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Structural Reforms, IMF Programs and Capacity Building: An Empirical Investigation

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Structural Reforms, IMF Programs and Capacity Building: An Empirical Investigation

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Abstract

This paper investigates the role that International Monetary Fund (IMF) programs and capacity building play in fostering structural reforms. To do so, we exploit two novel datasets on IMF capacity building and structural reforms available for over one hundred IMF member countries over the period 1980 - 2010. The main results are threefold. First, there is a general association between IMF programs and structural reforms but this relationship is not very robust. Second, IMF training leads to an increase in structural reforms but only through IMF programs and only when a significant share of public servants is trained. Third, IMF technical assistance does not significantly lead to more structural reforms but raises the likelihood of completion of ongoing IMF programs. Our results are robust to a large number of checks, estimators and correcting for endogeneity.

Contents

I. INTRODUCTION

Structural reforms are essential to unlock economies' growth potential. The International Monetary Fund (IMF), through its surveillance mandate, has been engaged in supporting efforts to improve policies for several decades in its 188 member countries. In addition to surveillance, the IMF also provides support through the so-called IMF programs which provide both financial assistance and a set of policies prescriptions to help restore economic health. It is thus not surprising that much of the focus in the economic literature has been on investigating the impact of IMF programs on economic outcomes. What is perhaps less known is the support provided to member economies through so-called IMF capacity building activities--including both training and technical assistance.[2] IMF Managing Director, Christine Lagarde recently stressed that "Technical assistance and training are a core mandate of the Fund, along with surveillance and lending".[3] Recently, the IMF has embarked on consolidating its capacity building strategy and on further integrating it with IMF lending activities. It is therefore high time to broaden the scope, away from an exclusive focus on the economic impact of IMF programs. This paper intends to fill the gap by studying the impact of IMF capacity building and its relation to IMF programs.

Our paper relates to three strands of the literature. Most immediately, it relates to the voluminous literature on the impact of IMF programs on output growth, inflation and indebtedness (e.g. Dicks-Mireaux, Mecagni, and Schadler, 2000; Przeworski and Vreeland, 2000; Barro and Lee, 2005). The evidence that IMF programs increase growth is mixed. In particular, Barro and Lee (2005) provide empirical evidence of a causal negative relationship between IMF (non concessional) lending and economic growth. Our paper also relates to the literature on the political economy of aid and aid effectiveness (e.g. Alesina and Dollar, 2000; Thacker, 1999; Ball and Johnson 1996; Rajan and Subramanian, 2008). This strand of literature provides evidence of a positive association between political clout and the allocation of development aid. For instance, countries which vote in line with the G7 at the United Nations General Assembly tend to receive more development assistance than others. The evidence on the impact of aid on economic growth is also mixed. Some authors have argued that the lack of evidence for aid effectiveness lies in the political economy of development assistance (Alesina and Dollar, 2000).

Furthermore, our paper relates to those papers which study the determinants of structural reforms (e.g. Tommasi and Velasco, 1996; Rodrik, 1996; Drazen, 2000; Alesina, Ardagna and Trebbi, 2006). This strand of the literature distinguishes between domestic and external factors influencing structural reforms. Domestic factors include occurence of crisis, business cycles and the nature of the political system (presidendialism vs. parliamentariasm ;

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[2] 'The objective [of capacity building] is to help improve the design and implementation of members' economic policies, including by strengthening capacities and training officials in macroeconomic analysis and policies.' See IMF website: http://www.imf.org/external/np/exr/key/tech.htm

[3] IMF Press Release, May 1, 2012: http://www.imf.org/external/np/sec/pr/2012/pr12156.htm

democracy vs. autocracy). External factors include IMF programs and more generally development aid. Evidence on the latter is mixed but the existing work lacks proper corrections for selection bias and endogeneity. Ostry, Prati and Spilimbergo (2009) provide a comprehensive dataset on structural reforms which we use in this paper. They show that there is a convergence effect in strutural reforms; that is, economies further away from the "frontier" tend to reform more that those which are closer. Giuliano, Mishra and Spilimbergo (2010) offer some evidence that more democratic countries reform more.

This paper makes several contributions to these strands of literature. First, it focuses on capacity building which has been largely ignored in the literature. Second, it investigates empirically the linkages between IMF capacity building and IMF programs. Indeed, this study is, to the extent of our knowledge, the first to focus on the impact of IMF capacity building in relation to IMF programs. Third, this paper uses structural reforms rather than economic outcomes as the dependent variables. This also contrasts with existing studies on the impact of IMF programs which use rather "distant" outcome variables such as growth and inflation. Fourth, we introduce a novel instrument for capacity building based on donor financing data. This in turn allows us to isolate a causal relationship between IMF capacity building and structural reforms.

This paper investigates the role that International Monetary Fund (IMF) programs and capacity building play in fostering structural reforms. To do so, we exploit two novel datasets on IMF capacity building and structural reforms available for over one hundred IMF member countries over the period 1980 – 2010. The main results from the panel fixed effects estimation are threefold. First, there is a general association between IMF programs and structural reforms but this relationship is not very robust. Second, IMF training leads to an increase in structural reforms but only through IMF programs and only when a significant share of public servants is trained. Third, IMF technical assistance does not significantly lead to more structural reforms but raises the likelihood of completion of ongoing IMF programs. Our results are robust to a large number of checks, estimators and correcting for endogeneity. All in all, the paper provides robust empirical evidence of complemetarity between IMF programs and IMF capacity building. These results suggest that ongoing IMF capacity building activities increase the likelihood that a subsequent IMF program provides a window of opportunity for reforms in which IMF program conditionality and governments' reform ownership are reconciled.

The remainder of the paper is organized as follows. Section II presents the data. Section III discusses the empirical strategy. Section IV addresses the endogeneity issues. Section V concludes.

II. DATA

A. Structural reforms

In our empirical analysis, we use a new dataset on structural reforms compiled by the Research Department of the IMF for a sample of 150 countries. The indices describe the degree of regulation of six sectors covering both real sectors (product and agriculture

markets, trade, and current account) and financial ones (domestic financial markets and capital account). Each index contains different sub-indices summarizing different dimensions of the regulatory environment in each sector. Indices are normalized between 0–1, where 1 refers to 'most liberalized'. Ostry, Prati and Spilimbergo (2009) provide a detailed discussion on the construction of indices and sub-indices.

B. IMF Capacity Building Activities and IMF Programs

For the purpose of this paper, we have constructed an exhaustive and novel dataset of capacity building. Recall that capacity building includes both training activities and technical assistance to IMF member economies. The IMF training data are available from 1981 to 2011. The dataset is a compilation of tabulated information from the IMF's Institute for Capacity Development's Participant and Applicant Tracking System (PATS) which tracks civil servants who participate in IMF Institute for Capacity Development (formerly IMF Institute) training courses. PATS provides data on the country of residence, agency, age, gender, position, and detailed educational background of applicants.[4] In our regression analysis, we use information on the number of officials trained from a given country to capture the impact of training and at the same time we use information on the number of applicants from any given country to control for a government's willingness to build capacity. Those training courses are on a broad variety of topics that include all aspects of macroeconomic policy, national statistics and finance. Those courses are offered either in a regional location or at IMF headquarters in Washington, DC. Figure 1 describes the evolution of the number of officials trained by the IMF by region. It shows that the number of officials trained is rather flat in the 1980s, but started to increase sharply during the 1990s for Central and Eastern Europe. The number of officials trained also started to increase steadily for East Asia and Pacific and Sub-Saharan Africa regions in the mid 1990s. The drivers behind the increase in officials trained by the IMF certainly lie in the interplay between demand and supply factors. Supply factors relate to the creation of regional (joint) IMF training centers in Austria and Singapore which have allowed for an increase in the offering of training courses regionally. Demand factors mainly relate to political and economic developments, such as the break-up of the Soviet Union and its consequences on Central and Eastern European countries' openness, and the Asian financial crisis which further led governments in those regions to feel the need to request IMF training courses. Figure 2 shows a map describing the number of officials trained by the IMF. It shows that Central, Eastern and South Asia have received the most IMF training but Latin America and Sub-Africa have received a relatively significant number of IMF training too.

