countries observed between 1984 and the end of 2007 in the final analyses.

⁵Before the 1980s two organisations—the Federal Deposit Insurance Corporation (FDIC) and Federal Savings and Loan

Figure 1: Prevalence of Explicit Deposit Insurance Governance Types in 174 Countries (1970-2007)



For a geographical visualisation of these trends over time see: http://christophergandrud.blogspot.com/2011_04_01_archive.html.

The full and constricted (see below) samples of countries and their respective DI governance-type from 1970 used in this paper are available at: http://dl.dropbox.com/u/12581470/DI_Map/Deposit_Insur_2011%20copy.dta.

well. Though banks failed, no insured deposits were lost and there has never been a repeat of the 1930s bank runs (Grossman, 1992, 802). Despite this success, by the end of 1979 only 17 countries had DI (Demirgüç-Kunt, Karacaovali and Laeven, 2005). There was considerable variety in governance among this group. Two systems were operationally independent (those of the United States and Norway). A number of the countries, such as Lebanon in 1967 and the Netherlands in 1978, created DI run or controlled by the central bank. The Dominican Republic created ministry of finance-controlled DI in the early 1980s. From approximately 1980 until 2008 the prevalence of DI increased considerably, with each governance style’s relative prevalence remaining proportionally constant. However, from the mid-1990s the proportion of countries with independent DI began to increase substantially, while the other types’ relative prevalence remained constant (see Figure 1).⁶

It is important at this point to make a quick note about data. Between 1980 and the 2008/09 financial Insurance Corporation (FSLIC)–insured deposits. The latter was dismantled in 1989. The organisations were governed by independent boards comprised of members from both major political parties who were appointed by the President with approval of the Senate

⁶Data is based on a sample of program descriptions in 166 countries by Demirgüç-Kunt, Karacaovali and Laeven (2005). The author coded the programs, expanded the sample to 174 countries, and extended it through 2007 using relevant national organisations’ websites.

crisis, once a country established an explicit deposit insurer it tended not to alter the governance structure.⁷ Jurisdictions transitioned from one form of explicit governance to another only five times (about 6 percent of all transitions).⁸ For this reason, I confine my theoretical arguments and empirical investigation to governance choices for jurisdictions' initial explicit DI programs in order to achieve empirically meaningful results. My focus is on variation and convergence in *new* institutions, and does not include transitions by existing institutions.

2 Policy Diffusion or Not

In this section I present a number of possible explanations for convergence on independent DI, including non-diffusion domestic economic-political causes, as well as diffusion-based theories that largely assume policymakers gather information about the effects of governance choices from non-domestic actors. These include crisis diffusion, regional peer diffusion, competition for deposits, and coercion. In the following sections I test the theories' empirical validity against each other using FG-CREHA.

2.1 Domestic Causes

The first two theories focus on domestic political economy causes of choosing one type of governance over the others. They implicitly assume that any multi-country convergence trends are largely coincidental.

2.1.1 Moral Hazard, Democracy, and Delegation

Independence may help deposit insurance systems maintain banking system stability while avoiding a number of problems—crises, high resolution costs—that can be caused by guaranteeing deposits. Policymakers in democracies may be more likely to delegate DI, because they have incentives to prevent crises and keep resolution costs low.

A major cause of banking crises is what Friedman and Schwartz (1963) called the “contagion of fear”. Individual bank failures can cause depositors at other banks to withdraw their money out of fear that their bank will also collapse soon. This leads to bank runs, which tend to spread extremely fast and have huge costs for a county's economy. Kaufman argues that bank failure contagion—defined as spillover “effects of shocks from one or more firms to others”—are faster, spread more broadly, and tend to result in larger losses

⁷With a few exceptions, some detailed below, this remains true to the present.

⁸For example, Argentina disbanded its central bank controlled system in 1991 in a major banking system overhaul as part of a transition to democracy. In 1995 it introduced an independently administered system (Demirgüç-Kunt, Karacaovali and Laeven, 2005, 57).

in the banking sector as well as the macro-economy than contagion in other industries (1994, 124). Deposit insurance can prevent this behaviour by separating the probability of deposit loss from bank solvency. Depositors don't need to run on their bank if they think it might fail, because their money is safe regardless. However, this separation creates moral hazard, (Diamond and Dybvig, 1983, Grossman, 1992) as depositors no longer have an incentive to make deposit decisions based on the likelihood of solvency.⁹ Banks may therefore increase the riskiness of their lending since they will not lose deposits when they make risky, high yield loans. Stability is actually undermined.

There are many ways to tailor an explicit DI program to minimise moral hazard while also gaining the positive public benefits of deposit insurance, including limiting coverage and closely regulating lending risks¹⁰ (see Grossman, 1992, Demirgüç-Kunt and Detragiache, 2002). Governance type may play an important role in ensuring the effectiveness of these measures by changing how susceptible the insurer is to pressure from deposit banks.

Banks have an interest in DI with few limits, since this allows them to capture risk premiums without worrying about losing the deposits needed to make risky loans. They also have an interest in deposit insurance being directly linked to the public budget, e.g. ministry of finance control, rather than limited to a fund that they contribute towards. If a bank does fail it will be the public that pays rather than the banking sector. Put another way, moral hazard can be decreased if deposit guarantee payouts are linked directly to banks and are separated from the general public budget or even the central bank's funds. This creates a separation between bank failure and deposit loss, but not bank failure and banking sector loss due to risky lending. For deposit insurance to work in the public good, preventing bank runs and moral hazard, it must be able to credibly maintain long-term limits on risky lending despite private bank pressure to do otherwise.

A wide body of literature argues that delegated institutions are better able to make these credible commitments (see Kydland and Prescott, 1977, Thatcher, 2002). A number of International Monetary Fund (IMF) pieces, among others, argue that deposit insurers should be independent of politicians and the banking industry to avoid conflicts of interest (Garcia, 1996, 1997, 1999, 2000). Political actors and others with ties to the banking industry could be persuaded by the banking sector in a cronyistic fashion (see Rosas, 2006, Satyanath, 2006) to loosen measures that decrease moral hazard. Independent agencies may be less vulnerable to such pressure.¹¹

⁹Though there is some evidence that depositors actually do discipline banks even in the presence of deposit insurance (Martinez Peria and Schmukler, 2001).

¹⁰Many deposit insurers, such as the FDIC, also have regulatory powers.

¹¹I generally do not make a distinction between independent public and private deposit insurance schemes, which may be a

Certain factors may incline a government to delegate and separate their DI in order to credibly minimise public costs at the expense of private gain. Rosas (2009) argues that democracies are more likely to institute measures that minimise the public costs of banking crises. Democratic politicians cannot rely on just the support of one group, such as the banking sector, but have to make policy in the interests of a wider proportion of the population to get re-elected. This leads to the hypothesis:

H_{Dem} Democracies are more likely than autocracies to create independent deposit insurers.

