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How Do Central Bank Governors Matter? Regulation and the Financial Sector

Do past employment characteristics of central bank governors affect financial regulation? To answer this question, we construct a new data set based on curriculum vitae of all central bank governors around the world in 1970–2011. We interpret work experiences as indicators of preferences toward deregulation. Over the average duration in office (5.6 years), a governor with financial sector experience is associated with three times more deregulation than a governor without experience in finance. Similar results hold for past experience at the IMF; in contrast, past experience at the BIS and the UN are associated with less deregulation.

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Central bank governors (presidents or chairmen) play a pivotal role in decisions about economic policy, even when they are part of a board or committee, and even when central banks are not fully independent. For example, in his role as chairman of the Board of Governors of the Federal Reserve, Paul Volcker is famously responsible for changing the conduct of monetary policy in the United States in the 1980s. Volcker's credibility, bolstered by his experience in the financial sector and the U.S. Treasury Department, was key for his success in reducing inflation.

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However, the role of heads of central banks extends well beyond controlling inflation, and covers financial regulation.

In this paper, we ask whether personal characteristics of central bank governors are associated with financial regulation. In light of the special role that financial regulation played in the recent financial crises in the United States and Europe, it is important to understand the forces that shape it.[1] The leading role of central bank governors in shaping policy in the aftermath of the crisis underscores the importance of identifying factors that influence their behavior. And public perceptions that central bank governors' behavior has benefited the financial sector also merits paying attention to what affects their actions.[2]

In order to address these questions, we construct a new data set with detailed information on governors of central banks over the period 1970–2011. We find that, even after controlling for political orientation of government, the professional backgrounds of central bank governors have explanatory power for changes in financial regulation. In particular, experience in the private financial sector is associated with greater financial deregulation. Experience in international organizations matters too: While experience in the International Monetary Fund (IMF) is similarly associated with financial deregulation as experience in finance, governors' experience at the United Nations and at the Bank of International Settlements (BIS) is associated with less deregulation.

Lacking a natural experiment, we cannot assert causality. However, the results are consistent with the idea that central bank governors have a degree of control over regulatory outcomes, and that their backgrounds can affect in which direction they exert this control. This can be taken into account when choosing governors, as Romer and Romer (2004) suggest.

Many central banks are statutorily in charge of financial regulation. In 2012, two-thirds of central banks in a sample of 145 countries regulate their banking system, while almost one-fourth regulate securities and insurance markets (Horakova 2012).[3] In these cases, central banks not only determine the implementation of regulation, but also influence the legal and regulatory environment.[4] Padoa-Schioppa (2003) argues that until recently bank and financial supervision constituted an inseparable part of central bank policy and actions.[5]

1. On the role of financial regulation, see, for example, Igan, Mishra, and Tressel (2012), Philippon and Reshef (2012), and Boustanifar, Grant, and Reshef (2018). *The Economist*, May 1, 2015: *What's wrong with finance?* also explains how deregulation helped create the preconditions for the financial crisis.

2. For examples of these perceptions, see Adolph (2013), Sherman (2009), and *The New York Times*, October 8, 2008: *Taking Hard New Look at a Greenspan Legacy*.

3. In all cases where the central bank regulates its securities and/or insurance markets, it also regulates the banking system.

4. Hirtle, Kovner, and Plosser (2016), demonstrate that discretion over bank supervision lead to apparently less risky behavior in large banks, without adversely affecting their competitiveness, supporting the notion that supervision has a distinct role as a complement to regulation.

5. Padoa-Schioppa (2003) argues that in order to achieve both financial stability and monetary policy, central banks applied bank supervision. Goodfriend and King (1988) argue that central banks must engage in financial regulation in order to achieve monetary policy goals. More recently, Hellwig (2014) also advocates the importance of bank and financial supervision for achieving the goals of central banks.

Even in cases where financial regulation is not the direct responsibility of the central bank, the governor may have great power to shape it, through public speeches, special reports on the topic, and less-visible political connections. For example, as chairman of the Federal Reserve, Alan Greenspan was extremely influential in advocating financial deregulation in the United States and justifying it ((Sherman 2009, Hacker and Pierson 2010, Johnson and Kwak 2010).[6] Bernanke was instrumental in developing responses to the 2008 financial crisis in the United States, including new financial regulation.[7] In France, concerns about potential conflicts of interest were voiced in media and in the National Assembly about the appointment of François Villeroy de Galhau as president of the *Banque de France* in 2015, in light of his past experience as director general of BNP Paribas—in particular with respect to bank supervision and regulation.[8] In this paper, we find that the relationship between experience in finance and financial deregulation is indeed systematic.

The importance of central bank governors is manifested in many instances. For example, in relation to the European debt crisis, Mario Draghi has come into the limelight as the new head of the European Central Bank and as a break with previous policies under Jean Claude Trichet.[9] Currently, Draghi is instrumental in shaping monetary policy at the European Central Bank, reforming banking regulation, and in coordinating policy more generally across the European Union. Responses to the Asian crisis in 1997 differed across the directly affected countries—in particular, imposing capital controls—and were influenced by central bank governors in the countries that were directly involved. Stanley Fischer's conduct as governor of the Bank of Israel had a significant effect on how that country's competitiveness and financial stability was perceived, with arguably positive outcomes.[10] The appointment of Raghuram Rajan as the head of the Reserve Bank of India in September 2013 is associated with calming financial markets, which were faced with bouts of volatility following the U.S. Federal Reserve announcements of tapering of purchases of

6. See also *The Economist*, May 1, 2015: *What's wrong with finance?* Both Fed governors Paul Volcker and Alan Greenspan are classified in our data set as having experience in "other private sector," as well as in the "financial sector." Volcker's first job was at the FRB of New York, and he also worked for the treasury. In between he worked at Chase Manhattan Bank (in two separate job spells), rising to the rank of Vice President, before becoming the Chairman of the Federal Reserve. Greenspan's only job in finance was his first, during graduate school. After this he worked mostly at his own consulting firm, Townsend-Greenspan & Co., Inc., before becoming the Chairman of the Federal Reserve.

7. For example, in testimony to the U.S. Congress in November and December 2009, and in a speech on January 3, 2010, Bernanke blamed regulatory failure for the financial crisis (not low interest rates), and advocated outright banning of some financial products. These were part of the statements that prepared the ground for the Dodd–Frank Act, which was signed into law on July 21, 2010. Bernanke had no work experience in the financial sector when he was appointed.

8. Le Monde, 15 September 2015: *Banque de France : ≪ François Villeroy de Galhau est exposé à un grave conflit d'intérêts ≫*, and *Banque de France : la nomination d'un ex-dirigeant de BNP dénoncée par 150 économistes* (in French). *Observatoire des Multinationales*, Octobre 5, 2015: *Quand le lobby bancaire met la main sur la haute administration* (in French).

9. For example, *Financial Times,* November 2, 2011: *Mario Draghi's historic choice*. The *New York Times*, November 3, 2011: *European Central Bank, Under New Chief, Cuts Key Rate* and The *New York Times*, November 3, 2011: *Mr. Draghi Makes a Start*.

10. The International Institute for Management Development, *World Competitiveness Yearbook* 2010. Fischer received an *A* rating on Global Finance's Central Banker Report Card in 2009, 2010, and 2011.

quantitative easing assets. Since taking over, he embarked on a reform agenda spanning both new financial regulation and modern monetary policy.[11] These examples make clear that central bank governors are indeed pivotal in more than just monetary policy.

Although perceptions in the media and in policy circles during the last several decades have illustrated the importance of central bank governors in determining the course of policy, responses to economic events, and economic outcomes—empirical evidence on the importance of central bank governors remains scarce. The goal of this paper is to help fill this gap. To this end, we build a new and unique data set which combines manually collected data on personal backgrounds of central bank governors with several policy outcome variables, which we use to evaluate the importance of central bank governors, and to determine their economic significance.

We ask the following questions. Do central bank governors influence financial regulation? If so, which characteristics matter and how? Is there a revolving door between the financial industry and central banks? In other words, do governors have financial sector backgrounds; and are they likely to return to the financial industry once their tenure expires? Is that likely to affect the nature of financial regulation? Are governors more likely to work in the financial sector after their term is over than in other occupations? Other occupational experiences may matter too, such as running a private business and entrepreneurship, experience in the government or in an international organization. For example, in many developing countries (e.g., India, until recently), central bank governors are often bureaucrats with experience in the ministry of finance. Are there other experiences that are significantly associated with financial sector regulation? Does past work experience of central bank governors in the financial sector affect inflation as well? And does it matter where these experiences took place (in the home country or abroad)?

The data suggest that about 20% of central bankers have previous experience in the financial sector; about a quarter of all central bankers are employed by the financial sector after their tenure ends. Our main finding is that central bankers that have prior experience in the private financial sector are associated with greater reforms in the financial sector (deregulation) in the countries and years in which they serve as governors. The effect is economically significant: We estimate that a central bank governor with past experience in finance is associated with a 50% faster annual rate of financial deregulation. Over the average duration of being a central bank governor, a governor with financial sector experience is associated with roughly three times more deregulation than a governor without financial sector experience. We also find that financial sector experience matters more when the financial sector is more tightly regulated (i.e., when there is greater scope for deregulation).

While past experience in finance is associated with financial deregulation, experience gained after the governors' tenure ends is not. This alleviates concerns for

11. *The Economic Times,* September 3, 2014: *First year as RBI governor: Raghuram Rajan has delivered on most counts with courage of conviction.*

"revolving doors" between finance and central bank positions. Finally, we do not find financial sector reforms to be significantly associated with central banker's education.

