Decentralization and Inflation: Commitment, Collective Action, or Continuity

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Decentralization and Inflation: Commitment, Collective Action, or Continuity?

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*D*o political and fiscal decentralization make it easier or harder to control inflation? Statistical analysis of average annual inflation rates in a panel of 87 countries in the 1970s and 1980s found no clear relationship between decentralization and the level of inflation. Political decentralization, however, does appear to reduce change in countries' relative inflation rates over time. By creating additional veto players, federal structure may "lock in" existing patterns of monetary policy—whether inflationary or strict. Among the (mostly developed) countries that started with low inflation, inflation tended to increase more slowly in federations than in unitary states. Among the (mostly developing) countries that started with high inflation, inflation tended to increase faster in the federations. There is evidence that political decentralization locks in a country's degree of practical central bank independence—whether high or low—and the relative hardness or softness of budget constraints on subnational governments.

The pros and cons of political and fiscal decentralization are vigorously debated, but little is known conclusively about its relationship to inflation. Different theoretical premises, supported by different empirical examples, imply opposite predictions.[1] According to one view, inflation is essentially the result of a commitment problem. Policymakers have an incentive to renege on promises of stable monetary growth because unanticipated inflation has a positive real effect. Only if they can restrict their future actions will their promises be credible and a low inflation equilibrium achievable (Barro and Gordon 1983; Kydland and Prescott 1977). Partial devolution of control over spending or monetary policy to lower levels of government may be one way to restrict the center's ability to renege, and competition among subnational jurisdictions to attract investment may reduce the incentive for regional governments to renege (Qian and Roland 1998). In federal systems, different levels of government can police one another, and the central bank may be better shielded from political pressures (Lohmann 1998). Under this logic, decentralization should reduce inflation.

A second argument attributes inflation to a collective action problem. Stable prices are a public good that will tend to be underprovided when the number of actors who must agree to contribute is large (Samuelson 1954). Although the advantages of low inflation are felt by all, the public spending and money creation that cause it accrue to particular beneficiaries. The more

actors there are with leverage over fiscal or monetary policy, the weaker will be the incentive for each to exercise restraint. Under this logic, decentralization, by dividing up authority among different levels of government and increasing the number of relevant actors, is likely to increase inflation.

Examples that support the commitment view are easy to adduce. In Germany and the United States, some scholars have argued, federal institutions and strong subnational governments have helped discipline central economic policymakers and preserve central bank independence (Lohmann 1998; McKinnon 1997). In Germany, a majority of members of the Bundesbank's policy-making council are selected by the Land governments, giving the state governments direct influence over monetary policy. In the United States, although state governments do not have any direct role in monetary policy, the representation of regional reserve banks on the Federal Reserve's policy-making committee may help to ensure that the interest of some regions in loose money is balanced by the interest of other parts of the country in stricter policy. But examples that make the opposite case are also numerous. In various Latin American countries, political decentralization seems to encourage higher public spending, foster excessive public sector borrowing, and weaken the one actor with an encompassing interest in price stability, the central government (Campbell, Peterson, and Brakarz 1991). The hyperinflationary last years of Yugoslavia serve as a particularly clear illustration of the "dangers of decentralization" (Prud'homme 1995).[2]

A third theory suggests that decentralization will not directly affect inflation but will lock in relative inflation rates, whether high or low, by making it hard to change monetary or fiscal policies and institutions. A federal structure increases the number of veto players whose agreement is required for a change in the status quo,

[1] Decentralization is defined by various scholars in somewhat different ways. By "fiscal decentralization" I mean the allocation of greater revenue-raising authority and/or expenditure responsibilities to subnational levels of government. "Political decentralization" refers broadly to an increase in the scope of decision making over which subnational governments or legislatures have autonomous authority.

[2] During the 1980s, control over the Yugoslav central bank slipped progressively from a weakening federal government to the more assertive republics. This exacerbated pressures to inflate the money supply, which hastened the financial and political crisis that undermined the state (see, e.g., Treisman 1996).

and this should make current policy—whether inflationary or austere—more sticky (Tsebelis 1995). The macroeconomic effect of federal institutions will depend in this case on which initial policies are being reinforced. In countries with relatively high inflation, federal institutions will tend to perpetuate the fiscal pressures or politicized monetary system that cause the inflation, and durable stabilization is difficult to achieve. In countries with relatively depoliticized monetary policy and low inflation, federal structures will help perpetuate the underlying conditions.