How can this theory explain the increase of independent deposit insurers from the mid-1990s? It could be that the number of democracies simply increased over this period following events such as the collapse of the Soviet Union.

2.1.2 The MoF and Credibility

There are reasons other than autocracy or crony capitalism that a government may retain direct control over an explicit deposit insurance program. Deposit guarantees are different from other economic policy areas where authority has been delegated, such as regulation or monetary policy. Insuring deposits in a time of uncertainty and fear, such as a banking crisis, involves more than simply demonstrating credible limits on moral hazard. In a crisis, guarantee payouts must be credible to prevent bank runs (Diamond and Dybvig, 1983, Laeven and Valencia, 2008). Depositors need to believe that they will actually get their money back if a bank fails. Delegated insurers created before a banking crisis may have time to establish reserve funds that are large enough to reassure depositors. However, if such a fund has not been created by the start of a crisis, only national fiscal resources appear to be adequate. Credibly signaling the ability to use fiscal resources would likely require control by the ministry of finance.

There are numerous examples of ministries of finance being turned to in banking crises to reassure depositors. During its 1997 crisis, the Indonesian Ministry of Finance established a deposit guarantee financed and controlled directly by the government. This preceded the establishment of an independent insurer in 2005. From 2006, Hong Kong had an independent deposit insurer, but in 2008 the Financial Secretary and the Hong Kong Monetary Authority—the MoF and the central bank—introduced guarantees backed by the Exchange Fund (government reserves) for the full value of deposits, rather than just a portion of them. Though this was to be administered by the deposit insurer, the decision and the funds to credibly commit to the new level came from outside.¹² Despite having an independent insurer, the government

relevant distinction for this theory.

¹²From an interview I conducted with Holly Tang of the Hong Kong Monetary Authority in March 2010.

appears to have believed that general fiscal resources were necessary to credibly reassure depositors during a potentially large banking crisis. In 2008, Sweden went a step further, asserting MoF control over its previously independent deposit insurer in the belief that credible deposit insurance during a crisis requires direct control by fiscal actors.¹³ This leads to the hypothesis that:

H_{Fiscal1} Countries in banking crises are more likely to establish MoF controlled deposit insurance, if they haven't already created a scheme by the beginning of the crisis.

A second hypothesis can also be used to test the theory more generally. The problem of establishing credibility in a new DI scheme is rooted in the potential cost of payouts if banks fail. This problem should be acute and present even in non-crisis times in countries whose banking sectors are very large relative to their overall economies. Thus, the second hypothesis:

H_{Fiscal2} Countries whose banking sectors are very large relative to the overall economy are more likely to govern new deposit insurance programs through the ministry of finance.

The two preceding hypotheses clearly cannot explain the independence trend, but may have instead mediated it.

2.2 Policy Diffusion

The hypotheses thus far have assumed that actors know which governance style is optimal. The following hypotheses assume that information about optimal governance policies is not fully known to all actors at all times. Instead, information and the incentives to incorporate it into policy are diffused through interactions between countries and with international actors.¹⁴ These processes are particularly plausible for deposit insurance governance. Given that there are many deposit insurance design variations that may affect financial system stability and public costs, it is difficult to actually identify what role governance plays. How can actors identify which governance style is actually optimal (Powell and DiMaggio, 1991, March and Simon, 1993)? To date there is a very ambiguous empirical relationship between DI governance type as described here and banking crises. No systematic studies have been done on the issue to my knowledge¹⁵ and a

¹³The reason given for this move was that “the [former deposit insurer], like other small authorities, was deemed too vulnerable in the event compensation had to be paid, and it was determined that its operations should therefore be managed by a larger authority” (Insättningsgarantin, 2010).

¹⁴A number of studies (for example Gilardi and Füglistler, 2008, Volden, 2006) have looked at how actors within countries can learn from sub-national jurisdictions. However, with the exception of the United States, which is not included in the following analysis, and a handful of federal countries these processes seem implausible for deposit insurance in this paper's observation period given that it was generally a brand new policy.

¹⁵The first systematic study of the effects of deposit insurance in general was only conducted in 2002 (Demirgüç-Kunt and Detragiache, 2002, Demirgüç-Kunt and Kane, 2002). These analyses did conduct a preliminary investigation comparing “official”

summary examination of governance type and banking crises using data from this paper in 70 countries finds no correlation between the two. Though this is certainly not definitive, it is clear that countries in the 1990s and 2000s probably did not have complete information to suggest a particular DI governance choice was generally optimal.

Despite an accumulation of empirical evidence that DI delegation minimises moral hazard and prevents crises, in the mid-1990s and early 2000s prominent international organisations began to strongly recommend independence as best practice. Beginning in the mid-1990s IMF staff economists, particularly led by senior staff economist Gillian Garcia, began to recommend that insurers be operationally independent from banks, political actors, and the central bank as a way of preventing the “pitfalls” of guaranteeing deposits. These included agency problems and moral hazard (Garcia, 1996, 1997, 1999, 2000).¹⁶ The recommendation was adopted into the World Bank/IMF’s Financial Sector Assessment Program when it began in 1999. Eventually, the recommendation would become Principle 5 of the International Association of Deposit Insurers’ (IADI)¹⁷ 2009 Core Principles for Effective Deposit Insurance Systems. These recommendations are correlated in time with the emergence of independence as the predominant type of governance in the mid-1990s. What causal mechanisms might explain this relationship?

2.2.1 Regional Peer Diffusion

Policymakers may be influenced by their regional peers to adopt a given policy. This process can work through a variety of specific mechanisms (see Brooks, 2005, 280-281). One could be competition, discussed below. Another is a learning process where policymakers use the experience of their peers to help identifying optimal policies (Linos, 2011, Meseguer, 2005, Simmons and Elkins, 2004, Volden, Ting and Carpenter, 2008). Regional peers may provide a useful sample of similar countries’ experiences to learn from. The most simplistic observation we would expect to make is:

$H_{DRegion1}$ Countries are more likely to adopt a certain type of deposit insurance governance as the proportion of prior adopters in its region increases.

The hypothesis is fairly neutral in that any governance type could become more likely to be adopted in a region where more countries adopted it. It is indistinguishable from a pure emulation model (Simmons and

to private management and found a positive relationship between official management and the incidence of crises. However, they did not distinguish between different forms of official management, particularly MoF and CB. Most other research up to that point had examined individual country experiences (for example Milhaupt, 1999).

¹⁶It is beyond the scope of this paper to determine why this recommendation was made. For research on ideational change in the IMF, for example, see Chwieroth (2010).

¹⁷The IADI was formed in 2002.

Elkins, 2004) and leaves open the question of why this learning or emulation process would start in the first place.