We also examine whether the effect of financial sector experience varies by type of financial reform: banking or securities market. We find that prior financial sector experience is significantly associated with reforms in the banking sector, but not with securities markets reforms. This can be explained by the fact that the vast majority of what we define as financial sector experience occurs in credit intermediation and banking, not in trading and securities. It is difficult to identify separate effects of subcomponents of banking reform, because they are all strongly correlated, but there is some evidence that the result for banking reform may be driven by subcomponents that are associated with increased competition, and removal of controls on credit and interest rates—but, importantly, not with changes in the quality of bank supervision. While introduction of competition can benefit the private financial sector, the quality of bank supervision is arguably more important for nonfinancial sector participants. If so, then our findings suggest that reform that is beneficial to the financial sector—but not reform that benefits nonfinancial actors—is associated with governors with past experience in finance. This lends some credence to populist concerns that central bankers benefit the financial sector.

Another type of experience that appears to affect financial regulation significantly is experience in an international organization. Almost 30% of governors have such experience. Central bank governors with prior experience in the United Nations and the BIS are overall associated with less reforms in the financial sector. Experience in the IMF is positively associated with financial sector reforms.

This is the first paper to ask whether heads of central banks affect financial regulation, rather than inflation (see relationship to the literature below). While we do not have plausible instruments for governors' personal characteristics, we argue that the results are not spurious, and are not completely driven by spurious correlation or omitted variables. The main concern in our context arises if countries that have a preference for reform also appoint governors that are more likely to advocate and implement reform. Attitudes toward deregulation are likely to be either country-specific but time-invariant, or broad, time-varying trends that are common across countries. The latter is evident in Abiad and Mody (2005), who examine the global trends in changes in financial regulation. In order to address this concern, we include country and time fixed effects in our empirical specifications. However, if attitudes toward deregulation are country-specific and time-varying, they would not be captured through the inclusion of these fixed effects. In order to try to address this concern, we also include country-by-decade fixed effects. This specification goes some way toward controlling for country-specific and time-varying omitted variables. We also estimate alternative specifications, in which we shift the timing of the job spells as governor either forward or backward. In these specifications, we find no effect of past experience in finance on financial regulation, which strengthens our interpretation. We also control in our regressions for left-leaning governments, in an attempt to capture changing political winds within countries. Our main results are not very sensitive to inclusion of this control.

Our results indicate a robust relationship between past experience in finance of central bank governors and financial reform while serving as governor, but our empirical strategy cannot distinguish whether this is because of a personal preference of governors, or a greater ability to implement reforms. These are likely to be highly correlated. In addition, we cannot identify to what degree past experiences more broadly (e.g., in finance or international organizations) may have shaped the views of governors on financial regulation, or whether self-selection into these activities is the mechanism. In all these cases, however, the results highlight the importance of examining the background and past experience of central bank governors.

This paper is distinct in three respects. First, it focuses on financial regulation rather than macroeconomic outcomes like inflation. The former has been neglected in the literature. Second, we examine not only education and past experiences of central bankers, but also track them after leaving office as well. This enables us to examine whether there is a "revolving door" for governors, and whether it matters. Third, we analyze a broad set of countries, including developed, emerging and low income over a long span of time, 1970–2011, which enables us to analyze how the role of governors varies across regions and whether governors have become more influential over time. Previous work has focused mostly on developed countries and has used shorter samples.

1. RELATIONSHIP TO THE LITERATURE

We contribute to the emerging literature on the importance of individuals and their characteristics for aggregate economic outcomes. Our work is also related to the literature on central bank independence (CBI), and to the emerging literature on political economy and network connections between policymakers and the financial sector (and with other industries more generally).

The relationship between the central bank and the financial sector is complex. In many cases, central banks supervise commercial banks and private insurers (Horakova 2012). In those instances, *de jure*, the power is on the side of the central bank. But as Posen (1995) forcefully demonstrates, the financial sector is a critical political actor in determining the degree of CBI, as well as the inflation rate.[12] Because of its usual mode of operation (short-term deposits and long-term lending), the financial sector has a strong preference for price stability and supports low inflation. Posen (1995) demonstrates empirically that the stronger the financial sector is as a political actor, the lower the inflation rate. However, Posen does not analyze the mechanism by which the financial sector exercises its political power, which is where our paper makes a contribution. In addition, inflation is of a slow moving and persistent nature, while regulation can be changed instantly (at least *de jure*), so we expect to find larger effects on changes in regulation.

12. This is consistent with the analysis of Havrilesky (1992). See also Eijffinger and de Haan (1996) on the political economy of central banks.

The literature on financial regulation shows that banks have strong incentives to affect how they are regulated, with particular stress on leverage and information; for example, see Goodhart et al. (1998). The idea of regulatory capture dates back at least to the classic analysis of regulation in Stigler (1971). In this respect, one way in which the financial sector can exert influence over how it is regulated and over monetary policy is through its ties with the central bank governor. However, it is important to distinguish regulation of industry *a la* Stigler (1971)—where regulation entails barriers to entry, price, cost, and quantity controls—from financial regulation—which also involves macroprudence, and curbing risk taking and asymmetric information. The latter may be hindered by increased competition.[13]

The financial sector is an important pool for potential governors; and as we show, central bank governors often find employment in the financial sector once their term in office ends. In this case, the governor brings with her attitudes and perceptions that are nurtured and welcomed in the financial sector. Indeed, Braun and Raddatz (2009) find in a cross section of 150 countries that bank regulation is more "probanks" when the prevalence of former politicians and central bank governors on executive boards of commercial banks is higher. But they do not attempt to discern causation from correlation. Our findings are consistent with the "pool of potential candidates" mechanism; we do not find evidence for an effect of post tenure employment in finance on current pace of deregulation, which is inconsistent with a "quid-pro-quo" mechanism. Lucca, Seru, and Trebbi (2014) find that career transitions of federal and state U.S. banking regulators respond to the business cycle. In contrast, our results are not qualitatively different when controlling for macroeconomic conditions.

A growing body of work has recently started to examine whether specific individuals have significant impact on the organizations and countries that they lead. This literature tries to understand which personal characteristics of prominent individuals affect firm-level and aggregate outcomes. For example, Bertrand and Schoar (2003) and Kaplan, Klebanov, and Sorensen (2008) examine how firm strategies and CEO performance are related to general ability and execution skills. At the national level, Jones and Olken (2005) and Besley, Montalvo, and Reynal-Querol (2011) use arguably exogenous unexpected deaths and departures of national leaders to establish significant impacts on growth, where the latter find that educated leaders matter more. Jones and Olken (2005) find that national leaders affect growth through their effect on inflation. Dreher et al. (2009) argue that leaders who were in their past careers entrepreneurs are more successful in implementing market-liberalizing reforms; in

13. For example, Korinek and Kreamer (2014) develop a model in which financial deregulation increases bank concentration and compensation in the financial sector (at the expense of the rest of the economy), and are associated with higher risk taking. Acharya, Pagano, and Volpin (2016) study a model in which an increase in firm-to-firm mobility causes employers to provide excessive short-term compensation, while the employees take excessive long-term risk. Bijlsma, Zwart, and Boone (2012), Thanassoulis (2012), and Benabou and Tirole (2016) study models in which competition between banks leads to competition for banker talent, which manifests in high banker compensation and incentive pay (bonuses) and unnecessarily high (long run) risk for banks.

contrast with Besley, Montalvo, and Reynal-Querol (2011), they do not find a robust effect of educational background.[14]

Subtle dimensions of education—other than attainment—may also affect attitudes toward inflation, as well as other economic outcomes, for instance where schooling takes place (country and school) and what topic was studied. Studying economics, or other subjects, may have a different effect on attitudes toward inflation in countries that have demonstrated ability to curb inflation, sometimes at the cost of higher unemployment (e.g., Germany, the United States, the United Kingdom). Rubinstein (2006) demonstrates that studying economics is correlated with higher willingness to lay off workers. However, we do not find any significant effect of educational backgrounds within the sample of central bank governors.

Fernandez and Fogli (2006, 2009) show how both cultural background and personal experiences shape the fertility behavior of immigrant women in the United States. Our results are consistent with this view: Working in the financial sector shapes the preferences and beliefs of those who worked there.

Several papers study turnover of prominent national figures and assess their impact on financial and money markets. Moser (2007) demonstrates that unexpected replacement of finance ministers increases interest rate spreads of sovereign debt. Kuttner and Posen (2010) and Moser and Dreher (2010) find that central bank governor turnover affects the exchange rate. This strand of the literature focuses on short-term outcomes. While surprise turnover may have an effect in the very short run, there may be no effect—indeed, even opposite effects—in the medium and long run.[15]

Romer and Romer (2004) argue convincingly that the beliefs of chairmen of the Board of Governors of the Federal Reserve System about whether there is a permanent trade-off between inflation and unemployment and about the level of the nonaccelerating inflation rate of unemployment (NAIRU) determined their policy decisions on monetary policy. They also discuss how these beliefs may have been shaped (and detected) before appointment. Malmendier, Nagel, and Yan (2016) show that personal lifetime experiences significantly affect the forecasts and voting behavior of members of the Federal Open Market Committee in the U.S. Federal Reserve System. In this context, our work can be understood as detecting preexisting attitudes toward financial regulation (in contrast to monetary policy and inflation, *cf.* Romer and Romer 2004 and Malmendier, Nagel, and Yan 2016) as they are shaped by experience in the financial sector, and testing whether they affect policy outcomes.