We have also compiled novel data on IMF technical assistance. The IMF provides technical assistance in its areas of core expertise including in macroeconomic policy, tax policy and

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[4] Arezki, Lui, Quintyn and Toscani (2012) provide a detailed description of this novel *dataset* on education attainment in public administrations covering the period 1981-2011 for 178 countries. The dataset uses information extracted from CVs for over 130,000 mid to senior level officials from mainly central banks and ministries of economy and finance.

revenue administration, exchange rate system, financial sector stability, legislative frameworks, and macroeconomic and financial statistics. Donors play an increasingly important role in financing technical assistance. In our regression analysis, we rely on information on donor financing to instrument our technical assistance based variable. The IMF technical assistance data is available for the period 1990-2012. Figure 3 describes the evolution of IMF technical assistance by region. It shows that the amount of IMF technical assistance has been rather stable for all regions except for Central and Eastern Europe. Sub-Saharan Africa followed by Central and Eastern Europe and East Asia have received the highest amount of IMF technical assistance. The world map in Figure 4 depicts the allocation of technical assistance by country. It confirms Central and Eastern Europe as well as Central and Eastern Asia and Sub-Saharan Africa as the largest recipients of IMF technical assistance.

We have complemented our dataset on capacity building data with data on IMF programs. IMF programs are associated with financial lending arrangements. As stated on the IMF's website: "A policy program supported by IMF financing is designed by the national authorities in close cooperation with the IMF, and continued financial support is conditioned on effective implementation of this program." There exist several IMF lending instruments and they have been subject to a recent overhaul in an attempt to make them more flexible. Appendix 1 provides a list of existing IMF lending facilities. IMF program data is available for the period 1952-2012. Figure 5 shows the evolution of IMF programs by regions. The evolution by region has been pretty flat over the period 1990-2012, except for Central and Eastern Europe. Sub-Saharan Africa, followed by Central and Eastern Europe and then Latin America, has the most important amount of IMF programs over the period. This seems to somehow mimic the evolution of technical assistance by region which indicates that IMF programs are linked to IMF technical assistance. This contrasts the evolution of training and programs, where we do not observe a similar pattern.

C. Controls

In our regression analysis, we use a number of control variables. To proxy the quality of political institutions, we use the revised combined Polity score (Polity2) of the Polity IV database (Marshall and Jaggers, 2009). The Polity2 score ranges from -10 to +10, with higher values indicating stronger political institutions. Giuliano, Mishra and Spilimbergo (2010) provide some evidence that more democratic countries reform more. We use, as a further control, an indicator of bureaucratic quality from The International Country Risk Guide (2012). The indicator ranges from 0 to 4. A higher value corresponds to situations where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In countries with stronger bureaucratic qualities, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training. One would expect that lower bureaucratic quality may lead to less reform. We also use, as control, a measure of educational attainment in the general population that is the average years of schooling (Barro and Lee, 2010). One would expect more educated societies to be more supportive of reforms as they are better equipped to monitor their governments' actions and demand accountability.

D. Who receives IMF Capacity Building and Programs?

In this sub-section, we take a cursory look at the determinants of IMF programs and capacity building activities. Appendix 2 Table A1 describes exploratory regressions where IMF capacity building and programs are the dependent variables which we explain by a wide range of explanatory variables reflecting country's characteristics. The main insights from this exercise are that countries experiencing a crisis are associated with more IMF technical assistance and IMF programs, but not necessarily more IMF training. We also find that member countries with higher bureaucratic quality are associated with less IMF training and less IMF programs. Countries with a higher GDP per capita tend to be associated with less technical assistance and programs. Countries with better political institutions (polity score) and higher foreign debt over GDP are associated with more programs. In general, more IMF programs are associated with more technical assistance but not more training.

III. EMPIRICAL STRATEGY

In this section, we systematically investigate the impact of IMF programs and capacity building on structural reforms.

A. Conceptual discussion

From a conceptual standpoint, there are many channels through which IMF capacity building may further reforms. The channels through which IMF training may affect reforms may be different from the way IMF technical assistance does. In the following, we enumerate the channels through which IMF training and technical assistance, respectively, could impact reforms.

IMF training and reforms

IMF training fosters reforms through three main channels. First, training courses raise awareness of the newest developments in the academic and policy discussion as well as of the best practices internationally. Second, IMF training also helps officials gain familiarity with the design of the so-called IMF macroeconomic framework that embodies the latest economic projections prepared by IMF staff for the purpose of Article IV consultations. Third, IMF training courses, if delivered to a large enough group of officials in a given country, might create a consensus that reforms are needed, especially in the context of an IMF program which encourages reforms. We therefore would expect the impact of IMF training to depend on whether a significant share of officials is being trained in a country and on whether there is an ongoing IMF program.

IMF technical assistance and reforms

Conceptually, IMF technical assistance may less directly affect the decision to conduct an overhaul of existing policies or to adopt a reform program, but rather should be seen as a supporting tool for ongoing reforms especially in the context of ongoing IMF programs. Technical assistance, because of its rather narrow focus may only improve on the

implementation of reforms when the will to reform already exists. In this respect, technical assistance may further reforms through a successful implementation of an IMF program. Indeed, technical assistance has in the past been closely associated with IMF program conditionality. We would therefore expect technical assistance to increase the likelihood of IMF program implementation. In other word, technical assistance may help avoid the derailment of IMF programs and the implementation rather than the decision to reform.

B. Model specification

In light of this conceptual discussion, we present below the empirical specification which is further used to systematically investigate on the one hand the impact of IMF capacity building on reforms and the impact of the former on IMF program implementation on the other hand.

Structural Reforms and Capacity Building

To examine the effects that IMF capacity building has on structural reforms listed in the earlier section, we estimate the following econometric model:

$$StructRef_{i,t} = \alpha_1 Prog_{i,t} + \alpha_2 Train_{i,t} + \alpha_3 TA_{i,t} + \alpha_j \sum_j Interact_{i,t} + \alpha_k \sum_k Control_{i,t}$$
$$+ \gamma_t + \delta_i + \varepsilon_{i,t}$$

where δi are country fixed effects that capture time-invariant country-specific unobservables and γt are year fixed effects that capture common year shocks. $\varepsilon i,t$ is an error term that is clustered along the country dimension. In our main regression, we estimate the average marginal effect that *Prog*, IMF program, *Train*, IMF Training, and *TA*, IMF technical assistance and *Interact* the interactive effects between *Prog* and *Train* or *TA* have on *StructRef*, structural reforms as defined in the previous section.[5] The specification also includes *Control*, a variety of control variables, discussed in the previous sections.[6]

Following our conceptual discussion on the potential relevance of training a 'sufficient' fraction of officials, we have normalized the training data by the number of public sector officials obtained from the International Labor Organization (ILO, 2012) and created an indicator variable which shows whether the fraction of officials trained was above or below the median relative to all other countries.[7] As a robustness check we also defined an indicator

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[5]*Prog* is defined as the number of years under an IMF program. *Train* is an indicator variable which shows whether the share of officials trained over the total civil servants in a particular country is above or below the median relative to all other countries. Train takes a value of 1 above the median and 0 otherwise. *TA* is defined as the number of person-years of technical assistance delivered in any given country.
[6] *Control* also includes the lagged level of the regulation index for the associated sector to control for the convergence effect of reforms. Estimates are however not reported in tables.