Regardless of its influence on inflation, decentralization has much to recommend it. Politically, strong local governments are thought to encourage participation, foster civic spirit, and provide a check against central tyranny (Madison [1788] 1961; Tocqueville [1835–40] 1988; Weingast 1997). Economically, competition among subnational jurisdictions may lead to more efficient public good provision, and decision making can satisfy regionally diverse demands more precisely when it is decentralized (Oates 1972; Tiebout 1956). For these reasons, regimes that range from postapartheid South Africa, to postauthoritarian Latin America, to postcommunist Eastern Europe have placed decentralization high on their political agenda. These projects are "in the air" everywhere (Bird 1993); by one scholar's count, they have been adopted in about 85% of developing countries with a population of more than five million (Dillinger 1994). In the developed world, devolution of authority to the states has been a major theme in U.S. politics in recent decades, and Italy, France, and the United Kingdom have all embarked on major decentralization projects.

The benefits of decentralization are better understood than its economic or political costs. If its inflationary consequences are different in different settings, we need to know why and whether the negative ones can be avoided. This article examines that issue empirically. I analyze the relation between political and fiscal decentralization and average inflation rates in a broad sample of countries in the 1970s and 1980s, and I find support for the third view: Decentralization tends to lock in either relatively high or relatively low inflation. Whereas unitary states often change policies rapidly, going from high to low inflation and vice versa, decentralized political institutions make a change in macroeconomic policies, whether good or bad, more difficult. In some (mostly developed) countries, federal structure has helped entrench the practical independence of the central bank and low levels of central government lending. In other (mostly developing) countries, federal structure has served to perpetuate the political vulnerability of central banks and the tendency of central governments to bail out debtors.

In the next section I examine theories about the relationship between decentralization and inflation. I then present a statistical analysis. First, I show that the hypothesis that federal structure enhances the continuity of inflation rates is supported by the data, whereas neither the commitment nor the collective action theory is supported at all. Second, I outline a simple model of how different political and economic conditions as well as aspects of the fiscal and monetary policy process affect inflation rates. I demonstrate that the key relationships postulated in the model are statistically significant in this data set. I then explore which aspects of fiscal or monetary policy—or political or economic conditions—are locked in by federal structure. Two variables that help determine inflation rates have significantly greater continuity over time in federal than in unitary states: the practical independence of central banks and the share of net lending in central government outlays. I interpret this as evidence that federal structure preserves the relative level of central bank independence, whether high or low, and the relative vulnerability of central government to demands for bailouts, whether high or low. In the last section I elaborate on the implications.

COMMITMENT, COLLECTIVE ACTION, AND CONTINUITY

Most economists and political scientists agree that price inflation is almost always a monetary phenomenon, caused by disproportionate increases in the money supply, and that high (although perhaps not moderate) inflation is both economically costly and politically unpopular. Yet, in scores of countries authorities expand the money supply at inflationary rates. Two views dominate the debate over why this is the case.[3]

The first attributes suboptimally high inflation to the inability of governments to commit credibly to monetary restraint. All governments press for a high level of monetary growth, regardless of the cost of inflation, for the simple reason that this is their dominant strategy (Barro and Gordon 1983; Kydland and Prescott 1977). On the one hand, if markets expect low inflation, then boosting the money supply has positive real effects; on the other hand, if markets expect high inflation, then it is still less costly in the short run to accommodate these expectations than to thwart them. High inflation occurs in equilibrium, although both markets and policymakers view it as an inferior outcome. Only some institutional mechanism that shields monetary policy from politics can stabilize prices. One that is frequently discussed is independence of the central bank, which has been found empirically to correlate with lower inflation rates.[4]

The second view associates high inflation with political fragmentation. The main idea is that monetary stability is a public good. If it is provided for one user of the currency, it is provided for all (nonexcludability), and one person's enjoyment of low inflation does not

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[3] A third set of models are not addressed here because their implications for decentralization are less clear. They attribute suboptimally high inflation to asymmetric information and the competition among social actors to avoid bearing the costs of stabilization. The classic example is Alesina and Drazen 1991.

[4] See Alesina and Summers 1993; Cukierman 1992; Cukierman, Webb, and Neyapti 1991. Cukierman finds that in developed countries legal independence of the central bank is associated with lower inflation. In developing countries, legal independence appears to differ from actual independence, as proxied by a low frequency in turnover of the bank's governor. It is actual independence that significantly correlates with inflation.

diminish that of another (nonrivalness). How much monetary stability is provided depends on the extent to which each party with control over fiscal and monetary policy agrees to "contribute" by restraining its demands for increased public spending and newly created money.[5] Public goods tend to be underprovided if the number of consumers is large and no single actor has an "encompassing interest" in providing them (Olson 1965). Weakening the central government's stake in lower inflation and increasing the number of other actors with leverage over policy should, by this logic, reduce the "amount" of price stability provided.

Empirically, there is some support for the view that too many fiscal cooks spoil the macroeconomic broth. Among OECD countries, those with more fragmented party systems and coalition governments tend to have higher public sector budget deficits (Grilli, Masciandaro, and Tabellini 1991; Roubini and Sachs 1989). Some scholars suggest that ethnic fragmentation also may reduce public good provision, inhibit financial system development, or have other undesirable economic consequences (Alesina, Baqir, and Easterly 1997; Easterly and Levine 1997). The argument in this work has been that political fragmentation increases the pressures on central policymakers to overprovide fiscal benefits and underprovide the public good of price stability.