Perhaps an interaction between peers and best practice recommendations could explain these issues. The independence recommendation, may have acted as a frame (Tversky and Kahneman, 1981, 1986) that focused actors attention, especially since it was made by such prominent policy actors as IMF staff economists, and drew on the dominant contemporary economic governance paradigm of independence (McNamara, 2002). However, unlike in the pure emulation model, decision-makers may have been hesitant to adopt independent DI before seeing how well it applied to their circumstances. Regional peers that adopted the best practice policy might have provided useful information on how well it worked. Policymakers may have been using an informal Bayesian process to learn from these two pieces of information. Best practice recommendations serve as policymakers' informative priors, which they update with the experience of regional peers. Policymakers may have electoral or credibility incentives to adopt best practice priors. They can claim that policies were "vetted" and negative consequences legitimately unforeseen (Linos, 2011, 681). Over short time horizons, the fact that a growing proportion of peers are adopting a policy without major discernible negative consequences¹⁸ may be the best new information they can obtain, further bolstering both their understanding and legitimacy claims. As more peers adopt a policy, more actors may consider it to be successful. This leads to the hypothesis that:

$H_{DRegion2}$ Countries are more likely to adopt a certain type of deposit insurance governance as the proportion of adopters in its region increases *and* when it is promoted as best practice.

Beyond simple geographical groups, some formal regional organisations, such as the European Union, may be particularly good samples for decision-makers to draw on. In 1994 the European Union created the directive on deposit insurance. Though it did not have a governance requirement, Gilardi (2005) has argued that the EU can push specific ways of implementing a directive either by limiting policy choices or framing expectations about policy outcomes.

H_{DEU} From 1994 EU members and candidate countries are more likely to adopt independent deposit insurance.

¹⁸This is a reasonable assumption for the time-period examined here since the number of banking crises globally actually fell substantially from the mid-1990s to 2007 (Reinhart and Rogoff, 2010, 21).

2.2.2 Competition

In open capital markets, depositors may choose which bank to place their deposits in based on the qualities of the jurisdiction where it resides. Countries can compete for depositors through deposit insurance. Depositors are probably most attracted by countries with high guarantees.¹⁹ This possibly explains the existence of explicit deposit insurance and the level of guarantees, but how might it affect governance choices?

The level of guarantees may not only influence depositors, but also the soundness of the banking system. Though guarantees are useful if a crisis occurs, it is reasonable to assume that depositors would prefer to avoid crises in the first place. There are a number of costs incurred by depositors during bank insolvencies, even if their money is eventually returned. Primarily, this involves the opportunity costs of illiquid deposits during bank restructuring and, for foreign depositors, the difficulty of making an insurance claim in another country. Therefore, deposits should flow to countries with a low perceived propensity for banking crises. One way for depositors to determine this probability is to look at the quality of a country's public financial institutions. As discussed above, delegated deposit insurance became best practice, i.e. perceived most likely to promote banking stability, from the mid-1990s. Therefore from this point, countries wishing to retain and gain deposits in an internationally competitive environment would adopt policies that depositors believed to prevent crises (see Brooks, 2005, for a general discussion):

H_{DComp} Countries with internationally open deposit banking sectors are more likely to adopt independent deposit insurance from the mid-1990s.

Clearly if investors had perfect information about the relationship between DI governance and crises, the relationship between competition and adoption would be constant overtime. The increase in independence would simply be the result of increasing openness.

2.2.3 Crisis Diffusion

Decision-makers may be especially open to recommendations when policies have failed. If a country experiences a systemic banking crisis, the status quo policy has demonstrably failed to achieve economic stability. Most political actors would be uncertain about how to return to stability. Best practice recommendations help to overcome uncertainty by suggesting plausible ways to re-achieve economic stability. When such recommendations appear to be the best alternative, actors' preferences will converge around them, and they will be more likely to be adopted (Blyth, 2002, Windmaier, Blyth and Seabrooke, 2007). One possible example

¹⁹For example, during the 2008/09 crisis many depositors in the United Kingdom shifted their funds to Irish banks after the government there created unlimited guarantees.

is the rapid adoption of independent DI in Latin America in the 1990s. As reported by the Inter-American Development bank, countries (for example, Argentina suffering from the tequila crisis) designed their deposit insurers according to “international best practice” (IDB, 2004, 105), i.e. made them independent. So:

$H_{DCrisis}$ Countries experiencing banking crises will be more likely to create independent deposit insurers *after* it has been promoted by as best practice, i.e. from the mid-1990s.

2.2.4 Coercion

As mentioned earlier, the IMF promoted independent deposit insurance. Did it go beyond general promotion to force or at least directly influence countries to create independent insurers? The IMF can directly influence deposit insurance policies with conditions on crisis loans (Vreeland, 2003). In the 1990s deposit insurance was a regular part of the IMF’s crisis-management advice (Demirgüç-Kunt, Kane and Laeven, 2008, 412). Conditions about changes to deposit insurance programs in general were often written into loan agreements. However, in these unstable circumstances, the IMF actually promoted ministry of finance control.

Though many of the relevant documents, such as stand-by agreements, are not widely available,²⁰ some indicate that the IMF did not promote independent deposit insurance for unstable countries without prior deposit schemes. Instead, they seem to have supported MoF control during the actual crisis. For example, Thailand’s 14 August 1997 letter of intent for a stand-by agreement indicates that a guarantee program should be created through the MoF in order to restore depositor confidence. Thailand created its first DI program in 1997 and the MoF controlled it. Later, it was made independent. Building on such examples it is expected that:

$H_{DCoerce}$ Countries that sign IMF stand-by agreements are more likely to create new ministry of finance controlled deposit insurers.

3 Empirical Model

To test these hypotheses I chose an empirical model that could accommodate a number of issues. These include (a) covariate values that may vary over time, (b) countries that do not adopt any form of explicit deposit insurance by the end of the observation period, i.e. right censoring, and uniquely up to this point in the diffusion literature (c) the likelihood of adopting one form of deposit insurance governance given the existence of three choices and their co-incidence with a common choice. In this section I justify the model

²⁰Electronic publication requires individual country agreement.

I chose—a Fine & Gray Competing Risks Event History Analysis—as the best able to address these issues. I also discuss the variables.

3.1 Traditional EHA in Policy Diffusion Studies

Many recent studies of policy diffusion have utilised EHA to test theories of why policy adoption rates change over time (see Brooks, 2005, Simmons and Elkins, 2004, Elkins, Guzman and Simmons, 2006, Weber, Davis and Lounsbury, 2009). In these studies, policy adoption choices are modeled as dichotomous responses. Unit i can choose to adopt policy k or continue without it. The diffusion literature is generally concerned with convergence at certain periods of time. EHA is used because it directly models time by focusing on the time it takes before a unit experiences an event,²¹ such as the adoption of some policy k . This is modeled primarily through the hazard rate $h(t)$; the instantaneous rate of an event k occurring by time t conditional on both the event not occurring by time t and the values of a unit i 's covariates. Formally:

$$h(t|\mathbf{x}_i) = \lim_{\Delta t \rightarrow 0} \frac{\Pr(t \leq T_k \leq t + \Delta t | T_k \geq t, \mathbf{x}_i)}{\Delta t} \quad (1)$$

where T_k is the time that event k occurs during some time interval $[t, t + \Delta t]$ conditional on the values of a unit's covariates \mathbf{x}_i (Cleves et al., 2004, 7).