[7]The data on public sector employment can be found on ILO website at the following URL address: http://laborsta.ilo.org/.

variable for the bottom, middle and upper thirds in terms of fraction of officials trained. Furthermore we use the lagged values of Training (given that we expect it to impact the decision to reform). We use the contemporaneous value of *TA* (given that we expect it to impact the implementation of reform). We use both Ordinary Least Square and difference and system-GMM (Blundell and Bond, 1998).[8] We use 5-year averages to reduce noise and given that we expect the time lag between the decision to reform and a reform being implemented to certainly be in excess of one year.

Program implementation and capacity building

To examine the effects that IMF capacity building has on IMF program failure listed in the earlier section, we estimate the following econometric model:

$$PF_{i,t} = \alpha_1 Train_{i,t-1} + \alpha_2 TA_{i,t-1} + \sum_j \alpha_j Controls_{i,t-1} + \gamma_t + \delta_i + \varepsilon_{i,t}$$

where δi are country fixed effects that capture time-invariant country-specific unobservables and γt are year fixed effects that capture common year shocks. $\varepsilon i,t$ is an error term that is clustered along the country dimension. In these regressions, we estimate the average marginal effect of *Train* and *TA* on IMF program failure, *PF*. *PF* takes a value of 1 for the whole duration of the original program period if at least for one single year the program was qualified as off track. It takes a value of 0.5 if a canceled program was replaced by a new one immediately and a value of 0 if the program was on track. In spite of the latent nature of the dependent variable, OLS is used as estimator as it always gives the best linear approximation to conditional expectation functions (see Angrist and Pischke, 2009). To verify that our results are robust to the method of estimation, we also use a Logit estimator. We use yearly observations in this specification since the considerations about the delay between reform decision and implementation do not apply in the context of measuring whether a country is off- or on-track.

C. Results

Table 1 presents basic estimates of the average marginal effect that IMF programs have on structural reforms in a world sample. The main finding is that IMF programs are associated with a significant increase in structural reforms in all sectors but trade and capital account. Those estimates are statistically significant at the 1% level. However, these raw results are not robust to the inclusion of control variables and we thus need to take a much closer look at the link between programs and reforms.

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[8] The so-called least square dummy variable estimator is biased in the presence of a lagged dependent variable of the order 1/T, T being the time horizon of the sample. Thus, an alternative estimation method is warranted. Blundell and Bond (1998) argue for the use of the GMM estimator that controls for endogeneity of regressors in a dynamic panel data setting. In this paper, we use regressors lagged once as instruments. Hansen's J test of overidentifying restrictions allows us to test overall validity of instruments and thus to check whether a model is misspecified. Our instruments easily pass the Hansen exogeneity test in most specifications.

Table 2 presents estimates of the average marginal effect of IMF capacity building and its interactive effects with IMF programs on structural reforms using ordinary least square estimators. The main result is that neither IMF programs, nor training, nor technical assistance have individually a significant impact on structural reforms.

Only when combined with an existing IMF program does IMF training have a statistically significant effect on domestic financial sector reforms, capital account and trade reforms. Indeed, columns (1), (3) and (6) in Table 2 show that the estimates of the interaction between IMF training and IMF programs are statistically significant at the 5% level. What matters also for training to have an impact through IMF programs, is that IMF training has been delivered to a significant portion of civil servants in any given country. Recall indeed that the IMF training variable takes a value of 1 above the median and 0 otherwise. Quantitatively, the point estimates are quite large. In a country with a 3 year IMF program, receiving above median training (relative to below median training) implies an increase in domestic financial sector reforms by 0.099 that is 9/10 of a standard deviation of domestic financial reform. To give some context, consider the example of the Philippines. A median amount of IMF training in a 5 year window corresponds to roughly 200 officials being trained. The point estimate corresponds to the Philippines moving to a level of domestic financial liberalization similar to Austria or Israel. Following an increase in training to above the median, trade reform would increase by 0.057 that is 1/2 trade reform standard deviation and 0.178 for capital account reform that is 7/10 of capital account reform standard deviation.
The point estimates presented in Table 3 using an alternative estimator namely difference-GMM are very similar to those presented in Table 2 using ordinary least square. The estimates associated with the interaction between IMF training and IMF programs are even more statistically significant when excluding from our regressions the IMF technical assistance variable which increases the size of our sample by about 10 years (results not shown in tables). In contrast, Tables 2 and 3 show that the estimates of the individual coefficients associated with technical assistance and the interaction of the latter and IMF programs are not statistically significant. These results suggest that there are complementarities between training and IMF programs, but not between programs and technical assistance, in explaining structural reforms.

Table 4 presents estimates of the average marginal effect of IMF capacity building on IMF program failures using ordinary least square estimators. The main result is that technical assistance is negatively associated with the probability of a program being cancelled. The estimates throughout columns (1) to (6) are significant at the 1% level. Technical assistance is thus robustly associated with IMF program implementation. Technical assistance thus might indirectly further reforms through better implementation of IMF programs which in turn interact with training in the lead up to reforms. IMF training, technical assistance and IMF programs are thus closely interlinked and their interactions associated with structural reforms. In the following, we further test the robustness of these statistical associations.

D. Robustness

Our main results are robust to using an alternative IMF program variable. Specifically, when using an indicator which takes a value of 1 when any given country has had at least one IMF program over the last 5 years instead of a count measure, our main results are unchanged. Our results are also robust to splitting the training data in three groups rather than two and to splitting the world into two regions—advanced advanced Economies and Central and Eastern Europe versus the rest of the world. Our main results also are not driven by the occurrence of crises. We have also further checked whether our results where hinging upon the use of a specific type of IMF program that is concessional vs. non-concessional programs. Results are robust to restricting our analysis to concessional programs. This seems intuitive given that those programs have a much stronger focus on reforms than many non-concessional ones which focus on short-term liquidity needs.

IV. ENDOGENEITY ISSUES

So far, we have not discussed potential endogeneity concerns. While we control for unobserved time-independent country specific effects, common time-trends and use system GMM, these might not be enough to address all issues of endogeneity. For instance, there could be a third variable such as a governments' willingness to turn around their economy which could both explain the increase in the path of structural reforms and the demand for capacity building activities. If this is the case, then it is likely that there is an upward bias in our results. The observed statistical association would then not be causal in either direction. Similarly, countries which have an active IMF program are likely to sign up for technical assistance at the same time which may again bias the results upwards. On the other hand it might be that 'strong' countries reform and at the same time do not make use of IMF capacity building and do not need IMF programs. In that case our results would be biased downwards. To address those concerns, we introduce a control for country authorities' motivation to reform and additionally construct instruments for technical assistance and IMF programs. We construct a new instrument for technical assistance based on donor contributions weighted by the 'country preferences' of the donors. Donor data is obtained from the IMF Institute for Capacity Development. To construct donor 'country preferences' we use total bilateral aid for the period 1981-2010 from the Organization for Economic Cooperation and Development(OECD, 2012). For instance, Belgium's top bilateral aid recipients are Democratic Republic of Congo (28%), Rwanda (7%) and Burundi (5%). We thus weigh any Belgian donor contributions to the IMF capacity building activities according to the above 'country preferences'. We repeat this exercise for all donors and sum to get the predicted TA allocation per recipient country and year. Our instrument is likely to satisfy the exclusion restriction as it is unlikely that donor funding to the IMF directly impacts structural reforms or program implementation. In addition, Figure 6 shows that the correlation between the actual geographical allocation of technical assistance and the predicted allocation is pretty strong. Those characteristics suggest that our instrument is a valid one.
To instrument for IMF programs, we follow Barro and Lee (2005) and use three sets of instruments namely: (i) United Nations voting patterns - percentage of votes in line with G7/US (this may make program approval more likely); (ii) share of IMF Staff from a certain nationality (this may influence the way staff deal with the authorities and eventually the