These two perspectives have opposite implications for how political or fiscal decentralization should affect inflation. If inflation is caused by an inability of the central government to commit credibly to stable fiscal and monetary policies, then the subdivision of power may help. The checks and balances of a federal system may make it harder for central policymakers to renege on commitments, that is, boost deficit spending before elections or pressure the central bank to ease interest rates. At times, the autonomy of organizations (such as the central bank) can be enhanced by dividing authority over them among competing actors with conflicting interests, which hampers the ability of any one of them to dictate policy (Moser 1997; Persson, Roland, and Tabellini 1997). Dividing power over the central bank between central and subnational governments may strengthen the bank's ability to resist political pressures and increase the credibility of its monetary policy.

Lohmann (1998) argues that exactly such a decentralization helps explain Germany's low inflation in the postwar period. The independence of the Bundesbank was enhanced by the way it was embedded into the country's federal institutions. A majority of the bank's council members were appointed by the Land governments. Central and Land elections were staggered, and the parties dominating governments at the two levels often differed. The Länder were also represented in the Bundesrat, the upper house of parliament, which could veto changes to central banking legislation. These factors served to check attempts by central government to inflate the economy in order to buy popularity during electoral campaigns. Germany's inflation in this

period was among the lowest in Europe. Along these lines, Wildasin (1996, 324) argues that in South Africa "strengthening provincial and local institutions may create a credible institutional constraint on the exercise of the redistributive powers of the public sector."

If inflation results from a collective action problem, however, then the subdivision of power should make the situation worse. Increasing the number of (central and subnational) actors with influence over fiscal or monetary policy should exacerbate the collective action problem in the same way that increasing the number of parties in government or ethnic groups lobbying for benefits is thought to do. The central government is the only actor with an encompassing interest in price stability. Subnational governments have far less reason for restraint: The costs of inflationary spending are spread across all regions, but the benefits can be targeted to their constituents.[6] Forcing the center to share power with partly autonomous subnational governments means that actors with more inflationary preferences are given a stronger say.[7]

In essence, these two arguments differ over the source of inflationary pressure. The commitment view places it with the central government. Because boosting the money supply is its dominant strategy, the central government prefers to inflate. The collective action view attributes the inflation motive to regional governments, which benefit from particularistic central spending programs whose costs are shared with other regions. Shifting the balance of power between central and regional governments will have opposite results depending on which of these assumptions about preferences is right. Of course, both may be correct, in which case decentralization will not have much effect on the inflation rate. And each may be correct in different settings, in which case the effect of decentralization is context dependent.

A more recent theory suggests a third type of relationship between political decentralization and inflation. Tsebelis (1995, 1999, n.d.) argues that major changes in central government policies will be rarer when the number of veto players—collective or individual decision makers whose agreement is necessary for a change in the status quo—is greater.[8] Federal constitutions are a deliberate way to increase the number of veto players. They may provide subnational governments with the right to veto certain central policies within their jurisdiction and/or formal rights in central decision making, and they sometimes establish the courts as arbiter between levels of government, or chief veto player. Therefore greater continuity in monetary and fiscal policies—and in the relative inflation rates they generate, whether high or low—may be

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[5] For an application of this argument to China, see Huang 1996, chap. 9.

[6] Weingast, Shepsle, and Johnsen (1981) show, in a similar vein, why the representatives of geographical constituencies in a legislature often favor excessive spending.
[7] According to the World Bank (1997, 124): "Because decentralization increases the number of actors and of budgetary accounts, countries facing serious budgetary and inflationary pressures will be confronted with additional challenges and risks."
[8] Franzese (1998) finds greater continuity in deficit and debt patterns in OECD countries that have a larger number of veto players.

expected in federal than in unitary states. In a sense, the commitment of the government to current policy is rendered more credible in this theory, but unlike the commitment view, no association is assumed between commitment and fiscally responsible policy. Bad policies are made more "sticky," too.[9]

Various contextual factors are thought to influence the way all three models work and complicate their implications for decentralization. Arguments, and in some cases empirical evidence, suggest that inflation rates may be affected by the level of economic development, political instability, import penetration, the exchange rate system, the political strength of the financial community, and the nature of the political regime (democratic or authoritarian). In the empirical analysis, I include indicators of these in a set of controls.[10]

The commitment, collective action, and continuity theories all appear to be based on valid logic, but their implications conflict. The more political power is shared among levels of government, the weaker will be the central government's capacity to inflate the economy unilaterally (the commitment argument); the weaker will be the government's ability to change the arrangements by which monetary and fiscal policy are determined, whether or not they are inflationary (the continuity argument); but the greater will be the capacity of subnational governments to press for inflationary central aid (the collective action argument).