It is common in diffusion studies to use Cox's (1972) Proportional Hazards (PH) event history model. The Cox PH hazard rate for the i th unit is given by:

$$h(t|\mathbf{x}_i) = h_0(t) \exp(\beta' \mathbf{x}_i) \quad (2)$$

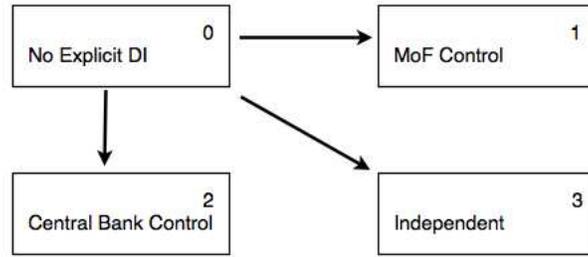
where $h_0(t)$ is the baseline hazard, i.e. the instantaneous rate of a transition at time t when all of the covariates are zero (Cleves et al., 2004). See Brooks (2005) and Golub (2008) for a further justification of the Cox PH model in diffusion research.

3.2 Competing Risks Models

What this method lacks is an ability to model the multiple choices that actors have and how the existence of these choices affects decisions. In many cases, only examining transitions to one policy produces biased estimates (Putter, Fiocco and Geskus, 2007). For example, it would be theoretically inappropriate to treat countries' propensities to give control of their deposit insurers to any one institution as independent of their

²¹For a discussion of situations where events are not observed, i.e. censoring in EHA see Cleves et al. (2004, Ch. 4).

Figure 2: Competing Risks Model of First Deposit Insurance Scheme Governance Choices



other options. We require an event history model that is able to account for multiple policy alternatives. A single Cox PH model cannot, and would thus be inadequate to test my competing hypotheses.

Though there are a number of different ways to examine multiple choices (see Putter, Fiocco and Geskus, 2007), a competing risks approach is most appropriate for examining deposit insurance governance choices in the period of interest, as well as new institution variation in general. In theory, none of the governance types is *a priori* the final choice. Once a country creates a deposit scheme controlled by the central bank it could later make it independent or impose MoF control and then reestablish central bank control, etc. Despite the lack of theoretical justification for these *a priori* assumptions, data availability significantly influences the ultimate empirical research design decision. There were only five instances between 1970 and 2007 when a country changed governance types after insurers had been established. A convenient way to handle this data limitation is to constrict our research focus on governance decisions for *new* explicit deposit insurance schemes. This creates three final states as shown in Figure 2. In such situations, competing risks models with mutually exclusive non-repeated transitions are the most appropriate type of EHA (Pintilie, 2007).

There are two ways to approach competing risks (a) transition-specific hazards²² and (b) hazards of the sub-distribution. However, for the purposes of diffusion analysis, the transition-specific hazard has the disadvantage of assuming that the competing risks do not exist (Pintilie, 2007), i.e. that the hazard of one risk occurring is independent of the others. This paper is more interested in assessing the changing impact of certain covariates on certain choices given the existence of alternatives. For such situations it is more appropriate to use the hazard of the sub-distribution. Additionally, transition-specific hazards are not suited to distinguishing the reasons for creating one type of deposit insurance compared to the others from the reasons for creating deposit insurance in general. Hazards of the sub-distribution competing risks deal with this issue in a much more straightforward manner (see Bakoyannis and Touloumi, 2011, for details).

²²Cause-specific hazard (for a discussion see Latouche, Beyersmann and Fine, 2007) is the common term from epidemiology. It is nonetheless an awkward term in the context of this research. “Transition-specific hazard” is more appropriate.

The hazard of the sub-distribution²³ at time t , $\gamma_k(t)$, for a transition of interest k is:

$$\gamma_k(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr(t < T \leq t + \Delta t, C = k | \{T > t \text{ or } (T \leq t \text{ and } C \neq k)\})}{\Delta t} \quad (3)$$

where T is the time of the observed transition C . If at time t no event is observed, then the observation is censored. The condition in the braces is one where an event k did not happen until after time t , as in standard EHA, or there is the possibility that the observations for a unit have ceased because it experienced a competing transition (Pintilie, 2007, 1363).

Fine and Gray (1999) developed a proportional hazards method, analogous to the Cox PH model, to estimate the hazard of the sub-distribution $\gamma_k(t)$ empirically given by:

$$\gamma_k(t|\mathbf{x}) = \gamma_{k,0}(t) \exp(\beta_k^T \mathbf{x}) \quad (4)$$

where $\gamma_{k,0}(t)$ is the baseline sub-hazard. FG-CREHA allows us to analyze independent variables on a policy choice of interest while accounting for the potential effects of the existence of other choices. Given that we are interested in governance choices among countries creating their first deposit insurer, we are looking for effects that differ across the models. Effects having equivalent magnitude, direction, and significance indicate common factors behind creating explicit deposit insurers in general (Bakoyannis and Touloumi, 2011). These would therefore be ancillary to this paper’s focus on governance choice.

3.3 Variables

My analyses are designed to find estimated effects that differ across the models for the following variables. See the Appendix for summary statistics for the analysis period 1984-2007, which I chose because of data availability. I constricted the sample of 174 countries to 70 countries, as this was the extent of the available banking crisis data from Reinhart and Rogoff (2010). For a full list of the countries in the sample and their DI governance-types, see http://dl.dropbox.com/u/12581470/DI_Map/Deposit_Insur_2011%20copy.dta. Separate analyses using imputed data²⁴ over a similar period for the full sample were also conducted as robustness checks. They produced roughly similar results and are not shown.

Democracy I operationalise democracy with *Unified Democracy Scores (UDS)* (Pemstein, Meserve and Melton, 2010). The scores were found through Bayesian latent variable analysis using 10 measures of democ-

²³Covariates are omitted for simplicity.

²⁴Created using the R package Amelia II by Honaker, King and Blackwell (2010).

racy, including Freedom House, Polity, etc.²⁵ I also included a *new democracy* dummy variable to see if becoming a democracy had an effect on governance choice. The variable equalled one for the first five years that a country’s Polity IV score (Marshall and Jaggers, 2009) was greater than 5.