awarding of IMF programs); and (iii) a country's IMF quota (a large quota may give a country more leverage for negotiating a program). In our specifications, the latter two usually add little explanatory power. We note that those instruments are better suited to non-concessional IMF lending which Barro and Lee (2005) focus on in their paper. In our paper, we see no reason to restrict our program variable to non concessional ones, as concessional lending is by far the most vital source of funding for developing IMF member countries. Unfortunately, this does reduce the strength of our instrument.

Given that we use lagged values of training, the training variable is in a strictly statistical sense weakly exogenous. However, the results are vulnerable to the fact that we might simply pick up a country's 'motivation' to reform. To control for this we include a measure of the number of applications a country makes to IMF courses using the PATS data discussed in the previous section. This will allow us to correct for omitted variable bias given that the conditional independence assumption is then satisfied. Recall that if we do control for motivation then the remaining biases are likely to work against us finding an effect of training on reforms.

In all following regressions we use the instruments for *TA* and *Program* as discussed above. Table 5 presents the estimation results of the regressions explaining structural reforms by IMF training and its interaction with IMF programs controlling for the number of applications. We shall note that the coefficient associated with the number of applications is positive in all regressions. This suggests that the variable we described as 'motivation' is indeed capturing a potentially important driver for reform. Nevertheless, our main result that is the significance of the interaction between training and program is robust to the inclusion of such a motivation variable. There is thus evidence that training in conjunction with programs does have a positive effect on reforms.
Table 6 shows the estimation results of the regressions explaining structural reforms by IMF technical assistance and its interaction with IMF programs. The finding that technical assistance does not have a direct impact on structural reform is still valid.
Table 7 presents the results of the regressions relating program failure to technical assistance using our instrument for technical assistance. We confirm that technical assistance helps to keep a program on track. The effect is somewhat smaller than in the OLS regressions indicating that two effects might be at work. First, programs deemed likely to succeed get more technical assistance. But crucially, more technical assistance also helps a program to be completed ceteris paribus.

V. CONCLUSIONS

This paper has analyzed the role of International Monetary Fund (IMF) programs and capacity building in fostering structural reforms. We found that IMF training leads to an increase in structural reforms but only through IMF programs and only when a significant share of public servants is trained. IMF technical assistance does not significantly lead to more structural reforms but raises the likelihood of completion of ongoing IMF programs. Our results are robust to an array of checks, choice of estimators and correcting for endogeneity using novel instruments. All in all, the paper provides robust empirical evidence of complemetarity between IMF programs and IMF capacity building. These results suggest

that ongoing IMF capacity building activities increase the likelihood that a subsequent IMF program provides a window of opportunity for reforms in which IMF program conditionality and governments' reform ownership reinforce each other.

It might be worth considering targeting training more at possible program countries to yield the most impact. Also, training *en masse* seems to yield the most impact perhaps because training a critical mass of officials may help foster a collective culture of reforms. The issue of policy ownership is central to the debate on how to raise the effectiveness of IMF programs (see Drazen, 2002 and Boughton and Mourmouras, 2002). IMF programs are often subject to the perception that they lack government policy ownership. Thus they may not have the expected long lasting impact. We argue that capacity building and training in particular may help alleviate such policy ownership "deficits". In other words, IMF training provides a key tool to reconcile conditionality associated with IMF programs with higher policy ownership. By raising awareness of relevant economic policies and sharing state of the art knowledge, capacity building can help facilitate reforms especially when a window of opportunity opens up through, for instance, an IMF program. Capacity building activities may also allow for a continued dialogue between the authorities and the IMF which in turn might influence IMF engagement in those countries.

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Appendix 1. Typology of IMF Programs

IMF programs can be divided in two main categories depending on whether they are concessional or not. Within those two categories are various sub-categories which are listed below.

Non-Concessional lending facilities:

- Stand-by-Arrangements
- Flexible Credit Line
- Precautionary and Liquidity Line
- Extended Fund Facility
- Rapid Financing Instrument

Concessional lending facilities:

- Extended Credit Facility
- Standby Credit Facility
- Rapid Credit Facility
- Poverty Reduction and Growth Facility

Source: IMF website http://www.imf.org/external/np/exr/facts/eng/list.aspx

Appendix 2. Table A1. Exploratory Regressions: What country features are associated with Training, Technical Assistance and Programs?

VARIABLES	(1) TA	(2) Training per gov. empl.	(3) Programs
Number of program years	0.476***	0.0118	
	(0.155)	(0.00720)	
Crisis Count	0.202***	-0.00306	0.0885***
	(0.0640)	(0.00272)	(0.0244)
Real GDP pc	-0.000104**	-8.57e-07	-6.58e-05***
	(4.71e-05)	(2.04e-06)	(1.68e-05)
Foreign Debt/GDP	0.00519	0.000392	0.00381*
	(0.00534)	(0.000274)	(0.00199)
Inflation	0.000223	-4.77e-05	-0.000716**
	(0.000795)	(3.34e-05)	(0.000325)
Polity 2 Score	0.0467	-0.00198	0.0671**
	(0.0827)	(0.00369)	(0.0311)
Bureaucratic Quality	-0.403	-0.0332*	-0.346**
	(0.420)	(0.0194)	(0.163)
Corruption	-0.274	0.0169	-0.0572
	(0.367)	(0.0159)	(0.143)
Average Years of Schooling	0.264	-0.00843	0.0409
	(0.207)	(0.00816)	(0.0739)
Dummy for Elected Leader	0.346	0.0332	-0.400
	(0.891)	(0.0430)	(0.351)
Leadership change	-0.245	-0.00157	0.00681
	(0.314)	(0.0142)	(0.128)
Time Fixed Effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Observations	273	222	273
Number of ifs	92	75	92