When theories conflict, the most useful way forward is often an empirical approach. Should policymakers in inflation-prone countries decentralize political power and fiscal responsibility in the hope of insulating monetary policy? Or should they centralize power in order to avoid collective action problems in macroeconomic stabilization? Does the most auspicious strategy depend on whether they start from high or low inflation? To answer these questions, we need to know more about which logic predominates in particular settings. I turn now to an investigation of the actual patterns of inflation in a broad selection of countries in the 1970s and 1980s.

EMPIRICAL ANALYSIS: DECENTRALIZATION AND INFLATION

Which of the various possible relationships between decentralization and inflation holds in practice? I analyzed average inflation rates of the Consumer Price Index (CPI) in 87 countries for four five-year periods in the 1970s and 1980s.[11] The dependent variable is the log of average inflation over the five-year period, taken from the International Monetary Fund's (IMF) *International Financial Statistics Yearbook*, various years. The log is used, as in numerous other studies, to avoid giving excessive weight to observations of extremely high inflation; hyperinflation is widely thought to be generated by a nonlinear process. Averaging over five years also reduces the influence of episodic high inflation and seems appropriate since many of the independent variables change relatively slowly or are only available as multiyear averages (e.g., the indicators of central bank independence). The sample includes all countries for which data are available for the main independent variables.

The estimation strategy is least squares with dummy variables.[12] Wherever possible, I use panel-corrected standard errors (pcse's) as recommended by Beck and Katz (1995) to correct for panel heteroskedasticity and contemporaneous correlation of the errors. In some cases, gaps in the data made it impossible to compute pcse's. In such cases, I corrected for panel heteroskedasticity and modeled the expected contemporaneous correlation directly by controlling for the average value of the dependent variable in all other countries (lagged one period to reduce problems of endogeneity).[13] To correct for serial correlation, I included a lagged value of the dependent variable, as recommended by Beck and Katz (1996).[14] In each regression, I include three dummy variables for period (1975–79, 1980–84, 1985–89; the excluded category is 1970–74) and five dummy variables for region (Asia, Latin America and the Caribbean, sub-Saharan Africa, the Middle East and North Africa, Eastern Europe and the former Soviet Union; the excluded category is Western Europe and North America). I also experimented using different regional groupings to check that this did not affect the main results.[15]

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[9] Political decentralization is not the only way to increase the number of veto players: Various other constitutional devices may entrench the power of competing institutional actors. Also, the political fragmentation created by decentralization may be overcome in some cases by a cohesive, nationwide party that aligns the interests of actors in different power centers. Thus, one would expect a correlation but not a perfect correspondence of political decentralization with more veto players.

[10] Some work suggests that inflation and other macroeconomic outcomes also may be related to a country's budget process and institutions. Various scholars believe that when the budget is formed by numerous spending agencies or levels of government submitting bids, which are then aggregated, fiscal discipline tends to be weaker than when the budget parameters are set by a central actor and then disaggregated downward (Alesina et al. 1996; Von Hagen and Harden 1996). No comprehensive indicator of cross-national differences in budget process is available, so I was unable to control for such differences systematically. A recent study provides comparative indicators for 20 countries in Latin America and the Caribbean (Alesina et al. 1996). It rates the relative power of finance ministries over other ministries in preparing the budget, parliament's authority to amend the budget, whether government regularly assumes the debt of public agencies, and whether state and local governments can borrow domestically without central restrictions. None of these correlates with federal structure.

[11] The choice of period was dictated by data considerations. Reasonably comprehensive information on central and local budgets is only available from the early 1970s onward.

[12] For a discussion of the technique, see Stimson 1985. The fixed effects for which I control are not for individual countries but for regions and periods.

[13] I am grateful to Robert Franzese for suggesting this technique.

[14] The analysis was done using STATA, with the xtpcse option. Beck and Katz (1995, 1996) show with Monte Carlo experiments that ordinary least squares (OLS) with panel-corrected standard errors, including a lagged dependent variable to correct for serial correlation, is generally preferable to either the Parks generalized least squares or Kmenta's approach to analyzing time-series cross-section data sets.

[15] In particular, I tried using instead the IMF classification of

As a preliminary check, I first tried to replicate in this data set the results of various works on the causes of inflation. Different authors find evidence that inflation is reduced by greater central bank independence (Alesina and Summers 1993; Cukierman 1992; Cukierman, Webb, and Neyapti 1992), higher exposure to imports (Romer 1993), and pegged exchange rates (Ghosh et al. 1995; Giavazzi and Pagano 1988) and is increased by political instability (Cukierman, Edwards, and Tabellini 1992; Cukierman and Webb 1995; Edwards and Tabellini 1991).