14. But this last result is driven by only 11 leaders who were entrepreneurs in their past, out of a pool of 513 leaders overall. Horowitz, McDermott, and Stam (2005) find that older leaders tend less to get their countries involved in violent conflict. Horowitz, McDermott, and Stam (2008) examine how military service and educational backgrounds shape the way leaders behave when facing international conflict. Gehlbach, Sonin, and Zhuravskaya (2010) show that businessmen become politicians in Russian gubernatorial elections where local institutions are weak.

15. Cukierman and Webb (1995) show how inflation and variability of inflation correlates with degree to which central bank governors are vulnerable to political upheavals. Dreher, Sturm, and de Haan (2008, 2010) examine the determinants of central bank governor departures before the end of their term (early departures). The importance of commitment and preferences over inflation of central bank governors is illustrated by Kydland and Prescott (1977), Barro and Gordon (1983), Rogoff (1985), and Cukierman (1992). Cukierman (1994) shows how delegation of monetary decisions serves the political desires of the incumbent government.

A paper closely related to ours is Göhlmann and Vaubel (2007), who study the importance of education and past occupations of the entire monetary board composition in 11 industrialized countries (plus the Euro zone post-1999). They find that former members of the central bank staff prefer significantly lower inflation rates than former politicians do. They also find weak evidence that suggests that private-sector bankers and insurance executives are associated with lower inflation. Moreover, Göhlmann and Vaubel (2007) examine only a handful of central banks in advanced economies. Our results, which cover a broader set of countries and a longer sample, do not indicate any effect of past experience in a central bank, neither on financial regulation nor on inflation.

While we acknowledge that decision making in central banks is often made by many members, we focus only on governors due to their pivotal role. Riboni and Ruge-Murcia (2010) estimate that in advanced economies decision making about inflation in central banks is consistent with a consensus based model without a pivotal role for the governor, where a supermajority (that is, a level of support that exceeds a simple majority) is required to adopt a new policy. Our results pertain to all economies, not only advanced ones. Riboni and Ruge-Murcia (2010) do not study decision making on financial regulation, where we do find a pivotal role for governors. Our work sheds light on this important dimension of the responsibilities of central banks.

2. DATA AND EMPIRICAL STRATEGY

2.1 Data on Central Bankers and their Characteristics

Our data set covers detailed information on 658 governors of central banks who have held tenure over the period 1970–2011. The information includes central bankers' dates of duty, country, details on educational background and work experience (including country where the experience was gained), and their age.[16] The data set is compiled from various sources, which include central bank reports, websites of central banks, as well as several other online sources. After creating a list of all governors, we conducted a "web scrapping" from the Internet. Data were cross-checked across multiple sources when possible. In cases where there were discrepancies, we preferred using information posted on official central bank websites. We then manually examined this data set, corrected and supplemented it when needed. We keep track separately of each unique educational and work experience for each governor. In country-year cells in which there was more than one governor we ordered governors according to their within-year spells.[17] It is important to note

16. There are only five females in our comprehensive list of 658 central bank governors. Of these five, only three are present in the regressions sample due to data constraints. We do not find any effect for a female dummy or interactions of other explanatory variables with female, so we omit this from the analysis.

17. We keep track of within-year transitions with a within-year identifier. For example, in Argentina in 2002, governor Rocque Maccarone was replaced by Mario Bleijer during January, who was replaced by

that due to data constraints, the regression sample is more limited in scope and covers 1973–2005.

Table 1 summarizes the occupational backgrounds of central bank governors before their tenure as head of the central bank (Panel A), and their occupations after their tenure (Panel B). We classify all work experiences into nine broad categories: Academic, International Organization, Private Financial Sector, Other Private Sector, Politics, Central Bank, Ministry of Finance, Other Government, and NGO. Each governor may have more than one type of work experience; therefore observations (or percentage points) across categories sum to more than the total number of governors (or 100%) for which work experience exists.

The majority of central bank governors have previous experience in government, and 30% have worked in the Ministry of Finance. Approximately half (47%) have previous experience in a central bank. Almost 30% of governors are academics; and almost 30% have prior experience in international organizations. Thirty-five percent have work experience outside the home country (i.e., the country where they serve as central bank heads); a majority of these have worked for international organizations (almost 66%). After their tenure at the central bank, governors often take positions in the international organizations, or in government. A significant fraction of central bankers have past experience in the financial sector—almost 20%. Of these, a quarter gained experience in finance outside of the home country. A quarter of all central bankers are employed in the financial sector after their tenure. A relatively small fraction (12%) of those who return to finance take positions outside the country where they served as governors.

Central bankers with previous experience in the financial sector have become more prevalent across the world from 1970 to 2011, as seen in Figure 1. The trend is common across high- and middle-income countries; with a fourfold increase between 1970 and 2010 for the latter. For low-income countries, central bankers with financial sector experience are less common, and their share has remained stable over time. This is not surprising, given the relative underdevelopment of financial markets in developing countries. The vast majority of what we define as financial sector experience occurs in credit intermediation and banking, not in trading and securities (not tabulated). The list of all 128 central bank heads in our sample with financial sector experience is provided in Online Appendix Table A1.

In Table 2, we examine a smaller sample of 106 central bankers (out of a total of 128 who had financial sector experience) for whom we know the date at which they left the financial industry. In this sample, almost 40% spend less than 1 year after leaving the financial sector and taking up the position as the central banker. However, a significant fraction takes longer periods of time between working in finance and serving as central bank governor. For example, 15% spent 10 or more years, 10.4% spent 8–9 years, and 8.5% spent 7–8 years before starting tenure as a central bank governor.

Aldo Piganelli in June, who was replaced by Alfonso Prat Gay in December. These were given within-year identifiers of 1 to 4, respectively.

TABLE 1

WORK EXPERIENCE OF CENTRAL BANK GOVERNORS

A. Before serving as central bank governor

	Academic	International organization	Financial sector	Other private sector	Politics	Central bank	Ministry of finance	Other government	NGO	All
Observations	193	193	129	110	21	314	195	372	0	662
Percent	29.2	29.2	19.5	16.6	3.2	47.4	29.5	56.2	0.0	–
Of which outside home country										
Observations	46	126	31	12	0	27	3	50	0	232
Percent	23.8	65.3	24.0	10.9	0.0	8.6	1.5	13.4	0.0	35.0

B. After serving as central bank governor

	Academic	International organization	Financial sector	Other private sector	Politics	Central bank	Ministry of finance	Other government	NGO	All
Observations	64	117	101	100	16	23	61	195	7	398
Percent	16.1	29.4	25.4	25.1	4.0	5.8	15.3	49.0	1.8	–
Of which outside home country										
Observations	12	64	12	13	1	7	10	39	2	135
Percent	18.8	54.7	11.9	13.0	6.3	30.4	16.4	20.0	28.6	33.9

NOTES: Panel A reports the number of central banker governors that have each type of past work experience, together with the percent that these observations in the sample. The percent need not sum to 100, because governors may have more than one type of past experience. Observations of experiences that occur outside of the country in which governors serve ("home country") are reported in the third and fourth lines. Panel B reports similar statistics for work experiences after serving as governor. The sample is smaller due to data restrictions.

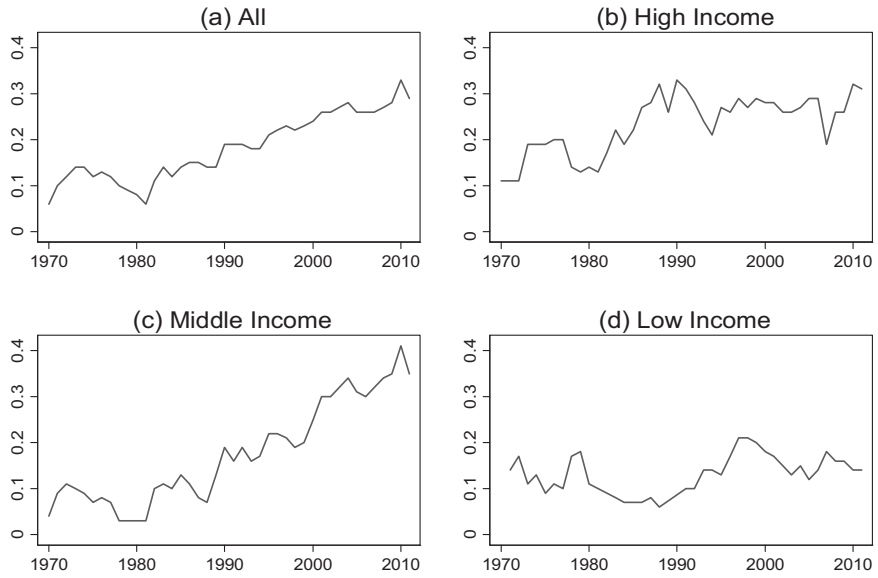

FIG. 1. Private Financial Sector Experience.

NOTES: The figure reports how the percent of central bank governors with experience in the private financial sector has changed over time. Panel A describes their prevalence across all countries, and Panels B–D distinguishes high-, middle-, and low-income countries (World Bank classifications).

TABLE 2

YEARS BETWEEN LEAVING PRIVATE SECTOR FINANCE AND STARTING POSITION AS CENTRAL BANK GOVERNOR

	0	1	2–3	4–5	6–7	8–9	10 or more	All
Percent	38.5	9.6	9.6	9.6	7.7	10.6	14.4	100

NOTES: Based on 104 observations for which we have data on date in which CBG left private-sector banking, out of total of 128 governors that had previous experience in this industry.