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: *TA* stands for IMF technical assistance, *Training per gov. empl.* stands for the share of civil servants who participated in IMF training courses over the total number of public sector employees. Programs stands for the number of program years is the number years during which a member country has been under an IMF program. The dependent variable is *TA* is column (1), *Training per gov. empl* in (2) and *Programs* (3). The method of estimation ordinary is least squares. The standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Figure 1. Evolution of Training Activities by Region
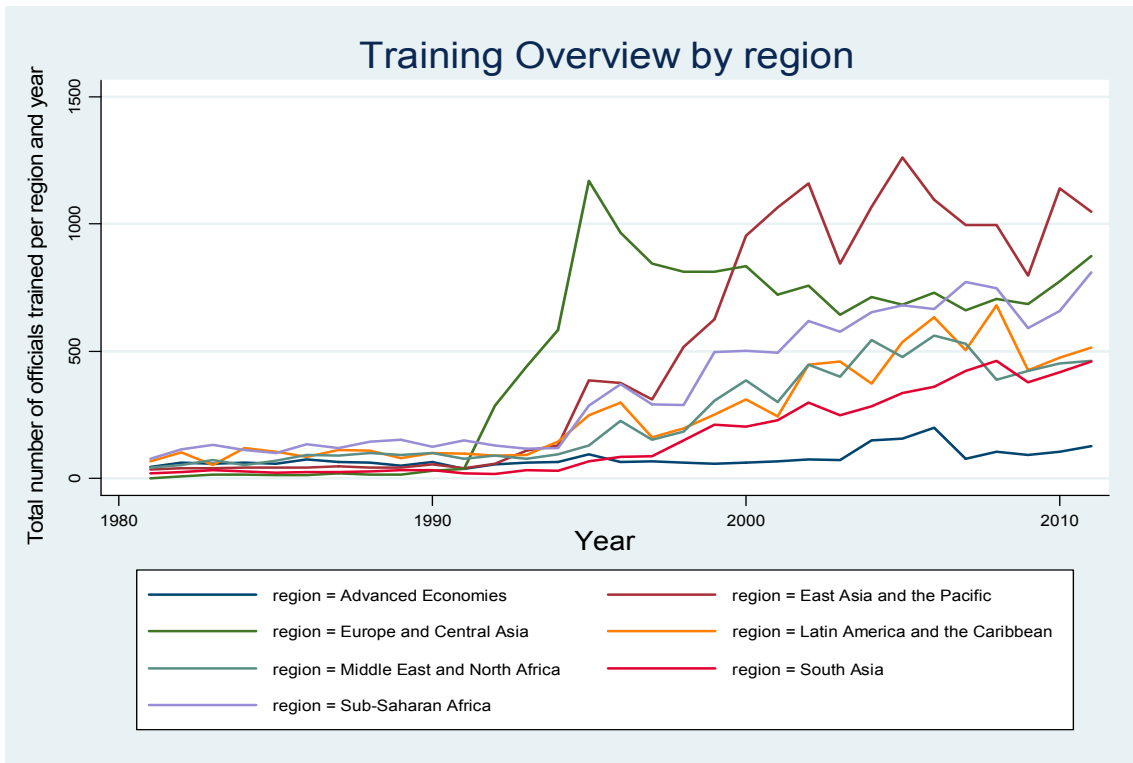
Source: Authors' compilations.

Figure 2. Total Number of Trained Officials during 1981–2011
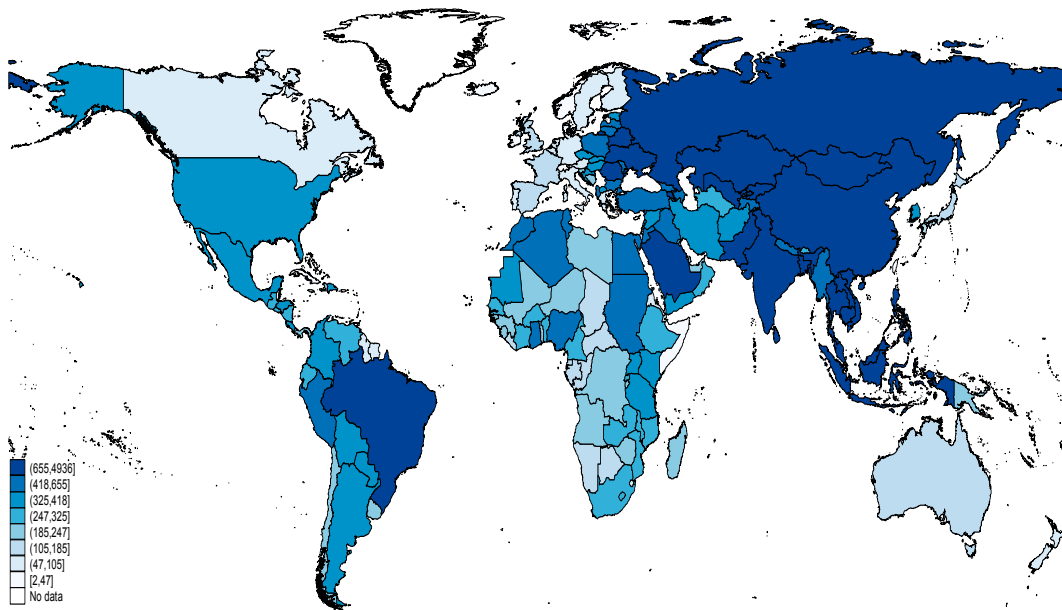
Sources: Authors' compilations.

Figure 3. Evolution of Technical Assistance by Region
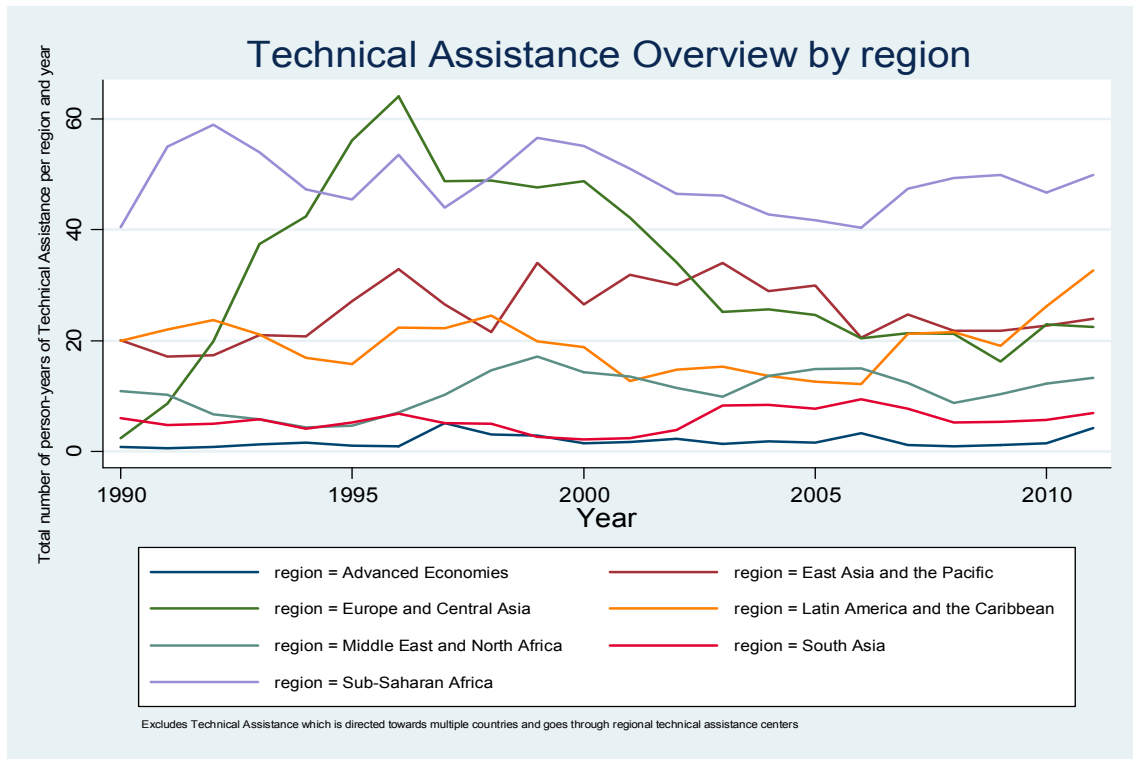
Source: Authors' compilations.