Regressing log inflation on the region and period dummies along with a measure of each of these, I was able to replicate three of these findings (at least in regressions that did not include other controls). First, using the indices of Cukierman, Webb, and Neyapti (1992), I confirmed their finding that central bank independence is linked to lower inflation.[16] Their indicator for the practical independence of central banks—infrequent turnover of the bank's chief executive—is significantly associated with lower inflation (at $p < .01$).[17] Second, I replicated the Ghosh et al. (1995) finding that countries with pegged exchange rates tend to have lower inflation than those with floating rates.[18] Third, I found some limited support for the claim that inflation is higher in more politically unstable countries. I tested three indicators of political instability: (1) whether the country underwent a war with an external power during the decade, (2) whether it underwent a civil war, and (3) the number of revolutions or coups during the decade.[19] No indicator was significant in the complete sample, but civil war was significantly associated with higher inflation among the OECD countries.[20] I did not find significant evidence that inflation was lower in countries with a higher share of imports in GNP; the coefficient was negative as expected, but the p level was only .16. This may, of course, be because the regression lacked appropriate controls.

I also tested for evidence in support of two other hypotheses. Posen (1995) and Cukierman (1992) argue that the strength of the financial sector should correlate with lower inflation because banking interests lobby for conservative monetary policy. I used two

indicators of banking sector development employed in previous studies: total claims of deposit banks as a share of GDP and total claims of deposit banks on the private sector as a share of GDP (Demirgüç-Kunt and Levine 1995; Levine and Zervos 1996).[21] I found that banking sector development is significantly correlated with lower inflation, using either indicator. The effect loses significance, however, if one controls for GDP per capita, so it is not entirely clear whether banking sector development or some other aspect of economic development leads to lower inflation rates.[22]

In recent decades scholars have debated whether the type of political regime, democratic or authoritarian, affects the government's ability to control inflation. Some suggest that democracies are more vulnerable to popular pressures for inflationary government spending (e.g., Skidmore 1977), whereas authoritarian regimes are able to repress social forces in the interest of financial stability (e.g., Haggard and Kaufman 1992; O'Donnell 1973). Significant doubts—both theoretical and empirical—have been raised about the latter argument (e.g., Geddes 1995), but it seemed worthwhile to test whether democracies tend to have higher inflation rates than other regimes. I used as a measure the number of years in the relevant five-year period that the country was democratic.[23] Democratic government turns out to be significantly related to higher inflation, controlling for economic development.

To test for the effects of political and fiscal decentralization, I used three admittedly imperfect indicators. The first is whether the state is classified by scholars as federal. I relied on Elazar (1995), but because my data end in 1989 I do not count as federal either Belgium or Spain, which some experts consider federal only in the 1990s. Political scientists debate the finer points of a definition of federalism, but there is basic agreement on the primary characteristic: a constitutionally guaranteed division of power between central and regional governments (see, e.g., Lijphart 1984, 170). In Riker's (1964, 11) formulation, a federal constitution has (at least) two levels of government for the same land and people; each level has "at least one area of action in which it is autonomous"; and this autonomy must be guaranteed in the constitution.[24]

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countries. This grouped all industrialized nations together and grouped developing countries by location in Asia, Africa, Europe, the Middle East, and the Western Hemisphere. When this yields slightly different results, I so indicate in footnotes.

[16] Since the indices of central bank independence are calculated only by decade, I use the same values for the two halves of each decade.

[17] I did not find their indicator of the *legal* independence of central banks significant in any regression.

[18] The variable I construct from their annual ratings takes the value of 3 for a pegged exchange rate system, 2 for an intermediate system, and 1 for a floating system. I use the average annual rating for the given five-year period. This variable may well be endogenous, so the question can still be raised whether pegged exchange rates reduce inflation, or high inflation prompts the adoption of pegged exchange rates.

[19] The revolution or coup variable is the main one used to measure political instability in Barro 1991. All variables were taken from Easterly and Levine 1997. Data for war and civil war were compiled by Sivard (1993); the coups and revolutions variables were compiled by Banks (1994).

[20] This is entirely attributable to the high inflation of Turkey, which experienced civil war in the 1970s and 1980s.

[21] I chose the figure as of 1970 so as to minimize the danger of reverse causation—high inflation reducing the size of bank deposits. The variables were lines 22a–d and 22d, respectively, from IMF *International Financial Statistics Yearbook*, 1987.

[22] The effect is also insignificant if the IMF's regional classifications—which group all industrialized countries together—are used for the regional dummies. Posen (1995) conjectures that federal states tend to have more developed banking sectors. This turns out to be true within the OECD. Among non-OECD states, however, the relationship between banking sector development and federal structure is negative (although not significant).

[23] The classifications were those of Alvarez et al. (1996).

[24] Obviously, constitutional guarantees are not always observed, so a constitutionally defined indicator of decentralization needs to be supplemented by alternative measures (such as the fiscal ones I also use) and the results checked for robustness.