Banking Crisis The second domestic and the crisis diffusion hypotheses both make predictions about the influence of crisis on deposit guarantee governance choices. I used banking crisis data from Reinhart and Rogoff (2010). *Banking crisis* is a dummy variable equalling one for every year that a country is in a banking crisis and zero otherwise.

Financial System Structure The structure of the banking sector may influence what type of governance is chosen. I examine the importance of deposit banking in general using a ratio of *deposit bank’s assets to GDP* from Beck and Demirgüç-Kunt (2009). To make interpretation easier, I converted it into a percentage. Alternatively, I measured the importance of big versus small banks using their *concentration* variable: this is a country’s three largest banks’ assets as a ratio of total bank assets in a given year. Though concentration was included in preliminary analyses, I do not show the results here because of a very high number of missing values that would have considerably constricted the analysis period.

Peers According to the regional peer diffusion hypothesis, as more countries in a region adopt a specific form of deposit insurance governance, non-adopting countries will be more likely to create independent insurers. I capture this process with *regional peer independence* and *MoF* monadic spatial effect variables (Neumayer and Plümper, 2010).²⁶ For any one country this is simply the percentage of other countries in their region that have independent or MoF-controlled DI in a given year (adapted from Strang and Tuma, 1993, Brooks, 2005). I use World Bank regional classifications. I used the full 174 country sample to find the variable values. All regions are represented in the analysis apart from North America, where every country had an explicit insurer before the observation period began.

I use a European Union dummy variable (*EU (from 1994)*) to control for whether or not a country was or, in the case of candidate countries, wanted to be under the jurisdiction of the EU’s deposit insurance directive. It equals 1 for every year from 1994 that a country was either an EU member or candidate (as in Demirgüç-Kunt, Kane and Laeven, 2008).

²⁵Only posterior means are used in this paper.

²⁶The procedure I used to create the dyadic data sets used to find the spacial effects was from Gilardi and Fuglister (2008).

Competition Though the competition hypothesis is specifically concerned with depositors shifting their funds into or out of a country, there is unfortunately little data on deposit flows for the full sample. As a proxy, I use the *KAOPEN* index of capital account openness (Ito and Chinn, 2008). It measures *de jure* openness.

IMF Stand-by I created a dummy variable *IMF stand-by* equalling one during a year that a country signed a stand-by agreement with the IMF and the following year. It is zero otherwise. Data is from Dreher (2006, updated to 2008). It may have been useful to examine the actual texts of these agreements, limiting the dummy to ones that required a specific governance type. This information is difficult to obtain, as few countries have allowed their agreements to be made available outside of the IMF’s Washington, DC archive.

Other Potential Factors I included the following variables in the models at some stage because, though they do not directly relate to one of the hypotheses, they might still be important and worth accounting for. I included a number of measures of bureaucratic and general country-level governance quality. These are taken from the International Country Risk Guide (2009). *Gross domestic product per capita (GDP/Capita)* in thousands of current US dollars is taken from the World Bank’s World Development Indicators (World Bank, 2011). I also considered *Central bank governor (CBG) tenure*. The variable is from Dreher, Strum and de Haan (2008, 2010).²⁷

4 Results

Tables 2 and 3 show results from two sets of FG-CREHA models.²⁸ The coefficients—which are interpreted in a similar way to coefficients in logistic regression—correspond to the primary governance types of interest—MoF and independent. Results from EHA with central bank controlled deposit insurance are not shown. I treated it as a competing event in both analyses. I include only countries that did not have a deposit insurer before 1984.²⁹ Since my purpose is to compare reasons for different governance choices, estimated similarities and the differences in sign and significance between these two models are the focus of the discussion. I summarise them in Table 1.

²⁷Please contact me for information about minor modifications made to these variables.

²⁸The data file and Stata do-file needed to fully replicate this paper’s analyses and estimation tables 2, 3, and 6 as well as time-varying covariate graphs can be found at http://dl.dropbox.com/u/12581470/code/Replicability_code/DI_Replication/public_DI_replicable_tables.do. Please note that International Country Risk Indicators are made available for replication only. They should not be distributed.

²⁹Of the 70 countries in the sample mentioned above 53 were at risk. Nine of these created MoF governance and 20 created independent governance.

Before discussing the results it is important to make a few notes about variations that were made as a result of numerous robustness checks. Ideally, I would have included in the analyses as many factors as possible that might help explain governance choice. However, as can be seen in Table 5 of the Appendix, many of the variables are highly correlated with one another. Problems associated with high multi-collinearity are well known (see Achen, 2002, Schrodtt, 2006), especially the tendency to create unreliable coefficient estimates. I did numerous regressions to determine which variables could be meaningfully included (den Poel and Larivière, 2004), only a subset of which I show. I used Schoenfeld-like residuals plotted against analysis time, along with locally-weighted regression-smoothed lines, to diagnose how well the models conformed to the proportional hazards assumption, i.e. whether covariates are multiplicatively associated with the hazard (see Fine and Gray, 1999, 503). I added linear time-varying coefficients for variables that violated this assumption (Golub, 2008, Stata Corp., 2009, 214-215). For these variables the estimated coefficients consist of both a time-invariant part β and a part $\beta_g(t)$ that varies linearly³⁰ with analysis time. The estimated coefficient is $[\beta + \beta_g(t)]$.

Note that because the analysis time was standardised,³¹ time specific events—e.g. best practice promotion—common to all units are largely captured in the baseline sub-hazard. The coefficients reported in Tables 2 and 3 are essentially average estimated effects over the analysis time (Hernán, 2010). Ideally, I would have plotted predicted probabilities of making a governance choice at each point in time to illustrate the interplay between the baseline sub-hazard and the variables. However, there is currently no straightforward way to make these plots in Stata or R for FG-CREHA models with time-varying coefficients. Hopefully, future versions will include this capability to make FG-CREHA easier to use in political economy. A temporary solution for identifying the impact of time-period specific best practice promotion is to compare FG-CREHA models with constricted time periods (see below).

4.1 Similarities: Creating Deposit Insurance

My purpose is not to determine why explicit deposit insurance is created in general.³² However, the central bank governor’s time in office variable had a similar time-varying effect in both of the models indicating that it may be part of the process behind both of these two governance choices. In separate models where central bank DI was the event of interest, it seems to have had no effect. Across the main governance choices of interest in the mid-1980s central bank governor tenure is predicted to have a positive effect. The longer the

³⁰Other functions were also tested, but did not substantially increase model fit.

³¹For example, a country that was made independent in 1990 has the same analysis time in 1990 as those that entered earlier.

³²For reference, Table 6 in the Appendix shows estimated coefficients for Single Transition Cox Proportional Hazard models for creating a deposit insurer for the first time of any governance type with the same sample and variables as the present paper.

Table 1: Summary Comparison of Estimated Covariate Effects.