Figure 4. Total Number of Technical Assistance during1990–2012

Overview of Total Technical Assistance 1990-2012
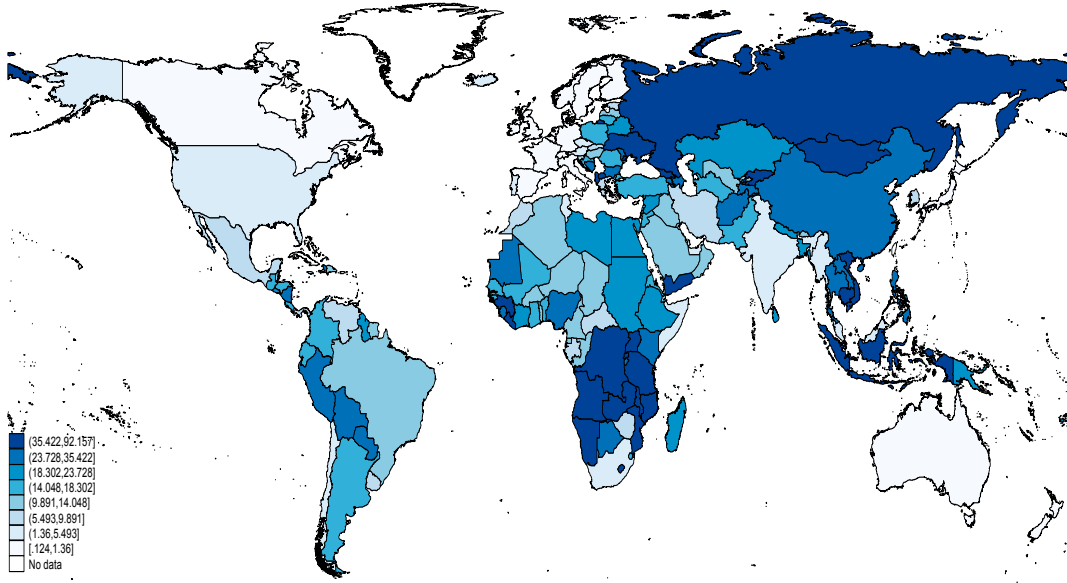
Sources: Authors' compilations.

Figure 5. Evolution of IMF Programs by Region
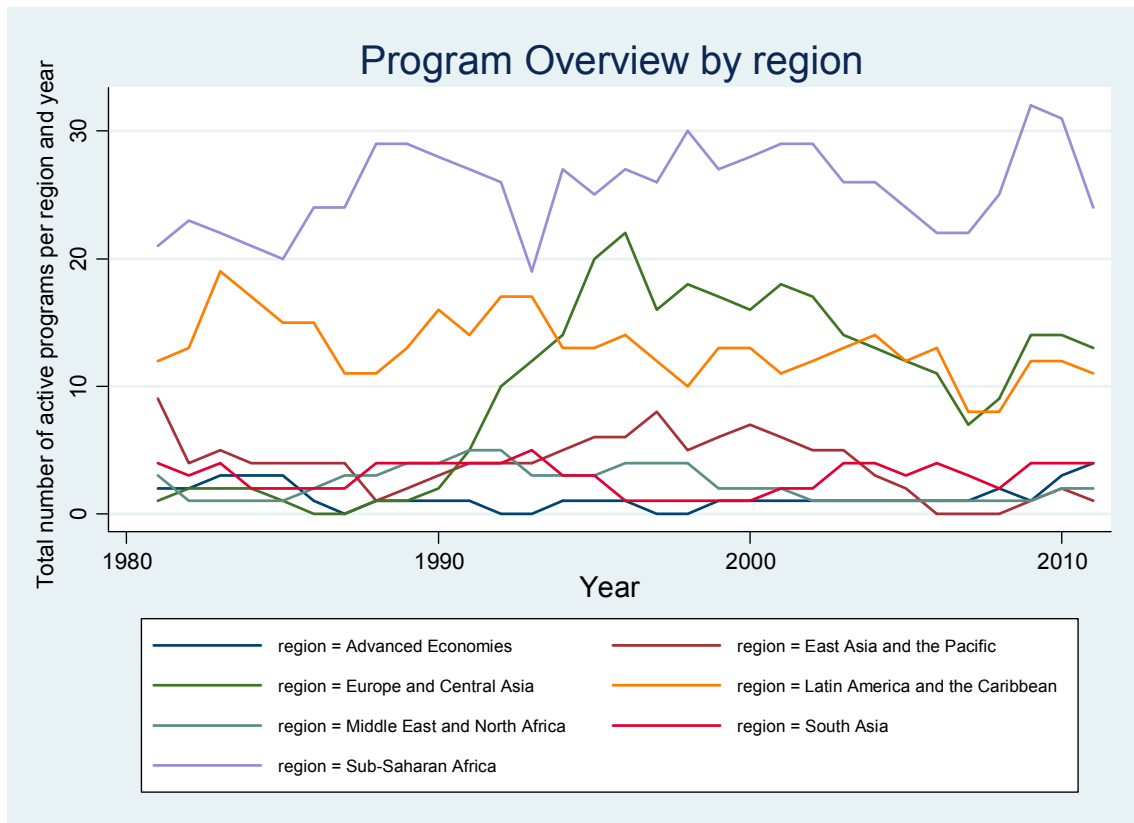
Sources: Authors' compilations.

Figure 6. Actual Technical Assistance vs. Predicted Allocation
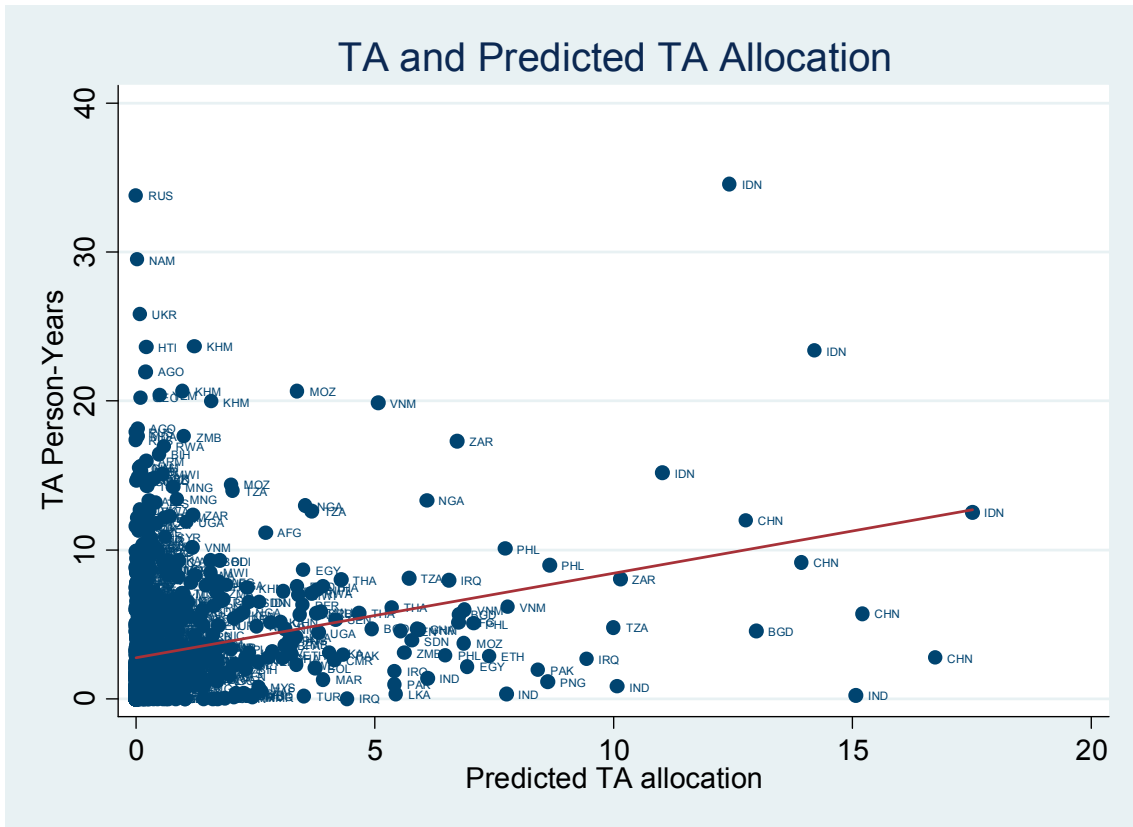
Sources: Authors' compilations.