TABLE 1. Decentralization and Inflation

	Model					
	(1)	(2)	(3)	(4)	(5)	(6)
Federal status	.03 (.07)	−.00 (.08)				
Subnational spending share (%)			.001 (.003)	−.001 (.003)		
Subnational tax share (%)					.001 (.003)	.001 (.002)
Controls						
Log average inflation previous period	.77** (.25)	.65*** (.17)	.72*** (.15)	.63*** (.12)	.77*** (.19)	.68*** (.12)
Turnover of central bank executive		.26 (.17)		.31* (.15)		.07 (.08)
Central bank legal independence		−.05 (.11)		−.19 (.10)		−.17 (.11)
Log GDP per capita		−.05 (.16)		.15* (.06)		.12 (.10)
Fixed exchange rate		−.06 (.05)		−.02 (.04)		.00 (.04)
Imports (% GDP)		−.00 (.00)		−.00 (.00)		−.01 (.00)
Civil war in decade		.07 (.07)		.09 (.13)		.05 (.08)
Number of revolutions or coups during decade		.10 (.07)		.28 (.33)		.27* (.12)
Bank lending to private sector		−.003 (.002)		−.004* (.002)		−.006* (.003)
Years democratic during the period		.04 (.02)		.02 (.02)		.01 (.01)
Constant	.41 (.24)	.73 (.51)	.41* (.19)	.27 (.18)	.42* (.21)	.42 (.33)
R^2	.5012	.5956	.5348	.7026	.5862	.6962
Wald χ^2	392.43	4.87	153.81	353.98	471.22	3,473.98
$p<$	.001	.31	.001	.001	.001	.001
N	319	222	178	123	196	139

Note: The dependent variable is the log average annual change in the CPI for successive five-year periods. Estimation is by least squares dummy variables; panel-corrected standard errors are in parentheses (adjusted for heteroskedasticity and contemporaneous correlation). $*p < .05$, $**p < .01$, $***p < .001$. For data sources, see the Appendix. To calculate pcse's for regressions in models 4, 5, and 6 it was necessary to exclude cases for which there were fewer than two observations available. For subnational tax share data, figures were also interpolated when data were available for subsequent and/or previous period. N varies across models because of gaps in the data for some variables. Each regression also includes dummies for period and for region (Asia, Latin American and Caribbean, sub-Saharan Africa, Middle East and North Africa, Eastern Europe and the former Soviet Union; the excluded category is Western Europe and North America). Coefficients on these (not reported) are available from the author upon request.

This is the definition I use.[25] It fits with Elazar's (1995) classification of countries.

The second and third indicators are the share of subnational governments in total government spending (compiled mostly from the IMF *Yearbook*, data taken as close to the midpoint of the five-year period as possible) and in total tax revenues. These fiscal variables have the advantage of being continuous, compared to the dichotomous federal structure dummy. All three variables are quite highly correlated in the country-years for which data are available (the two fiscal variables with each other at .90, both with federal status at .59).

Table 1 shows the regression of log inflation on federal status, subnational spending share, and subnational tax share for the full sample of country/periods.

All regressions include the already mentioned regional and period dummy variables as well as a one-period lag of log inflation. In each case, I show two models; one includes a set of controls based on the studies discussed above, and one does not.[26] None of the decentralization variables have noticeable effects, with coefficients close to zero. Based on this alone, it may seem that political or fiscal decentralization has little to do with inflation.

In Table 2 are test results for the third theory, that decentralization is not associated with either high or low inflation per se, but with greater continuity in either because of the perpetuation of policy and institutions. In other words, federal states with relatively low or high inflation are more likely than similar unitary states to remain in that condition, whereas unitary states with low inflation are more likely than

[25] Both India and Pakistan classify as federations under this definition. Article 26 of India's constitution stipulates that states have an exclusive right to legislate on any of a list of areas, including the state courts and local governments. Pakistan's constitution (Article 142) gives provincial assemblies exclusive authority to make laws on any matter not covered by two lists included in the constitution.

[26] Log per-capita GDP should capture in part the greater dependence of less developed countries on seignorage (the profit to the state from money creation) because they lack effective tax collection systems.