	None -> MoF	None -> Ind.
Democracy (UDS)		tvc (+ to -)
New Democracy	-	+
Banking Crisis	+	
Deposit Bank Assets/GDP	tvc (- to +) or +	
Peer Region, by type		+
Capital Openness (KAOPEN)	tvc (- to +)	
IMF Stand-by		
EU (from 1994)	-	+
GDP/Capita		+
CBG Tenure	tvc (+ to -)	tvc (+ to -)

Note: the direction (sign) of the effect is only shown if they were consistently significant at at least the 10% level.

tvc indicates a time-varying coefficient, i.e. switches sign over the course of the analysis. The order of the direction over time is shown in parentheses.

central bank governor was in office, the more likely it was that explicit deposit insurance controlled either by the MoF or a independent entity would be created. However, beginning in the 1990s this reversed. The longer the tenure, the less likely it was that deposit insurance controlled by one of these entities would be created. It is initially unclear why this might be and is beyond the scope of my paper.

4.2 Differences: Governance Choice

Despite this similarity, most significant effects varied between the two models, suggesting that they influenced governance choice.

Democracy Democracy, as measured by the posterior mean of the Unified Democracy Score, seems to have had no effect on whether or not a country gave control to the ministry of finance. Its effect on creation of independent DI went from positive in the early part of the analysis period to weakly negative around the year 2000. New democracies were less likely to create MoF DI than older democracies and other regimes. The reverse effect was found for independent deposit insurance, in line with the hypothesis that democracies are more likely to delegate deposit insurance in an attempt to minimise moral hazard.

Table 2: Fine & Gray Competing Risks Coefficients for Creating *MoF* Controlled 1st Deposit Insurer (others competing)

Variable	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
Democracy (UDS)		0.227 (0.401)									
New Democracy			-21.167*** (0.620)								-19.197*** (1.157)
DB Assets/GDP				-0.016 (0.010)						-0.013 (0.014)	0.013** (0.005)
Crisis Dummy					1.645** (0.823)				1.537* (0.814)	1.597* (0.905)	2.706*** (0.720)
Regional Peer SE (MoF)						0.096* (0.052)					0.046 (0.070)
Capital Openness (KAOPEN)							-7.091*** (2.546)				-8.173*** (2.997)
IMF Stand-by								1.226* (0.707)	1.048 (0.785)	1.283 (0.914)	
EU (from 1994)	-12.184*** (1.323)	-14.133*** (1.171)	-12.131*** (1.332)	-13.980*** (1.154)	-14.179*** (1.471)	-11.485*** (1.274)	-12.665*** (1.235)	-12.850*** (1.118)	-14.279*** (1.223)	-14.998*** (1.287)	-15.146*** (1.215)
GDP/Capita	-0.130 (0.088)		-0.136 (0.087)		-0.067 (0.103)	-0.126 (0.077)	-0.125* (0.069)	-0.065 (0.078)	-0.005 (0.072)		
CBG Tenure	0.353 (0.262)	0.371 (0.251)	0.318 (0.278)	0.282 (0.272)	0.271 (0.228)	0.331 (0.245)	0.460* (0.244)	0.267 (0.255)	0.225 (0.251)	0.173 (0.252)	0.342 (0.229)
Time Interactions											
Capital Openness (KAOPEN)							0.491*** (0.170)				0.583*** (0.211)
CBG Tenure	-0.191** (0.093)	-0.199** (0.093)	-0.179* (0.097)	-0.174* (0.089)	-0.144* (0.077)	-0.183** (0.088)	-0.181** (0.085)	-0.158** (0.072)	-0.133** (0.063)	-0.113** (0.054)	-0.128* (0.070)
DB Assets/GDP				0.002*** (0.001)						0.002** (0.001)	
Countries at Risk	49	50	49	47	49	49	49	49	49	47	47
No. of MoF Created	9	9	9	9	9	9	9	9	9	9	9
Pseudo log-likelihood	-25.471	-26.263	-24.871	-23.882	-23.226	-24.409	-21.215	-24.043	-22.197	-19.342	-14.764
chi2	197.365	228.187	1316.392	249.775	215.864	195.558	281.116	247.356	238.830	359.971	1205.021
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Standard errors in parentheses. */**/** at 10/5/1% significance levels. GDP/capita was dropped from models with Democracy (UDS) and Deposit Bank Assets/GDP due to high correlations (0.693 and 0.708 respectively). The governance quality indicators are not shown for the same reason. Only significant time interactions shown.

Democracy's time-varying effect seems to be driven largely by Australia and New Zealand, whose major banks are subsidiaries of Australian banks. These were the only two countries in the sample with UDS scores greater than 1.5 after 2002 that had not created some type of explicit DI.³³ Unobserved factors may have influenced their choices not to create explicit DI overall. Once I accounted for the 'Oceania effect', it seems that democracies generally did prefer delegating deposit insurance governance. For example, when I limited the sample to the years 1984 to 2000, the time-varying coefficient was no longer significant.³⁴

Deposit Bank Assets/GDP The size of the banking sector relative to the economy appears to have had little impact on whether or not an independent insurer was created. Depending on the set of other covariates included in the model, the relative size of the deposit banking sector had a slight time-varying effect—almost negative to no effect in the first few observation years and then positive—or was simply positive, as in the 'garbage can' MoF model. This suggests some weak evidence for the hypothesis that, in order for guarantees to be credible in countries with large banking sectors, decision-makers choose to have them directly linked to the public budget.

Banking Crises Also in line with the related MoF governance credibility hypothesis, countries experiencing banking crises were more likely to create their first deposit insurer controlled by the ministry of finance. There appears to be no effect of crisis on delegating control, providing evidence against the idea that actors in crises reached for best practice governance ideas. The obviously high functional cost of guaranteeing deposits during a banking crisis may simply make recommendations for independence seem implausible in these circumstances, no matter how well they are promoted.

³³Australia introduced a temporary guarantee program in response to the recent global crisis. New Zealand created a voluntary program in 2008.

³⁴Hernán (2010) refers to this issue as period-specific selection-bias.