Table 1. Exploratory regression relating IMF program to structural reforms

VARIABLES	(1) Domestic Finance Reforms	(2) Current Account Reforms	(3) Trade Reforms	(4) Agriculture Reforms	(5) Networks Reforms	(6) Capital Account Reforms 1
Number of years with an active program	0.0215***	0.0127***	0.00299	0.0245***	0.00770***	0.00973
	(0.00387)	(0.00344)	(0.00329)	(0.00330)	(0.00225)	(0.00822)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Initital Liberalisation Level	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	FE	FE	FE	FE	FE	FE
Observations	477	921	765	1,049	1,157	477
R-squared	0.106	0.107	0.151	0.094	0.027	0.227
Number of ifs	91	121	141	125	132	91

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the various indices of reform over six different sectors namely domestic finance, current account, trade, agriculture, networks and capital account. The lagged level of regulation indices for the associated sectors are included but estimates are not reported. The method of estimation is ordinary least square. Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

**Table 2. Results for training and TA interacted with programs**

VARIABLES	(1) Domestic Finance Reforms	(2) Current Account Reforms	(3) Trade Reforms	(4) Agriculture Reforms	(5) Networks Reforms	(6) Capital Account Reforms 1
Training per gov. empl. above the median lagged	0.00691	0.0514	-0.0342	0.130**	0.0686	-0.124
	(0.0319)	(0.0529)	(0.0325)	(0.0570)	(0.0765)	(0.107)
TA Person-Years	-0.00782*	0.00598	0.00717*	-0.000608	-0.0126	-0.0139
	(0.00429)	(0.00658)	(0.00410)	(0.00658)	(0.00990)	(0.0142)
Number of years with an active program	-0.0174***	-0.00321	-0.00995	-0.00689	-0.0270*	0.00302
	(0.00601)	(0.0107)	(0.00629)	(0.00994)	(0.0152)	(0.0205)
Interaction TA and Program	0.00170*	-0.00121	-0.000907	0.000571	0.00149	-0.00129
	(0.000867)	(0.00143)	(0.000876)	(0.00135)	(0.00206)	(0.00296)
Interaction lagged Training and contemp. Program	0.0156**	0.00551	0.0191**	-0.00816	0.000412	0.0595**
	(0.00757)	(0.0129)	(0.00774)	(0.0128)	(0.0184)	(0.0254)
Polity 2 Score	0.00173	0.00121	-0.00142	0.00590**	0.000436	0.0154**
	(0.00179)	(0.00302)	(0.00138)	(0.00241)	(0.00371)	(0.00611)
Average years of schooling	0.0232	0.00797	-0.00620	-0.00611	0.0168	0.00142
	(0.0165)	(0.0276)	(0.0169)	(0.0299)	(0.0414)	(0.0558)
Bureaucratic Quality	0.00963	0.00377	-0.00828	-0.0152	0.0258	0.00382
	(0.0134)	(0.0218)	(0.0127)	(0.0215)	(0.0326)	(0.0452)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Initial Liberalisation Level	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	205	241	245	215	232	205
R-squared	0.801	0.485	0.585	0.777	0.444	0.533
Number of ifs	71	83	89	76	80	71
Log Lik	329.8	239.4	373.3	231.6	146.8	81.21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the various indices of reform over six different sectors namely domestic finance, current account, trade, agriculture, networks and capital account. The lagged level of regulation indices for the associated sectors are included but estimates are not reported. The method of estimation is ordinary least square. Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level.
*Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 3. Results for Training and TA interacted with programs

VARIABLES	(1) Domestic Finance Reforms	(2) Current Account Reforms	(3) Trade Reforms	(4) Agriculture Reforms	(5) Networks Reforms	(6) Capital Account Reforms 1
Number of years with an active program	-0.00901	-0.00368	-0.00303	-0.00442	-0.0388**	0.00787
	(0.00614)	(0.0116)	(0.00768)	(0.0138)	(0.0166)	(0.0248)
Training per gov. empl. above the median lagged	0.0262	0.0887**	-0.0152	0.118*	0.174*	-0.0521
	(0.0192)	(0.0410)	(0.0210)	(0.0697)	(0.0954)	(0.186)
TA-Person Years	-0.00332	0.00483	0.00898	-0.00105	-0.0207***	-0.00986
	(0.00503)	(0.00608)	(0.00590)	(0.00350)	(0.00748)	(0.0150)
Interaction lagged Training and contemp. Program	0.0136*	0.0105	0.00829**	-0.00280	-0.00345	0.0643*
	(0.00705)	(0.0137)	(0.00419)	(0.0174)	(0.0267)	(0.0365)
Interaction TA and Program	0.000419	-0.00135	-0.00160	0.000107	0.00332**	-0.000675
	(0.00135)	(0.00134)	(0.00148)	(0.000694)	(0.00155)	(0.00426)
Polity 2 Score	0.00621	-0.000412	0.00337	0.00603	0.00875	0.00821
	(0.00603)	(0.00530)	(0.00312)	(0.00693)	(0.00555)	(0.0116)
Bureaucratic Quality	-0.00154	-0.0232	-0.00807	0.000993	0.0565	-0.0129
	(0.0124)	(0.0206)	(0.0155)	(0.0176)	(0.0433)	(0.0840)
Average years of schooling	0.0442**	0.0376**	0.0203*	0.0250	0.237***	0.113***
	(0.0204)	(0.0183)	(0.0121)	(0.0304)	(0.0437)	(0.0408)
Initial Liberalisation Level	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Procedure	Two-Step	Two-Step	Two-Step	Two-Step	Two-Step	Two-Step
Robust S.E	Yes	Yes	Yes	Yes	Yes	Yes
Observations	121	148	138	131	151	121
Number of ifs	63	75	72	72	79	63

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the various indices of reform over six different sectors namely domestic finance, current account, trade, agriculture, networks and capital account. The lagged level of regulation indices for the associated sectors are included but estimates are not reported. The method of estimation is differnce-GMM. Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level.
*Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 4. Capacity building and program failure