We summarize the educational backgrounds of central bankers in Table 3. Almost 73% have a background in Economics, and 7% have experience in Finance and Banking (Panel A). Figure 2a shows that since the late 1980s, the proportion of central bankers with economics or banking and finance degrees increased significantly. For example, in 1985, 60% of central bankers had a degree in economics. This figure increased to more than 75% in 2010. Business degrees have also become more prevalent. On the other hand, the proportion of central bank governors with law degrees has declined significantly. Panel B of Table 3 shows that 45% of central bank governors have a Ph.D. Figure 2b shows that the proportion of Ph.D. central bank governors has increased sharply over time, while those with only a bachelor's degree has declined. Only five governors are female.

TABLE 3

EDUCATION OF CENTRAL BANK GOVERNORS

A. Education fields (percent)

	Economics	Finance and banking	Accounting	Business	Law	Engineering	Natural sciences	Other
Percent	72.3	6.9	5.0	16.0	9.5	4.2	5.3	10.9

B. Highest degree attained (percent)

	BA	MA	PhD
Percent	16.1	40.2	43.7

NOTES: Panel A is based on a sample of 524 governors, for which we data on educational background. Panel B is based on 492 governors, for which we know the highest degree attained.

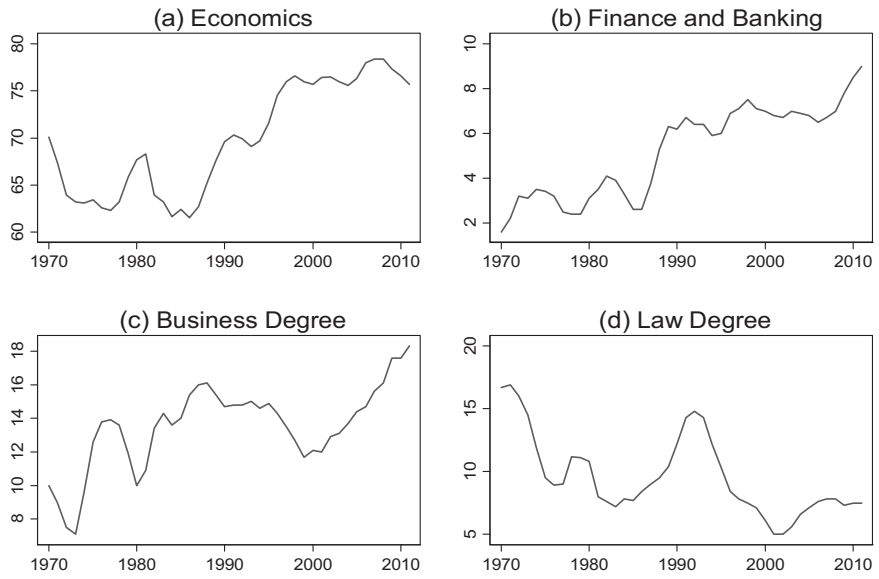

FIG. 2a. Education Fields over Time.

NOTES: Figures represent the percent of governors with each type of experience. Data are 3-year moving averages.

2.2 *Data on Financial Regulation*

Our analysis of financial regulation is based on the data set used by Giuliano, Mishra, and Spilimbergo (2013)—an extensive data set, compiled by the Research Department of the IMF, describing the degree of regulation for a sample of 150 industrial and developing countries in 1973–2005.[18] These data have significant advantages

18. This is based on the methodology in Abiad and Mody (2005). See Ostry, Prati, and Spilimbergo (2009) for more details on these data.

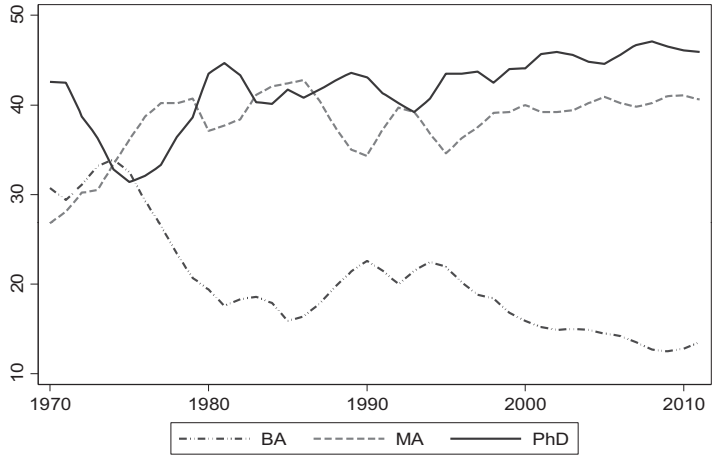

FIG. 2b. Highest Degree Attained.

NOTES: Figure represent the percent of governors with each education level. Data are 3-year moving averages.

over existing data sources, which cover fewer sectors and countries. In the original data set, there are six subindices summarizing different dimensions of the regulatory environment. The subindices are then aggregated into a variable that we call *Index* and normalized between 0 and 100. Higher values are associated with less strict regulation. The correlations among the six subcomponents of financial liberalization are high, at 0.5 or higher.[19]

In most of the paper, we focus on the aggregate *Index*, but we also entertain two more aggregate subindicators of regulation in financial markets:

- Securities markets regulation: This subindex assesses the quality of the market institutions, including the existence of an independent regulator and the extent of legal restrictions on the development of domestic bond and equity markets.
- Banking sector regulation: This subindex captures the existence of price and quantity controls, barriers to competition, and quality of regulation.

These subindices are described in more detail in Table 4.

2.3 Other Data

- Lagged level of regulation index: This variable can be a proxy for important incentives in favor and against the implementation of structural reforms. Excessive government regulation and/or market failures may be perceived as costlier

19. The two measures most frequently used as indicators of financial repression—credit controls, and interest rate controls—are highly correlated with each other, with a correlation of 0.65. Less correlated are the measures of financial liberalization relating to entry barriers and securities regulations. The measure of privatization in the banking sector has the lowest correlation with the other components, an indication that privatization does not coincide with other reforms.

TABLE 4

FINANCIAL SECTOR REGULATION INDICES

Financial sector	The index of domestic financial liberalization is an average of six subindices, five related to banking and one related to the securities market.
Banking	The banking subindex is an average of the following five indicators: (i) interest rate controls, such as floors or ceilings; (ii) credit controls, such as directed credit and subsidized lending; (iii) competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks; (iv) the degree of state ownership; and (v) the quality of banking supervision and regulation, including power of independence of bank supervisors, adoption of Basel capital standards, and a framework for bank inspections.
Securities market	The sixth subindex relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents.

when the economy is least reformed. At the same time, the beneficiaries of existing large rents may oppose reforms. In addition, since the regulation indices are bounded between zero and one, this variable controls for the mechanical property that the index allows less scope for deregulation as regulation becomes lighter.

- Economic crises: According to a widely held view, economic crises foster reforms by making evident the cost of stagnation and backwardness. The opposite view maintains that it is easier to implement reforms during periods of economic growth when potential losers can find other opportunities in a booming economy or when countries become richer and have more resources to compensate the losers. Crisis is measured by episodes of hyperinflation (inflation rate greater than 40% points).
- Real devaluation: Compensation schemes can offset costs associated with reforms. A large government may compensate losers from reforms compared to a very lean government with a small budget. We use the magnitude of change in the real exchange rate as a control variable; a real devaluation could promote exports and therefore help compensate losers from reforms. For instance, some important reforms happened together with large devaluations and in the context of IMF programs.
- IMF program: Indicator for the existence of IMF program in all specifications.
- Reforms in neighbors: Reforms in neighboring countries or in trading partners may affect the adoption of domestic reforms through peer pressure and imitation. We use the weighted average of reforms in neighboring countries, where the weights are defined by geography. The source for geographic distance is CEPII.[20]

20. http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

For bilateral trade flows, we use the IMF's Direction of Trade Statistics. This variable acts like a time-varying and country-specific trend in reform.

- Left wing in power: The ideology of the ruling government may determine the adoption of reforms. For example, Alesina and Roubini (1992) argue that right-wing governments are more inclined to market-oriented reforms. We capture the ideological orientation of the executive with the indicator "left," which is equal to 1 if the executive belongs to a party of the left and 0 if it belongs to a right-wing, centrist, or other party. The source for this variable is the Database of Political Institutions from the World Bank.[21]
- CBI. The measure of the *de facto* independence of a central bank is the turnover rate of central bank governors. The data are from Cukierman, Webb, and Neyapti (1992). We create an indicator that is equal to 1 for above median CBI (i.e., below median turnover). Turnover is computed once, during 1980–89, and has no within-country time variation.

The unit of analysis is a country-year observation. The merged data set with central banker's past experience and financial regulation comprises an unbalanced panel of 1,493 observations with 74 countries, 32 years from 1973–2005, and 320 central bankers. Due to data limitations, the data set for our preferred specification with several control variables is a smaller sample, an unbalanced panel of 1,222 observations: 68 countries and 246 central bank governors. Table A2 provides the summary statistics for the key variables used in this specification.

Figure 3 shows the evolution of the share of central bankers with prior financial sector experience and the financial regulation index (normalized between 0 and 1, with 0 corresponding to the strictest degree of regulation and 1 corresponding to the least strict). Both variables tend to move together over time, especially for high- and middle-income countries. Although suggestive of a relationship between the two, Figure 3 does not show that increased prevalence of central bankers causes financial reforms, or financial deregulation. The empirical analysis below examines this issue more rigorously.