Table 3: Fine & Gray Competing Risks Coefficients for Creating *Specialised & Independently* Controlled 1st Deposit Insurer (others competing)

Variable	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Democracy (UDS)		2.222*** (0.552)								2.335*** (0.746)
New Democracy			1.503** (0.617)							0.890* (0.530)
DB Assets/GDP				0.000 (0.006)						
Crisis Dummy					0.766 (0.513)				0.792 (0.499)	
Regional Peer SE (Ind.)						0.059*** (0.019)				0.036* (0.019)
Capital Openness (KAOPEN)							-0.357 (0.248)			
IMF Stand-by								-0.687 (0.763)	-0.746 (0.761)	
EU (from 1994)	2.000** (0.805)	2.104** (0.818)	1.611** (0.734)	2.694*** (0.679)	1.835** (0.779)	1.764** (0.722)	1.916** (0.837)	2.009** (0.782)	1.831** (0.754)	1.648* (0.864)
GDP/Capita	0.072*** (0.027)		0.095*** (0.028)		0.086*** (0.028)		0.110*** (0.040)	0.064** (0.027)	0.078*** (0.028)	
CBG Tenure	0.157** (0.064)	0.173** (0.069)	0.179*** (0.068)	0.162** (0.072)	0.142** (0.063)	0.186*** (0.070)	0.144** (0.058)	0.155** (0.063)	0.139** (0.061)	0.189** (0.078)
Time Interactions										
Democracy (UDS)		-0.144*** (0.039)								-0.144*** (0.050)
CBG Tenure	-0.024*** (0.009)	-0.026*** (0.010)	-0.028*** (0.010)	-0.026** (0.011)	-0.022** (0.009)	-0.029** (0.012)	-0.023*** (0.008)	-0.025*** (0.009)	-0.022*** (0.009)	-0.031** (0.013)
Countries at Risk	49	49	49	47	49	50	49	49	49	50
No. of MoF Created	18	18	18	17	18	18	18	18	18	18
Pseudo log-likelihood	-55.156	-50.100	-53.021	-53.871	-54.103	-54.549	-53.892	-54.717	-53.586	-48.846
chi2	27.660	35.067	26.533	19.818	33.760	27.381	31.179	31.949	44.616	32.830
p	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Standard errors in parentheses. */**/** at 10/5/1% significance levels. GDP/capita was dropped from models with Unified Democracy Score and Deposit Bank Assets/GDP due to high correlations (0.693 and 0.708 respectively). The governance quality indicators are not shown for the same reason. Only significant time interactions shown.

Peer Diffusion Though the results do not provide support for the crisis diffusion hypothesis, they do weakly suggest that regional peers can influence governance choices. First, though EU legislation did not enforce a specific governance type, (just that explicit DI be created,) being an EU member or candidate country seems to consistently have had both a positive effect on decisions to delegate governance and a negative effect on placing control in the MoF. Second, the proportion of regional peers with independent DI also had a positive effect on delegation choices, even when controlling for EU status. Conversely, the proportion of peers with MoF-controlled DI does not appear to have had an effect on that governance choice. I conducted separate analyses within the observation period 1984-1993 with the regional peer and general EU member/candidate country variables to make sure that the estimated effects were actually related to the mid-1990s recommendations, rather than a general effect based on some other process. In the pre-1994 analysis, the variables had no effect on governance choices. By examining the time-period specific “biases” in the sample (Hernán, 2010) rather than just average effects, I find that simple peer learning or some other time-independent regional effects are insufficient explanations. Regional proximity and organisations appear to interact with recommendations to influence policy choices.

Competition The capital openness variable had no impact on delegation decisions, and had a time-varying effect on creating MoF-controlled guarantees. It had a small negative effect until later in the observation period, when it became positive. This provides some weak evidence against the competition hypothesis, and suggests that there may be no association between competition and governance choice in general. Note that these results are not conclusive given the incomplete operationalisation of the variable. Nonetheless, it does seem that having a more internationally open financial system, i.e. one more prone to international deposit banking competition, did not impact DI governance choices. This may be because countries simply compete for deposits on other factors. For example, Switzerland competes on taxation. Iceland before the 2008/09 crisis competed on interest rates.

IMF Coercion Though the IMF may have been important in promoting explicit DI and independence in general, there is little evidence from these models that it directly coerced countries to adopt a particular governance style, even the best practice style they promoted. This finding was especially strong when I included banking crises in the analysis.³⁵ It may have been that IMF stipulations in stand-by agreements were inconsequential, since MoF-controlled deposit insurance would have been created regardless. This result does not necessarily indicate that the IMF was not an important force in DI governance trends, just that

³⁵Surprisingly, the two are not very highly correlated in the sample.

this influence did not work through coercing countries during instability.

Discussion

In this paper I have tried to understand why countries converged on independently governed deposit insurance over the past 20 years. In order to do this, I have also make an important methodological contribution to policy diffusion studies by demonstrating how FG-CREHA can be used to understand decisions in complex choice environments.

FG-CREHA has allowed me to identify a number of possible reasons why countries converged on independent DI between the mid-1990s and at least 2007. I found some evidence that independence in new insurers was partially diffused through a regional peer learning process that interacted with best practice recommendations. FG-CREHA enabled the identification of a possible positive relationship between regional peer governance type adoption and best practice independence ideas. The more formalised EU peer group effect was consistently strong. It is fairly conclusive from this evidence that a simple emulation process did not drive DI governance adoption practices, otherwise the positive relationships would have been more consistently observed across the governance types. By pinpointing the time correlation between when independence recommendations were made and when peer adoption trends began in all regions besides North America, I can suggest that recommendations helped initiate the peer learning process. Recommendations seem to have acted as a catalyst for peer learning. This is also likely part of the explanation for why we observe countries converging on independent DI from the mid-1990s.

FG-CREHA enabled me to show how domestic functional factors affected convergence patterns. The increase in the number of democracies in the late 1980s and early 1990s may have helped cause the observed convergence, since democracies and especially new democracies, appear to be more likely to delegate than countries with other regime types. This is possibly due to electoral incentives to mitigate public costs, therefore mitigating moral hazard. These results are slightly puzzling in light of the regional peer findings. Is it that actors did objectively know that independent DI reduced moral hazard and helped prevent crises throughout the period? This seems doubtful, given the scarcity of non-ambiguous empirical evidence. The fact that I found some evidence for both hypotheses should not actually be that surprising. Both are based on exaggerated and unrealistic assumptions about actors' beliefs and knowledge. In reality, actors don't have perfect information about how deposit insurance governance will achieve electorally conditioned goals. Equally, they are also not totally ignorant of the effects of governance style in the absence of an IMF

recommendation or peer evidence.

It is also probably unrealistic to ascribe the democracy findings entirely to Rosas' domestic functional concerns. Linos (2011) has shown how democratic electorates themselves can be influenced by recommendations and learn from regional peer and major country examples. This creates incentives for democratic decision-makers to adopt promoted policies and policies adopted by regional peers and prominent countries, such as the United State's independent FDIC.

Crisis seems to have dampened the spread of independence in new insurers. During a banking crisis the main problem for new insurance programs is demonstrating an ability to actually honour guarantees. Because honouring guarantees could potentially be very costly, new deposit insurance programs tend to be more credible if directly backed by the national budget via MoF control. Crises, rather than promoting the adoption of general best practice ideas, may actually inhibit them when high and immediate contingent liabilities are apparent. No matter how well delegation is promoted, the sheer cost of a new deposit insurance scheme makes any new independent program implausible during a crisis. This suggests we need to at least qualify claims that countries adopt policies for socially diffused reasons (see in particular McNamara, 2002) when high and obvious fiscal costs are involved.