VARIABLES	(1) Canclled Progr/ Total Programes	(2) Canclled Progr/ Total Programes	(3) Canclled Progr/ Total Programes	(4) Canclled Progr/ Total Programes	(5) Canclled Progr/ Total Programes	(6) Canclled Progr/ Total Programes
Total Technical Assistance in the last 5 years	-0.0142***	-0.0143***	-0.0136***	-0.0208***	-0.0132***	-0.0233***
	(0.00338)	(0.00350)	(0.00341)	(0.00566)	(0.00378)	(0.00627)
Total Training per gov. empl. In the last 5 years	-0.0360*	-0.0340	-0.0330	0.0412	-0.0174	0.0311
	(0.0218)	(0.0221)	(0.0219)	(0.0329)	(0.0260)	(0.0360)
Lagged Polity Score		-0.00582				-0.0120
		(0.00593)				(0.0119)
Lagged Real GDP pc			2.01e-05			4.76e-05
			(1.38e-05)			(5.37e-05)
Lagged Government Debt/GDP				0.00330**		0.00422***
				(0.00147)		(0.00151)
Lagged Dummy for Elected Leader					0.127*	0.0635
					(0.0676)	(0.100)
Constant	0.293***	0.310***	0.212***	0.146	0.215***	-0.0557
	(0.0450)	(0.0488)	(0.0716)	(0.123)	(0.0611)	(0.273)
Method	OLS	OLS	OLS	OLS	OLS	OLS
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	629	604	629	163	476	123
R-squared	0.070	0.072	0.073	0.246	0.079	0.417
Number of ifs	70	64	70	34	64	28
R-squared by hand	0.0696	0.0716	0.0732	0.246	0.0792	0.417
Log Lik	-8.341	-13.10	-7.111	57.75	9.882	67.58

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the ratio of the number of cancelled program over total number of programs. The method of estimation is ordinary least square. Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 5. Impact of training on structural reforms controlling for country motivation

VARIABLES	(1) Domestic Finance Reforms	(2) Current Account Reforms	(3) Trade Reforms	(4) Agriculture Reforms	(5) Networks Reforms	(6) Capital Account Reforms
Number of years with an active program	-0.00768	0.00250	-0.0112	0.0312*	-0.0344**	-0.0158
	(0.00612)	(0.0123)	(0.00904)	(0.0163)	(0.0143)	(0.0254)
Training per gov. empl. above the median lagged	0.00149	0.0441	-0.0161	0.0874	-0.0724	-0.0697
	(0.0357)	(0.0480)	(0.0204)	(0.0684)	(0.0795)	(0.0762)
Number of applications lagged	0.00379	0.0245	0.00377**	-0.00796	0.00266	0.0753
	(0.0181)	(0.0185)	(0.00192)	(0.00614)	(0.00492)	(0.0540)
Interaction lagged Training and contemp. Program	0.0207*	-0.00340	0.0109	-0.0321	0.0590**	0.0401*
	(0.0108)	(0.0208)	(0.00813)	(0.0215)	(0.0230)	(0.0239)
Polity 2 Score	0.000816	0.00515	0.00446***	0.00252	0.00711**	0.0107*
	(0.00214)	(0.00407)	(0.00171)	(0.00547)	(0.00291)	(0.00572)
Bureaucratic Quality	0.0184*	0.0228	-0.00336	-0.0216	0.0111	0.0570
	(0.0103)	(0.0236)	(0.0109)	(0.0248)	(0.0191)	(0.0377)
Average years of schooling	0.0191***	0.00517	0.00521*	0.0205	0.0105	-0.00268
	(0.00429)	(0.00870)	(0.00315)	(0.0129)	(0.00734)	(0.0128)
Initital Index Level	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM
Hansesn Test (Prob > chi2)	0.786	0.073	0.24	0.152	0.359	0.466
Observations	182	218	222	192	209	182
Number of ifs	64	76	82	69	73	64

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the various indices of reform over six different sectors namely domestic finance, current account, trade, agriculture, networks and capital account. The lagged level of regulation indices for the associated sectors are included but estimates are not reported. The method of estimation is system-GMM (Blundell and Bond, 1998). Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 6. Impact of technical assistance on structural reforms using instrument based on donor funding

VARIABLES	(1) Domestic Finance Reforms	(2) Current Account Reforms	(3) Trade Reforms	(4) Agriculture Reforms	(5) Networks Reforms	(6) Capital Account Reforms
Number of years with an active program	-0.00398	0.00248	0.00252	0.0114	-0.0224*	0.0241
	(0.00832)	(0.0107)	(0.00850)	(0.0187)	(0.0135)	(0.0219)
Number of applications lagged	0.0262	0.0243**	0.00542*	-0.00331	0.00894	0.0290
	(0.0226)	(0.0116)	(0.00295)	(0.00564)	(0.00919)	(0.0399)
TA Person-Years	-0.0109**	-0.00620	0.000542	-0.00391	-0.00788	-0.00584
	(0.00517)	(0.00842)	(0.00254)	(0.00764)	(0.00660)	(0.0173)
Interaction TA and Program	0.00237**	0.000710	-0.000378	0.000458	0.00199	-0.00183
	(0.00119)	(0.00179)	(0.000653)	(0.00182)	(0.00161)	(0.00380)
Polity 2 Score	0.00241	0.00581	0.00542***	-0.000309	0.00716**	0.00939*
	(0.00175)	(0.00403)	(0.00185)	(0.00461)	(0.00302)	(0.00533)
Bureaucratic Quality	-0.000993	-0.00292	0.00424	-0.0290	-0.000355	0.0603
	(0.0111)	(0.0190)	(0.0107)	(0.0272)	(0.0183)	(0.0421)
Average years of schooling	0.0168***	0.00733	0.00484	0.0230*	0.00784	-0.00323
	(0.00540)	(0.00948)	(0.00373)	(0.0130)	(0.00717)	(0.0156)
Initital Index Level	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM	System and Difference GMM
Hansesn Test (Prob > chi2)	0.638	0.352	0.133	0.265	0.092	0.23
Observations	182	218	222	192	209	182
Number of ifs	64	76	82	69	73	64

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the various indices of reform over six different sectors namely domestic finance, current account, trade, agriculture, networks and capital account. The lagged level of regulation indices for the associated sectors are included but estimates are not reported. The method of estimation is system-GMM (Blundell and Bond, 1998). Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 7. Capacity building and program success using an instrument based on donor financing

VARIABLES	(1) Canclled Progr/ Total Programes	(2) Canclled Progr/ Total Programes	(3) Canclled Progr/ Total Programes	(4) Canclled Progr/ Total Programes	(5) Canclled Progr/ Total Programes	(6) Canclled Progr/ Total Programes
Total Technical Assistance in the last 5 years	-0.0374*	-0.0390*	-0.0306	-0.0382**	-0.0572	0.0691
	(0.0205)	(0.0230)	(0.0221)	(0.0191)	(0.0415)	(0.329)
Total Training per gov. empl. In the last 5 years	-0.0198	-0.0173	-0.0221	0.0748*	0.00685	0.0977
	(0.0292)	(0.0307)	(0.0290)	(0.0442)	(0.0422)	(0.218)
Lagged Polity Score		-0.000519				-0.0854
		(0.00762)				(0.260)
Lagged Real GDP pc			2.72e-05			0.000534
			(2.16e-05)			(0.00134)
Lagged Government Debt/GDP				0.00468**		0.00517
				(0.00194)		(0.00358)
Lagged Dummy for Elected Leader					0.195*	0.356
					(0.103)	(1.102)
Constant	0.388***	0.393***	0.259	0.181	0.366**	-2.309
	(0.115)	(0.115)	(0.169)	(0.171)	(0.176)	(6.765)
Method	IV	IV	IV	IV	IV	IV
Instrumented	TA	TA	TA	TA	TA	TA
Excluded Instruments	Donor Contr.	Donor Contr.	Donor Contr.	Donor Contr.	Donor Contr.	Donor Contr.
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	558	533	558	137	420	106
Number of ifs	59	53	59	28	55	25

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are the ratio of the number of cancelled programs over total number of programs. The method of estimation is ordinary least square. Standard deviations are shown in parentheses below the point estimates are based on robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.