2.4 Empirical Strategy

We define financial sector reform as the change in the index of regulation in country c at time t:

$$Reform_{c,t} = Index_{c,t} - Index_{c,t-1}. \tag{1}$$

$Reform_{c,t} > 0$ means a change toward fewer restrictions on financial activity—for example, fewer restrictions on development of domestic bond and equity markets,

21. Note that the Data set of Political Institutions defines the ideology of the government also for autocratic regimes. We also examined the effect of whether a country has a presidential form of government, where it may be easier to implement reforms. Since our regressions include country fixed effects and there are very few transitions to or from presidential systems, we drop this variable from the analysis.

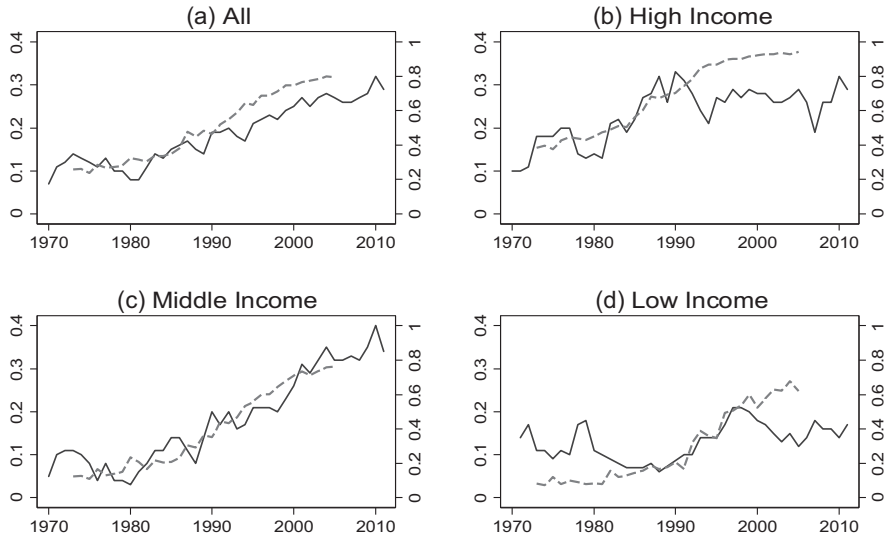

FIG. 3. Private Financial Sector Experience and Financial Deregulation.

NOTES: The figures report the percent of governors with past experience in the private financial sector, together with the financial regulation index from IMF (2009). Here 0 corresponds to the strictest degree of regulation and 1 corresponds to the least strict.

fewer price (interest rate) controls, or fewer restrictions on competition—that is, deregulation. Our baseline specification is

$$Reform_{c,t} = \alpha \cdot Index_{c,t-1} + \beta \cdot CBG_{(c,t)_i} + \phi \cdot X_{c,t} + \gamma_c + \chi_t + \varepsilon_{c,t}, \qquad (2)$$

where $CBG_{(c,t)_i}$ is a vector of characteristics of the central banker i who is in office in country c, in year t. Here, γ_c and χ_t are country and year fixed effects, respectively, and $X_{c,t}$ are country-specific and time-varying controls. Country fixed effects control for any country-specific time-invariant characteristics, and time dummies control for any common trend in financial sector deregulation, which may be correlated with characteristics of central bankers. Standard errors in all regressions are clustered at the governor level, in order to reflect the fact that in general there are potentially multiple country-year observations per governor, while governor characteristics do not vary along these dimensions (Moulton 1990).[22]

We restrict the data set to one governor per country-year cell, to ensure that $Reform_{c,t}$ is "treated" by not more than one governor. We do this because our dependent variable varies only at the country-year level; repeating the reform variable

22. Being bounded between −100 and 100 by construction, the reform variable does not have a unit root; however, it can still exhibit a trend within the bounds. Giuliano, Mishra, and Spilimbergo (2013) report standard panel unit root tests and reject the null of unit roots for the financial sector reform index.

for country-year cells with multiple governors will likely create correlation across errors within a country-year cell. Less than 3% of the country-year observations have more than two governors (3, 4, or 5); we drop these observations. About a quarter of all country-year observations in our data set involve two central bankers in the corresponding year, that is, these are country-year cells in which governors are replaced during a year. For these country-year cells, we keep the central banker who took office first, because future governors are captured in the subsequent country-year cell. Consistent with this, we restrict attention to governors who appear in at least two calendar years. Our main findings are robust to keeping the incoming central banker (rather than the outgoing one), and also to including multiple governors in the country-year cell.

We control for the lagged level of the index in order to identify the existence of convergence toward some possible country-specific levels of regulation, and in order to take into account the limited range of the index (as the index increases there is less scope for reform).[23] In some specifications, we interact $CBG_{(c,t)_i}$ with the lagged level of the index in order to examine whether the effect of governor characteristics depends on scope for reform.

We estimate (2) by the "within" estimator. Since (2) includes lagged values of *Index* and country fixed effects, the "within" estimator is subject to the "Nickell bias" because *Reform* includes the current level of *Index* (Nickell 1981). The fact that *Reform* is the change in *Index* does not change this. This bias vanishes as number of periods increases within a country. Our sample is long, including 31 years from 1974 to 2005. Nevertheless, in our regressions below we also report results using a generalized method of moments (GMM) dynamic panel estimator.[24]

3. RESULTS

We begin analyzing the relationship between past experience of the central banker and financial sector reform in Table 5. Column (1) includes the lagged level of the index, dummies for past experience of the central banker $CBG_{(c,t)_i}$ (including past experience in the financial sector, academia, other private sector, central banking, ministry of finance, and international organizations), and our basic set of control variables $X_{c,t}$ (including lagged economic crises [inflation > 40], lagged real devaluation, lagged IMF Program, lagged dummy for left government in office).

The coefficient on past experience in the financial sector in column (1) is 1.086 and statistically significant at the 5% level; central bankers with prior experience in the

23. We also address potential concerns about nonlinear effects of lagged level of the index. We add the square of the lagged level of the index in order to examine the sensitivity of our results to the linear specification. Our main findings are robust to this. We thank an anonymous referee for pointing out this issue.

24. In particular, we apply the `xtabond2` command in Stata, encompassing both the "difference GMM" and "system GMM" refinement. We use two lags of the endogenous lagged variable in the instrument set, which includes the other (presumably exogenous) variables.

TABLE 5

FINANCIAL SECTOR REFORMS AND EXPERIENCE OF CENTRAL BANKER

	Dependent variable: financial sector reform in (country, year)							
	[1] Baseline	[2] Lag index x experience	[3] Central bank independence	[4] Left leaning government I	[5] Left leaning government II	[6] Tenure as governor	[7] Age	[8] GMM
Lagged level of index	−0.144***	−0.137***	−0.144***	−0.140***	−0.139***	−0.145***	−0.153***	−0.085***
	[0.016]	[0.016]	[0.017]	[0.016]	[0.016]	[0.016]	[0.018]	[0.028]
Past experience in private financial sector	**1.086****	**2.599***	**−0.102**	**1.147****	**1.131****	**1.488****	**1.312****	**0.846****
	[0.493]	**[1.366]**	**[0.784]**	**[0.526]**	**[0.526]**	**[0.661]**	**[0.537]**	**[0.411]**
Past experience in private financial sector * Lagged level of index		**−0.025**						
		[0.018]						
Past experience in private financial sector * High central bank independence			**2.381****					
			[1.034]					
Past experience in academia	0.690*	0.601^	0.938**	0.644^	0.643^	0.723*	0.771*	0.148
	[0.393]	[0.395]	[0.412]	[0.441]	[0.438]	[0.394]	[0.405]	[0.380]
Past experience in other private sector	0.489	0.476	0.416	0.417	0.398	0.505	0.287	0.748*
	[0.417]	[0.415]	[0.414]	[0.468]	[0.465]	[0.424]	[0.422]	[0.418]
Past experience in central banking	0.149	0.163	−0.023	0.26	0.272	0.105	0.189	0.31
	[0.361]	[0.361]	[0.350]	[0.374]	[0.372]	[0.370]	[0.408]	[0.339]
Past experience in ministry of finance	0.012	0.037	−0.354	0.107	0.095	0.009	0.315	−0.022
	[0.423]	[0.417]	[0.420]	[0.439]	[0.438]	[0.426]	[0.463]	[0.349]
Past experience in international organization	**−0.775****	**−0.789****	**−0.385**	**−0.816****	**−0.795***	**−0.752****	**−0.852****	**−0.605***
	[0.376]	**[0.371]**	**[0.361]**	**[0.406]**	**[0.406]**	**[0.373]**	**[0.386]**	**[0.320]**

(*Continued*)