It is important to note a major limitation of my research. Since only about six percent of countries had changed governance in existing insurers, governance and deposit insurance creation choices are effectively tied together for empirical purposes. It is currently very difficult to separate out any complex interactions leading to both governance and insurance creation choices. I am limited to identifying explicitly different results across competing risks models. However, this would be a limitation of any research on variation in new institutional types. Nonetheless, I have made an important step in expanding our ability to examine policy choices in complex environments through FG-CREHA. Doing so will enable future researchers to examine convergence and variations in new policies and other institutions.

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Appendix

Table 4: Deposit Insurance Governance Choice Analysis Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
UDS	0.634	0.912	-1.433	2.036	1680
New Democracy	0.085	0.278	0	1	1680
Crisis Dummy	0.202	0.401	0	1	1680
DB Assets/GDP	60.787	44.696	1.298	270.442	1510
Concentration	0.649	0.207	0.148	1	1148
Regional Peer SE (Ind.)	25.548	22.341	0	100	1680
Regional Peer SE (MoF)	6.335	6.350	0	24.138	1680
KAOPEN	0.454	1.636	-1.831	2.5	1619
IMF Stand-by	0.161	0.368	0	1	1680
Bur. Quality	2.53	1.204	0	4	1600
Socio. Risk	6.173	2.145	0.5	11	1600
EU (from 1994)	0.099	0.299	0	1	1680
GDP/Capita	9.506	12.203	0.19	76.2	1609
CBG Tenure	3.457	3.773	-1	29	1551

Table 5: Correlation Table For Variables Used in the Deposit Insurance Fine and Gray EHAs

Variables	UDS	New Dem	Crisis Dummy	DBA/GDP	Conc.	Reg. Indp.	Reg. MOF	KAOPEN	IMF	Bur. Qual.	Socio. Risk	eu1994	GDP/Capita	CBG
UDS	1.000													
New Dem5-0.044	1.000 (0.073)													
Banking crises	-0.122 (0.000)	0.060 (0.013)	1.000											
DB Assets/GDP	0.485 (0.000)	-0.171 (0.000)	-0.069 (0.007)	1.000										
Conc.	0.115 (0.000)	-0.013 (0.650)	-0.044 (0.135)	0.033 (0.283)	1.000									
Reg. Peer Indp.	0.541 (0.000)	-0.118 (0.000)	-0.137 (0.000)	0.407 (0.000)	-0.091 (0.002)	1.000								
Reg. Peer MoF	0.296 (0.000)	-0.008 (0.749)	-0.093 (0.000)	0.021 (0.410)	-0.141 (0.000)	0.322 (0.000)	1.000							
KAOPEN	0.575 (0.000)	-0.156 (0.000)	-0.179 (0.000)	0.553 (0.000)	-0.042 (0.163)	0.548 (0.000)	0.272 (0.000)	1.000						
IMF Stand-by	-0.158 (0.000)	0.117 (0.000)	0.118 (0.000)	-0.286 (0.000)	-0.040 (0.173)	-0.174 (0.000)	0.081 (0.001)	-0.214 (0.000)	1.000					
Bur. Qual.	0.644 (0.000)	-0.188 (0.000)	-0.045 (0.072)	0.616 (0.000)	0.136 (0.000)	0.461 (0.000)	-0.033 (0.187)	0.472 (0.000)	-0.254 (0.000)	1.000				
Socio. Econ. Risk	0.476 (0.000)	-0.155 (0.000)	-0.171 (0.000)	0.614 (0.000)	0.138 (0.000)	0.436 (0.000)	-0.003 (0.902)	0.486 (0.000)	-0.234 (0.000)	0.651 (0.000)	1.000			
EU1994	0.287 (0.000)	-0.044 (0.073)	-0.073 (0.003)	0.202 (0.000)	0.064 (0.031)	0.397 (0.000)	0.134 (0.000)	0.277 (0.000)	-0.070 (0.004)	0.216 (0.000)	0.202 (0.000)	1.000		
GDP/Capita	0.693 (0.000)	-0.190 (0.000)	-0.122 (0.000)	0.708 (0.000)	0.144 (0.000)	0.644 (0.000)	0.100 (0.000)	0.609 (0.000)	-0.273 (0.000)	0.702 (0.000)	0.642 (0.000)	0.292 (0.000)	1.000	
CBG Tenure	0.102 (0.000)	-0.105 (0.000)	-0.100 (0.000)	0.018 (0.495)	0.006 (0.838)	0.116 (0.000)	-0.040 (0.113)	0.062 (0.015)	-0.084 (0.001)	0.134 (0.000)	0.156 (0.000)	0.075 (0.003)	0.162 (0.000)	1.000

Table 6: Cox PH Coefficients for Creating *Deposit Insurance*

Variable	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Democracy (UDS)		0.327 (0.241)								0.355 (0.228)
New Democracy			0.260 (0.408)							
DB Assets/GDP				0.000 (0.005)						
Capital Openness (KAOPEN)								-0.291** (0.135)		-0.318** (0.157)
EU (from 1994)	2.813*** (0.728)	2.764*** (0.741)	2.770*** (0.700)	2.772*** (0.715)	2.720*** (0.746)	2.411*** (0.736)	2.659*** (0.726)	2.781*** (0.714)	2.834*** (0.745)	2.232** (0.870)
GDP/Capita	0.007 (0.024)	-0.012 (0.025)	0.010 (0.024)	0.002 (0.027)	0.035 (0.024)	-0.004 (0.023)	0.001 (0.023)	0.037 (0.028)	0.017 (0.024)	0.050* (0.028)
Time Interactions										
Crisis Dummy					0.103*** (0.031)					0.104*** (0.028)
Regional Peer SE (Ind.)						0.002** (0.001)				0.002*** (0.001)
Regional Peer SE (MoF)							0.004** (0.002)			
IMF Stand-by									0.066*** (0.025)	0.066** (0.028)
CBG Tenure	-0.016*** (0.005)	-0.016*** (0.005)	-0.016*** (0.005)	-0.016*** (0.005)	-0.014*** (0.005)	-0.015*** (0.006)	-0.015*** (0.006)	-0.017*** (0.005)	-0.015*** (0.005)	-0.012** (0.005)
Countries at Risk	49	49	49	46	49	49	49	49	49	49
No. of MoF Created	36	36	36	34	36	36	36	36	36	36
Pseudo log-likelihood	-106.995	-106.205	-106.872	-101.224	-101.994	-104.810	-105.032	-104.998	-105.083	-95.894
chi2	30.759	29.956	30.820	31.120	33.195	34.647	34.938	53.963	30.068	43.849
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Standard errors in parentheses. */**/** at 10/5/1% significance levels. Many of the variables are time-varying in that the estimated coefficient increases or decreases over-time.