TABLE 2. Testing the Continuity Hypothesis

Decentralization Indicator	Federal Status		Subnational Spending Share (%)		Subnational Tax Share (%)	
	Model					
	(1)	(2)	(1)	(2)	(1)	(2)
Decentralization (measures vary as indicated in column headings)	−.28*** (.07)	−.34 (.18)	−.011** (.004)	−.016** (.005)	−.020*** (.003)	−.021*** (.004)
Decentralization × log inflation one period earlier	.32*** (.05)	.34* (.14)	.012** (.004)	.014*** (.004)	.020*** (.002)	.020*** (.003)
Log inflation one period earlier	.71** (.25)	.57** (.18)	.51*** (.12)	.45*** (.11)	.44*** (.10)	.39** (.13)
Controls						
Turnover of central bank executive		.12 (.18)		.09 (.17)		.13 (.21)
Central bank legal independence		.12 (.15)		.17 (.10)		.05 (.10)
Log GDP per capita		−.05 (.15)		.12 (.12)		.17 (.12)
Fixed exchange rate		−.06 (.05)		−.04 (.03)		−.03 (.04)
Imports (% GDP)		−.00 (.00)		−.00 (.00)		−.004*** (.001)
Civil war in decade		.07 (.07)		.28 (.15)		.07 (.06)
Number of revolutions or coups during decade		.11* (.05)		.08 (.28)		.35 (.44)
Bank lending to private sector		−.003 (.002)		−.00 (.00)		−.003*** (.001)
Years democratic during period		.04 (.02)		.05 (.04)		.01 (.01)
Constant	.48* (.24)	.77 (.52)	.67*** (.15)	.30 (.19)	.76*** (.11)	.42 (.25)
R^2	.5132	.6091	.5687	.6506	.7168	.7769
Wald χ^2	326.22	162.33	100.10	101.45	450.87	122.05
$p<$	.001	.001	.001	.001	.001	.001
N	319	222	178	140	172	129

Note: The dependent variable is the log average annual change in the CPI for successive five-year periods. Estimation is by least squares dummy variables; panel-corrected standard errors are in parentheses (adjusted for heteroskedasticity and contemporaneous correlation). *$p < .05$, **$p < .01$, ***$p < .001$. For data sources, see the Appendix. To calculate pcse's for regressions in models 5 and 6 it was necessary to exclude cases for which there were fewer than two observations available. For subnational tax share data, figures were also interpolated when data were available for subsequent and/or previous period. N varies across models because of gaps in the data for some variables. Each regression also includes dummies for period and for region (Asia, Latin American and Caribbean, sub-Saharan Africa, Middle East and North Africa, Eastern Europe and the former Soviet Union; the excluded category is Western Europe and North America). Coefficients on these (not reported) are available from the author upon request.

similar federal states to let the rate slide upward, and unitary states with high inflation are likelier than similar federal states to stabilize successfully. To test this, I include in the regressions in models 1 and 2 a term for federal structure and an interaction term for federal structure and log inflation in the previous period. (As before, I also control for the log of average inflation in the previous period.) If federal structure increases the continuity of either relatively low or relatively high inflation, then the interaction term should have a positive coefficient, and the coefficient on the federal dummy should be negative. If so, this means that inflation for a federal state (I_{tF}) is lower than inflation for a unitary state (I_{tU}), given low levels of

previous inflation, but higher than inflation for a unitary state, given high levels of previous inflation.

The reason is easy to demonstrate formally. Inflation is modeled as an exponential growth process. For federal states: $I_{tF} = a_F I_{(t-1)F}^{bF} + $ [other factors]c; for unitary states: $I_{tU} = a_U I_{(t-1)U}^{bU} + $ [other factors]c (a_F represents the coefficient and bF the exponent on previous inflation for federal states; a_u and bU are the corresponding coefficient and exponent for unitary states; c is a vector of coefficients on other factors). My hypothesis is that at low levels of I_{t-1}, $I_{tF} < I_{tU}$, but at high levels of I_{t-1}, $I_{tF} > I_{tU}$. This will be the case if two hypotheses are both true: H1, $bF > bU$; H2, $a_F < a_U$. The equation estimated statistically is the following:

$\log(I_t) = \alpha + \beta_1 \text{federal} + \beta_2 \log(I_{t-1}) + \beta_3[\text{federal} \times \log(I_{t-1})] + [\text{controls}] \gamma + \varepsilon_t$. From the estimates, we can derive: $a_F = 10^{(\alpha+\beta 1)}$; $a_U = 10^\alpha$; $bF = \beta_2 + \beta_3$; $bU = \beta_2$. H1 can be rewritten as $\beta_2 + \beta_3 > \beta_2$, or $\beta_3 > 0$; and H2 yields: $10^{(\alpha+\beta 1)} < 10^\alpha$, or $\alpha + \beta_1 < \alpha$ and $\beta_1 < 0$. This proved to be the case.[27] Both the interaction term and the federal structure dummy are significant, or very close to significant, with the expected signs, whether or not the controls are included.[28] The other columns of Table 2 show that this relationship also holds when subnational expenditure or tax share is used as the indicator of decentralization.

These findings provide some strong support for the continuity hypothesis. In general, average inflation rates tended to rise during the 1970s and 1980s in both unitary and federal states. Although there was a general upward drift, the rise was less in federations with low inflation in the previous period compared to similar unitary states, and the rise was greater in federations that started from high inflation compared to similar unitary states. The regression suggests a cutoff point around 7.5%. Federations with inflation higher than this five years earlier tended to have a faster rise than similar unitary states, and those with inflation lower than 7.5% five years earlier tended to have a slower rise than similar unitary states.[29] Figure 1 graphs this estimated relationship.