TABLE 5

CONTINUED

	Dependent variable: financial sector reform in (country, year)							
	[1] Baseline	[2] Lag index x experience	[3] Central bank independence	[4] Left leaning government I	[5] Left leaning government II	[6] Tenure as governor	[7] Age	[8] GMM
Lagged crisis (inflation > 40)	−0.153	−0.251	−1.045	−0.237	−0.211	−0.16	−0.274	−0.297
	[0.996]	[1.036]	[0.818]	[0.998]	[0.996]	[1.005]	[1.004]	[2.641]
Lagged real devaluation	0.653	0.617	1.385*	0.783	0.795	0.651	0.666	−5.632*
	[1.026]	[1.053]	[0.787]	[0.970]	[0.969]	[1.017]	[1.030]	[3.318]
Lagged reforms in geographical neighbors	−7.872	−8.086	0.367	−8.056	−8.247	−8.016	−9.313	−15.211
	[8.511]	[8.578]	[8.577]	[8.694]	[8.726]	[8.502]	[8.658]	[22.184]
Lagged IMF Program	0.057	0.018	0.143	−0.007	−0.025	−0.032	0.189	−0.169
	[0.396]	[0.400]	[0.417]	[0.348]	[0.350]	[0.334]	[0.400]	[1.366]
Lagged dummy for left	−0.061	−0.109	−0.16		0.302	0.04	−0.01	0.036
	[0.337]	[0.341]	[0.376]		[0.414]	[0.397]	[0.363]	[1.083]
Lagged dummy for left in year of appointment				−0.425	−0.519			
				[0.454]	[0.458]			
Past experience in private financial sector * Years as governor						−0.097		
						[0.102]		
Years as governor						0.05		
						[0.060]		
Age of governor (in logs)							1.706	
							[1.320]	
Lagged index at first quartile		1.753**						
Lagged index at second quartile		1.133**						
Lagged index at third quartile		0.483						
Observations	1,222	1,222	1,043	1,138	1,138	1,222	1,157	1,222
Number of countries	68	68	50	67	67	68	68	68
Number of governors	246	246	199	228	228	246	231	246
R^2	0.21	0.21	0.21	0.20	0.20	0.21	0.22	

NOTES: All regressions include country and year fixed effects. Standard errors are clustered at the governor-level. ***, **, *, and ^ denote statistically significant at 1, 5, 10, and 15%, respectively. Central Bank Independence (CBI) is taken from Crowe and Meade (2008). Central Banks with CBI above the median are defined as "High Central Bank Independence." The bold-face type signifies the variables of interest.

financial sector are associated with greater financial sector reforms.[25] This implies that, on average, we predict reform to be about 1.1 percentage points greater every year in which there is a governor with financial sector experience than in a year in which the governor has no financial sector experience. Compared to the average annual level of reform of about 2.0 (Table A2 in the Online Appendix), the point estimate of 1.1 implies an economically large effect: on average, having a central bank governor with past experience in finance increases the annual rate of financial deregulation by more than 50%. The average duration of tenure of a governor over our sample is 5.6 years. This implies that a governor with financial sector experience, on average, can increase reforms roughly three times faster during tenure, relative to a governor who did not have such past work experience.[26]

We also find that past experience in an international organization is negatively and significantly associated with reform. On average, countries where central bankers have prior experience in international organizations are associated with 0.775 percentage points slower reform. We examine below (in Table 8) which international organizations drive this result. We do not find past experience in any other sector—academia, other private sector, central banking, ministry of finance—to be significantly associated with reform (experience in academia is only marginally statistically significant, and less stable across specifications).

Next, we ask whether the effect of financial sector experience varies by the scope for further deregulation. In column (2), we interact financial sector experience with the lagged level of the index. The interaction is negative, which implies that the lower is the level of the index, the greater the effect of experience in the financial sector on financial reforms. Experience in the financial sector matters much more when there is greater scope for deregulation.[27] At the bottom of column (2), we report the marginal effect of past experience in finance at different quartiles of the lagged index. There we see that the effect is 1.753% higher reform when the lagged index is at the first quartile. Compared to the average effect in column (1) of roughly 1%, this implies a much larger effect when the scope for reform is larger. At the third quartile the effect diminishes to 0.483 and is no longer statistically significant at conventional levels.

3.1 Sensitivity Analysis

Central bank governors may have more power to affect policy when they are more independent. The results in column (3) of Table 5—where we interact past experience in finance with a dummy for high (above median) CBI—are consistent with this idea. Essentially, all the effect of past experience in finance rests with banks that are highly independent, where the effect is more than twice as large.

One important threat to the internal validity of our main result is that if a promarket party or individual takes power, it may both appoint central bankers with financial

25. The effect of central bankers with prior financial sector experience for financial reforms is statistically indistinguishable between advanced economies, and emerging and LICs (not shown).

26. $5.6 * (1.1/2.0) = 3.08$.

27. In Online Appendix Table A3, we include interactions of all the experience variables with the lagged level of the financial sector reform index. Our main findings remain robust.

sector experience and take other actions to deregulate. Alternatively, if a party in power suddenly decides to pursue deregulation, it may both appoint central bankers with financial sector experience as a way to implement this agenda more effectively and at the same time take other actions to deregulate. This concern is addressed, to some extent, by the fact that our findings are robust to controlling for whether a left-wing government is in power.[28] In order to further address this concern, in column (4) we replace the annual indicator for left by an indicator for the left-wing government in power in the year the governor was appointed (essentially, moving the information from $X_{c,t}$ to $CBG_{(c,t)_i}$); and in column (5) we include both. This only increases the effect of past experience in finance.

Related to the concern above, if an unobserved change in political winds causes the appointment of a governor with the intention to implement financial reform, then reforms are more likely to happen in the first years during tenure. On the other hand, if deregulation is the preference of the governor, then it is likely to be more spread out throughout time. To test this idea, in column (6) we add an interaction of past experience in finance with the number of years as governor, as well as the number of years as governor independently. The interaction is insignificant, indicating that governors with private financial sector experience are no more likely to reform in early years on the job, as is likely to be the case if countries who want to reform are likely to hire governors from the private financial sector. Finally, in column (7) we add the age of the governor, which also increases the effect of past experience in finance, but has no significant effect on the main result.[29]

An additional concern with our main results may arise due to the Nickell (1981) bias: we are estimating a fixed effects panel regression with (effectively) lagged dependent variable. This bias diminishes with the number of periods in the panel, which is 31 in our sample.[30] Despite this relatively long time period, we estimate our baseline specification using the Arellano–Bond dynamic panel estimator.[31] In column (8), we see that the coefficient on the lagged dependent variable diminishes, as would be predicted after correcting for the Nickell bias. This also results in a reduction in the size of the coefficient on past experience in finance. Thus, while the magnitude of least squares is upward biased, the association is not driven by the Nickell bias.

28. It has been argued that Alan Greenspan succeeded Paul Volcker precisely because Volcker was not perceived as being in favor of financial deregulation. See, for example, *The Huffington Post* (2008): "The Fall of Wall Street is to Market Fundamentalism What the Fall of the Berlin Wall Was to Communism," October 17, 2008. If this were true, it would pose a threat to our interpretation. The left versus right-wing leaning governments dummy variable addresses this concern in our regressions, for example, capturing the switch from the Carter to the Reagan administration.

29. In unreported regressions, we show that the larger coefficient to past experience in finance in columns (4), (5), and (7) is partly due to changes in the sample, where we lose mostly observations from less developed countries.

30. See Buddelmeyer et al. (2008) for properties of the Nickell bias in long panels.

31. We use the `Stata` command `xtabond2`, with two lags of the endogenous lagged variable in the instrument set, which includes the other (presumably exogenous) right-hand side variables. Using two lags prevents losing many observations; results using more than two lags are qualitatively and quantitatively similar.

While we do not have plausible instruments for governors' characteristics, we argue that the results are not completely driven by spurious correlation. The obvious threat to internal consistency is bias due to omitted variables: external events may determine both reforms and governors' characteristics. We try to address this with several control variables. In addition, in Online Appendix Table A4 we show that macroeconomic events do not predict the background of the governor.[32]

Related to the concern addressed above by inclusion of the indicators for the left-wing government (annual and at date of appointment), an additional concern for identification of the effect of past experience arises if the political system in countries with a preference for reform tend to choose central bank governors who are more likely to be reform oriented. If attitudes toward deregulation are either country-specific but time-invariant, or broad time-varying trends that are common across countries, then country and time fixed effects in our empirical specifications control for such attitudes. If, however, attitudes toward deregulation are country-specific and time-varying, this is insufficient. However, the inclusion of country and year-varying fixed effects does not leave us with any degrees of freedom. Therefore, we estimate equation (2) with country-by-decade fixed effects to try to further address this concern. This goes some way toward controlling for country-specific and time-varying omitted variables.

Table 6 reports regressions where we compare our baseline results on the effect of past experience in the financial sector (columns (1) and (2) replicate columns (1) and (2) in Table 5) with estimates of these effects from specifications without country fixed effects, without year fixed effects, and then when we include country-by-decade fixed effects. These comparisons shed some light on whether the concerns raised just above are likely to bias our results.

Columns (3) and (4) report estimates of equation (2) without country fixed effects. Since the country fixed effects are relegated to the error in these specifications, we expect them to bias the estimator, as an omitted factor. Compared to column (1), the estimated coefficient on past experience in the private financial sector in column (3) drops, and although the standard error drops too, the estimate is not statistically significant at conventional levels. This implies that countries that tend to implement financial reform (larger country fixed effects) are less likely to appoint a governor with past experience in finance, who is more likely to implement reform. We would expect the opposite, that is, that countries that prefer reform appoint governors that are more likely to implement reform. The attenuation effect is smaller in column (4) versus column (2), but the interpretation remains the same. The difference in attenuation between columns (3) and (4) is due to the fact that the interaction of experience in finance with lagged regulation captures some of the variation that is country-specific and correlated with past experience in finance.

Next we investigate whether common trends in the incidence of reform are correlated with the incidences of governors with past experience in finance. To do this,

32. This is in line with Dreher and Lamla (2007) and Dreher et al. (2009), who demonstrate that backgrounds of politicians are virtually uncorrelated with macroeconomic and political events and crises.

TABLE 6

FINANCIAL SECTOR REFORMS AND EXPERIENCE OF CENTRAL BANKER: BASELINE AND NO FIXED EFFECTS

	Dependent variable: financial sector reform in (country, year)							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Baseline		No country fixed effects		No time fixed effects		Country* decade fixed effects	
Lagged level of index	−0.144***	−0.137***	−0.030***	−0.026***	−0.039***	−0.031***	−0.195***	−0.192***
	[0.016]	[0.016]	[0.007]	[0.007]	[0.007]	[0.007]	[0.019]	[0.020]
Past experience in private financial sector	**1.086****	**2.599***	**0.467**	**1.991***	**0.889***	**3.249****	**0.904***	**1.492**
	[0.493]	**[1.366]**	**[0.365]**	**[1.206]**	**[0.492]**	**[1.497]**	**[0.511]**	**[1.333]**
Past experience in private financial sector * Lagged level of index		**−0.025**		**−0.024^**		**−0.039****		**−0.01**
		[0.018]		**[0.015]**		**[0.020]**		**[0.018]**
Past experience in academia	0.690*	0.601^	0.081	0.027	0.398	0.276	0.039	0.025
	[0.393]	[0.395]	[0.287]	[0.292]	[0.393]	[0.396]	[0.417]	[0.418]
Past experience in other private sector	0.489	0.476	0.44	0.434	0.927**	0.894**	0.046	0.046
	[0.417]	[0.415]	[0.343]	[0.345]	[0.410]	[0.410]	[0.405]	[0.405]
Past experience in central banking	0.149	0.163	−0.052	−0.073	0.294	0.309	0.139	0.137
	[0.361]	[0.361]	[0.267]	[0.266]	[0.384]	[0.388]	[0.345]	[0.343]
Past experience in ministry of finance	0.012	0.037	−0.232	−0.281	−0.354	−0.307	0.400	0.412
	[0.423]	[0.417]	[0.280]	[0.284]	[0.446]	[0.436]	[0.475]	[0.469]
Past experience in international organization	**−0.775****	**−0.789****	**−0.535****	**−0.511****	**−0.728***	**−0.747****	**−0.594^**	**−0.620^**
	[0.376]	**[0.371]**	**[0.255]**	**[0.249]**	**[0.383]**	**[0.378]**	**[0.409]**	**[0.413]**

(*Continued*)

TABLE 6

CONTINUED

	Dependent variable: financial sector reform in (country, year)							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Baseline		No country fixed effects		No time fixed effects		Country* decade fixed effects	
Lagged crisis (inflation > 40)	−0.153	−0.251	0.98	0.865	1.534	1.341	0.414	0.415
	[0.996]	[1.036]	[0.965]	[0.995]	[1.139]	[1.188]	[1.037]	[1.044]
Lagged real devaluation	0.653	0.617	0.144	0.125	0.788	0.721	0.923	0.915
	[1.026]	[1.053]	[1.126]	[1.157]	[0.945]	[0.973]	[0.937]	[0.945]
Lagged reforms in geographical neighbors	−7.872	−8.086	−13.535^	−13.369^	7.54	6.435	−13.584*	−13.710*
	[8.511]	[8.578]	[8.876]	[8.933]	[7.195]	[7.271]	[8.171]	[8.206]
Lagged IMF Program	0.057	0.018	0.198	0.166	0.079	0	−0.32	−0.332
	[0.396]	[0.400]	[0.297]	[0.301]	[0.365]	[0.370]	[0.379]	[0.381]
Lagged dummy for left	−0.061	−0.109	0.511*	0.495*	0.346	0.275	0.131	0.123
	[0.337]	[0.341]	[0.286]	[0.290]	[0.363]	[0.372]	[0.407]	[0.410]
Lagged index at first quartile		1.753**		1.1959*		1.934**		1.160^
Lagged index at second quartile		1.133**		0.614^		0.970*		0.917*
Lagged index at third quartile		0.483		0.003		−0.040		0.662
Observations	1,222	1,222	1,222	1,222	1,222	1,222	1,222	1,195
Number of countries	68	68	68	68	68	68	68	68
Number of Governors	246	246	246	246	246	246	246	246
R^2	0.210	0.212	0.12	0.12	0.10	0.10	0.30	0.30

[a]NOTES: All regressions include country and year fixed effects. Standard errors are clustered at the governor-level. ***, **, *, and ^ denote statistically significant at 1, 5, 10, and 15%, respectively. The bold-face type signifies the variables of interest.

we drop time fixed effects in columns (5) and (6) of Table 6. The omission of time fixed effects in column (5) lowers a bit the coefficient on past experience in finance compared to column (1), implying that broad trends in deregulation are negatively correlated with the rising incidence of governors with past experience in finance.[33] The estimated effect at the first quartile of the lagged index in column (6) is a bit larger than in column (1), and is markedly smaller than at the third quartile. Overall, we interpret this as evidence that not taking into account aggregate trends in reform only weakly affects our estimates of the effect of past experience in finance on reform.

In the last permutation of fixed effects, we replace the country and time fixed effects with country-by-decade fixed effects. These fixed effects absorb changes in trends toward reform across decades within countries. This is a very demanding specification, since it restricts identification of the effect of past experience in finance to variation within decades within countries. The results in columns (7) and (8) confirm the main message of columns (1) and (2). The coefficients are somewhat smaller, but we still find a significant effect of past experience in finance, although the interaction with lagged level of the regulation index loses statistical significance. The country-by-decade fixed effects pick up some of the variation in the remaining scope for reform.

The message from Table 6 is that country-specific attitudes, or global trends toward deregulation, or even country and time-varying (by decade) attitudes toward reform do not drive our results. If anything, countries with a preference for financial sector reform are less likely to appoint reform-oriented governors, and therefore controlling for such preferences raises the magnitude of the effect of financial sector experience on reforms.

In order to further address concerns that slowly changing, but persistent country-specific factors (such as evolving preferences toward deregulation) drive the results, we shift the timing of governors' job spells. If such factors determine both the pace of deregulation and the appointment of governors, then we expect to find little change in the results when we shift the timing of job spells forward or backward. One way to view this exercise is like a placebo, where we estimate whether characteristics of future or past governors determine the current pace of deregulation.[34] The average length of a job spell as governor is about 5.6 years. Therefore, we estimate (2) while shifting the timing of a governor's characteristics $CBG_{(c,t)_i}$ either 6 years earlier to $t-6$ or later to $t+6$. We also lag or lead $Index_{c,t-1}$ by 6 years, commensurate with the $CBG_{(c,t)_i}$ lag or lead, in order to take into account the fact that the propensity for reform changes (although this is immaterial for the results). We do this in two ways: first use the lead or lag of the entire vector of governor characteristics in $CBG_{(c,t)_i}$; then we only change the timing of the private-sector financial experience information. In all these specifications, the coefficient on experience in finance is small and not statistically significant, whether shifted forward or backward. These

33. This does not contradict the pattern in Figure 3, which does not control of other covariates.

34. Note that this is distinct from asking whether future employment of current governors affects current reform.

results indicate that the effect is concentrated in the period of the job spell, further weakening concerns for spurious correlation.[35]

In a final check, we try to predict experience in finance by regressing it on our macroeconomic control variables. The macroeconomic environment may affect preferences about the economy and also about the nature of the desired central bank governor. We fit a linear probability model with the indicator for past experience in finance as the dependent variable. We do this both at the annual frequency, and also using only the years in which the governor is appointed. We do not find any robust effect of the macroeconomic environment, except in response to lagged crisis (inflation $> 40\%$) at the annual frequency. This effect vanishes when we use only the year of appointment (Online Appendix Table A4).

3.2 Financial Sector Experience and Types of Financial Deregulation

We now ask whether the effect of financial sector experience varies by type of financial reform: banking or securities market. In order to address this question, we repeat the main specifications in Table 5 (columns (1) and (2)) by changing the type of reform as the dependent variable. The results are reported in Table 7. In Panel A, we find that prior financial sector experience is significantly associated with reforms in the banking sector (column (1)), but not with securities markets reforms (column (2)). This result can be explained by the fact that the vast majority incidence of financial sector experience occurs in credit intermediation and banking, not in trading and securities. Moreover, central banks regulate banks more often than securities markets, so this is likely to be a dimension in which the governor has more influence. Columns (3)–(7) repeat the regressions for the various subcomponents of banking sector reforms. The effect of experience in the financial sector is positive for all subcomponents of banking reform (Panel A), and statistically significant for three subcomponents: directed credit, interest rate controls, and entry barriers/competition restrictions.

When we add an interaction of past experience in finance with the lagged reform index in Panel B of Table 7, we find that banking reform is more influenced when there is greater scope for reform, as in Table 5. When looking at subcomponents of banking deregulation we find strong effects on reducing the prevalence of Directed Credit and Interest Rate Controls, more so when the scope for doing so is large, and similar effects—albeit not statistically significant—for Entry Barriers, Competition Restriction, and Privatization.

We do not find an effect of past experience on quality of banking supervision. Recall that this pertains to the power and independence of bank supervisors, the adoption of Basel capital standards, and the presence of a framework for bank inspections. Therefore, reform in this dimension, as the index is constructed, is in fact a movement toward stricter regulation, not deregulation. This can explain why supposedly probank governors with experience in finance are not associated with deregulation in this dimension.

Overall, the evidence suggests that central bank governors with financial sector experience are associated with procompetitive reforms, and with fewer restrictions

35. These results are available by request.

TABLE 7

COMPONENTS OF FINANCIAL SECTOR REFORMS AND EXPERIENCE OF CENTRAL BANKER

	Dependent variable: financial sector reform in (country, year)						
	[1] Components of financial regulation		[3]	[4]	[5] Components of banking subindex	[6]	[7]
	Banking	Securities	Directed credit	Interest rate controls	Entry barriers, competition restrictions	Quality of banking supervision	Privatization
A. Baseline specification							
Lagged level of index	−0.153***	−0.201***	−0.177***	−0.178***	−0.186***	−0.225***	−0.189***
	[0.017]	[0.026]	[0.027]	[0.024]	[0.021]	[0.022]	[0.030]
Past experience in private financial sector	1.299**	0.482	2.186**	2.010^	1.729**	0.41	0.365
	[0.523]	[0.880]	[1.048]	[1.340]	[0.871]	[0.853]	[1.025]
Observations	1,222	1,222	1,222	1,222	1,222	1,222	1,222
Number of countries	68	68	68	68	68	68	68
Number of Governors	246	246	246	246	246	246	246
R^2	0.20	0.20	0.17	0.18	0.18	0.19	0.18
B. Experience interacted with lagged index							
Lagged level of index	−0.146***	−0.201***	−0.173***	−0.173***	−0.185***	−0.226***	−0.196***
	[0.017]	[0.026]	[0.026]	[0.023]	[0.020]	[0.023]	[0.032]
Past experience in private financial sector	2.733**	1.15	6.459***	6.497**	2.102	−1.173	−3.336
	[1.344]	[2.439]	[2.174]	[3.068]	[2.006]	[1.917]	[2.413]
Past experience in private financial sector * Lagged level of index	−0.024	−0.011	−0.071**	−0.075*	−0.006	0.026	0.062*
	[0.018]	[0.034]	[0.030]	[0.042]	[0.027]	[0.027]	[0.036]
Observations	1,222	1,222	1,222	1,222	1,222	1,222	1,222
Number of countries	68	68	68	68	68	68	68
Number of Governors	246	246	246	246	246	246	246
R^2	0.21	0.20	0.17	0.18	0.18	0.19	0.18

NOTES: All regressions include country and year fixed effects. The following control variables are included, but not reported: Past experience in academia, Past experience in other private sector, Past experience in central banking, Past experience in ministry of finance, Past experience in international organization, Lagged crisis (inflation > 40), Lagged real devaluation, Lagged reforms in geographical neighbors, Lagged IMF Program, Lagged dummy for left. Standard errors are clustered at the governor-level. ***, **, *, and ^ denote statistically significant at 1, 5, 10, and 15%, respectively.

on banking activities. Consistent with a free market approach (including fewer restrictions on entry), governors with financial sector experience do not promote reform toward tougher, or better quality regulation. This is consistent with an interpretation that governors who have past experience in finance have aligned preferences with the financial sector: it is not reforms *per se* that are promoted; rather, reforms that are favored by banks are promoted and others are not, in particular those that pertain to macroprudential regulation, and attempts to curb risk taking and asymmetric information.[36]

3.3 Differential Effects on Deregulation across International Organizations

We now ask whether the effect of experience varies across different international organizations: the IMF, World Bank, United Nations (UN), BIS, other development banks (not the World Bank). Although on average experience in an international organization is associated with less financial reforms (Table 5), we find substantial variation across different international organizations. In column (1) of Table 8, we find that experience at the IMF is associated with greater reforms; this is consistent with the influence of the so-called "Washington Consensus" at the IMF on governors. In contrast, experience at the UN and the BIS seem to drive the negative association in Table 5. This is consistent with the view that these institutions instill a more prudential and cautious view on financial deregulation, especially at the BIS. Experience at the World Bank shows no significant relationship with financial sector reforms.

In columns (2) and (3), we examine the effect of different types of international organization experience on the subcomponents of the financial sector reform index: banking and securities. The estimated effects are qualitatively similar to that in column (1) of Table 8, with some variation in magnitudes. Past experience at the IMF predicts deregulation of both subcomponents, with a higher effect for securities market deregulation. Experience at the UN predicts slower banking deregulation, but not securities markets. Experience at the BIS is strongly and negatively associated with both banking and securities market deregulation; more so with slower securities markets deregulation. In fact, we find some evidence, albeit weak, for experience at the BIS to be associated with more reforms in the quality of banking supervision, which conforms with the mandate of the BIS to strengthen the regulation, supervision and risk management of the banking sector (these results are available upon request).

3.4 The "Revolving Door" and Education

Governors' decisions may be affected by the promise of lucrative employment in finance in return for promoting deregulation. In order to address this so-called "revolving door" hypothesis, we estimated versions of (2) with experience indicators for post-term employment, either in addition to past experience indicators or alone.

36. It important to distinguish financial regulation from the classic regulatory capture theory in Stigler (1971), where regulation entails barriers to entry, price, cost, and quantity controls. Instead, financial regulation highlights macroprudence, and attempts to curb risk taking and asymmetric information, which can be hindered with increased competition (Goodhart et al. 1998).

TABLE 8

FINANCIAL SECTOR REFORMS AND EXPERIENCE OF CENTRAL BANKER: DOES THE EFFECT VARY BY TYPE OF EXPERIENCE IN INTERNATIONAL ORGANIZATIONS?

	Dependent variable: financial sector reform in (country, year)		
	[1]	[2]	[3]
		Components of financial regulation	
		Banking	Securities
Lagged level of index	−0.151***	−0.156***	−0.211***
	[0.016]	[0.017]	[0.027]
Past experience at the International Monetary Fund	**1.489****	**1.336***	**3.112****
	[0.721]	**[0.728]**	**[1.469]**
Past experience at the World Bank	**0.509**	**0.313**	**1.826**
	[1.165]	**[1.269]**	**[1.307]**
Past experience at the Bank of International Settlements	**−1.881****	**−1.564****	**−4.168****
	[0.751]	**[0.742]**	**[1.621]**
Past experience at the United Nations	**−1.969*****	**−2.187*****	**−1.21**
	[0.715]	**[0.806]**	**[1.130]**
Past experience in other development banks (not the World Bank)	**−0.706**	**−0.77**	**−0.975**
	[0.586]	**[0.653]**	**[0.841]**
Past experience in private financial sector	0.974**	1.188**	0.367
	[0.475]	[0.518]	[0.776]
Past experience in academia	0.759*	0.548	2.223***
	[0.391]	[0.417]	[0.757]
Past experience in other private sector	0.686^	0.742*	0.431
	[0.422]	[0.438]	[0.765]
Past experience in central banking	0.169	0.102	0.57
	[0.370]	[0.384]	[0.697]
Past experience in ministry of finance	−0.067	−0.055	−0.071
	[0.423]	[0.448]	[0.753]
Lagged crisis (inflation > 40)	−0.055	−0.138	−0.767
	[0.937]	[1.104]	[1.434]
Lagged real devaluation	0.691	0.303	2.45
	[1.035]	[0.882]	[2.490]
Lagged reforms in geographical neighbors	−7.429	−9.5	5.39
	[8.562]	[10.133]	[14.291]
Lagged IMF Program	0.037	−0.093	0.467
	[0.344]	[0.386]	[0.728]
Lagged dummy for left	0.195	0.167	0.393
	[0.384]	[0.450]	[0.698]
Observations	1,222	1,222	1,222
Number of countries	68	68	68
Number of Governors	246	246	246
R^2	0.22	0.21	0.21

NOTES: All regressions include country and year fixed effects. Standard errors are clustered at the governor-level. ***, **, *, and ^ denote statistically significant at 1, 5, 10, and 15%, respectively. The bold-face type signifies the variables of interest.

We do not find any evidence for future experience in financial industry (or any other sector) to be a significant determinant of financial sector reforms.[37] We also examined the possible effect of education on *Reform*. We do not find any robust relationship between educational characteristics of the central bank governor and deregulation.[38]

37. Results reported in Online Appendix Table A5.
38. Results reported in Online Appendix Table A6.

This is in line with Dreher et al. (2009), who do not find a robust relationship between educational background of political leaders and the likelihood that they implement market-liberalizing reforms.

4. CONCLUSION

In this paper, we ask whether personal characteristics of central bank governors affect financial regulation. Our main finding is that governors that have prior financial sector experience (20% of central bankers in our sample) are associated with greater financial sector reform—in particular banking reform (rather than securities markets reform). Previous experience at the IMF has the same effect as experience in the financial sector. In contrast, previous experience at the UN and BIS has the opposite effect. We cannot identify to what degree these experiences may have shaped the views of future governors, or whether self-selection into these activities is the mechanism. In both cases, however, these past experiences have the same interpretation, as they occur before taking office as governor.

Our findings have important implications. On one hand, if the goal of the country's government is to implement deregulation, this may manifest itself in the choice of a central bank governor with experience in the financial sector; but in addition, achieving this goal may also be facilitated by this choice. On the other hand, in cases where the choice of the central bank governor does not take into account past experience, financial deregulation may be an undesirable outcome.

Overall, our results strengthen the importance of considering the background and past work experience before appointing a central bank governor. In this sense, our paper strengthens the broad argument in Romer and Romer (2004), while shifting the focus from inflation to financial regulation. In light of the recent economic crises in the United States and Europe, and the perceived importance of financial regulation (e.g., Igan, Mishra, and Tressel 2012, Philippon and Reshef 2012, Boustanifar, Grant, and Reshef 2018), this shift in focus may indeed be warranted. Our empirical strategy cannot identify whether greater financial reform is a preference of the central banker (we rule out the importance of the effect of country preference), or simply indicates greater ability to implement reform. In both cases, however, past experience in finance predicts greater financial reform, which makes the case for the importance of examining past experience of candidates for central banks.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.