Another way to make the same point is to consider the correlations between current and earlier inflation. Among unitary states, the correlation is a respectable .55. Among federal states, it is .82. There is also a far tighter relationship in federal states between average inflation rates across long periods. The correlation between the log of average inflation in 1985–89 and in 1955–59 is .58 for unitary states but .93 for federations. The relationships are shown in Figure 2A and B.

I performed some additional checks in order to be sure that the results were not sensitive to the coding of certain countries on the federal dummy. For instance, some federations in the developing world are less politically decentralized than others. In India, Pakistan, Venezuela, Nigeria, and former Yugoslavia, state governors are appointed by the center rather than elected or selected locally. In Malaysia, some state governors are federally appointed and others inherit the office. I excluded these cases from the sample (both with and without Malaysia) and ran the regressions in Table 2
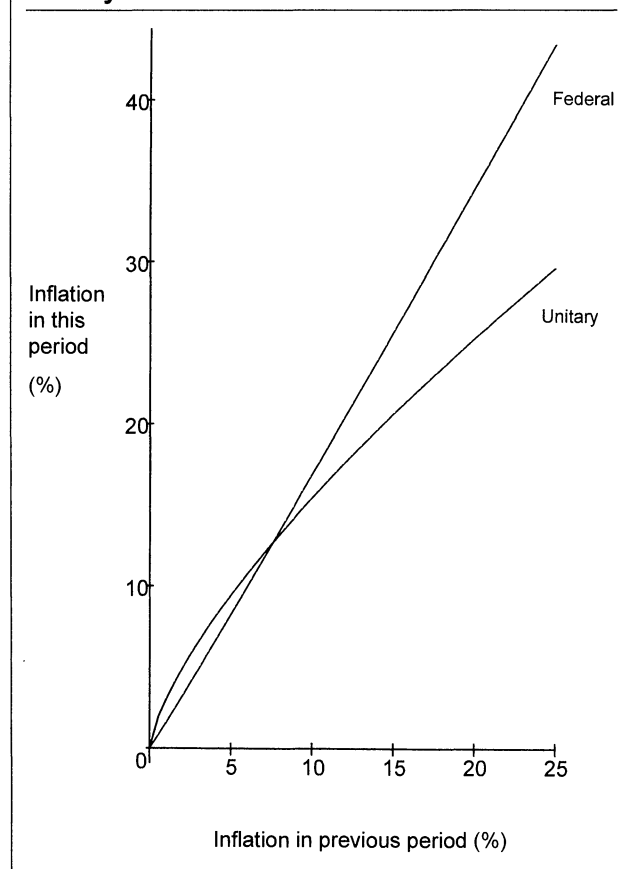

FIGURE 1. Inflation in Federal and Unitary States

[27] The estimated relationship for unitary states: $\text{Log}(I_t) = .71\text{Log}(I_{t-1}) + .48$, which yields $I_t = 3.02I_{t-1}^{.71}$. For federal states it is: $\text{Log}(I_t) = 1.03\text{Log}(I_{t-1}) + .20$, which yields $I_t = 1.58I_{t-1}^{1.03}$.

[28] Including the controls, the federal dummy just misses the conventional .05 level of significance ($p < .06$).

[29] The 7.5% cutoff is implied by the estimated regression coefficients not including controls. Controlling for log per-capita GDP, central bank independence, openness to imports, exchange rate system, political instability, size of the banking sector, and democracy, the cutoff is around 10%. Obviously, these should be taken as only approximate estimates.

The estimates imply that a unitary state with inflation above about 45% will on average see inflation decrease in the following period at inflation (I_{t-1}) of 45%, the estimates from Table 2, model 1, with decentralization set at zero, imply that $I_t = I_{t-1}$. The estimates for federal states (without controls) suggest a tendency for inflation to increase on average from all starting points above zero.

(both with and without the controls). The results were very similar and often stronger than those reported in the table.[30]

Since the rest of the article focuses on this result, it is worth repeating that it holds regardless of which of these three measures of political or fiscal decentralization is used. Each is imperfect in its own way. Coverage for the fiscal variables is much poorer, and the data may contain considerable measurement error. Furthermore, states that call themselves "federal" are not by any means equally decentralized politically. The fact that the same result appears regardless of indicator adds some confidence in the finding. In most of the analysis below, I use federal status as the primary decentralization indicator, since that information is available for a far larger number of cases than data on either of the fiscal variables, but where relevant I also use the other indicators.

[30] One reviewer wondered whether the results might be influenced by the coding of India, Pakistan, and Germany as federal. He considers these far more centralized than "federal" suggests. I ran the regressions in Table 2 (using both the dichotomous federal dummy and the continuous fiscal variables, both with and without controls) excluding Germany, Pakistan, and India. The results were virtually identical.

FIGURE 2.   Inflation in the 1950s to 1980s

A. Federal States

Log average inflation 1955-59

B. Unitary States

Log average inflation 1955-59
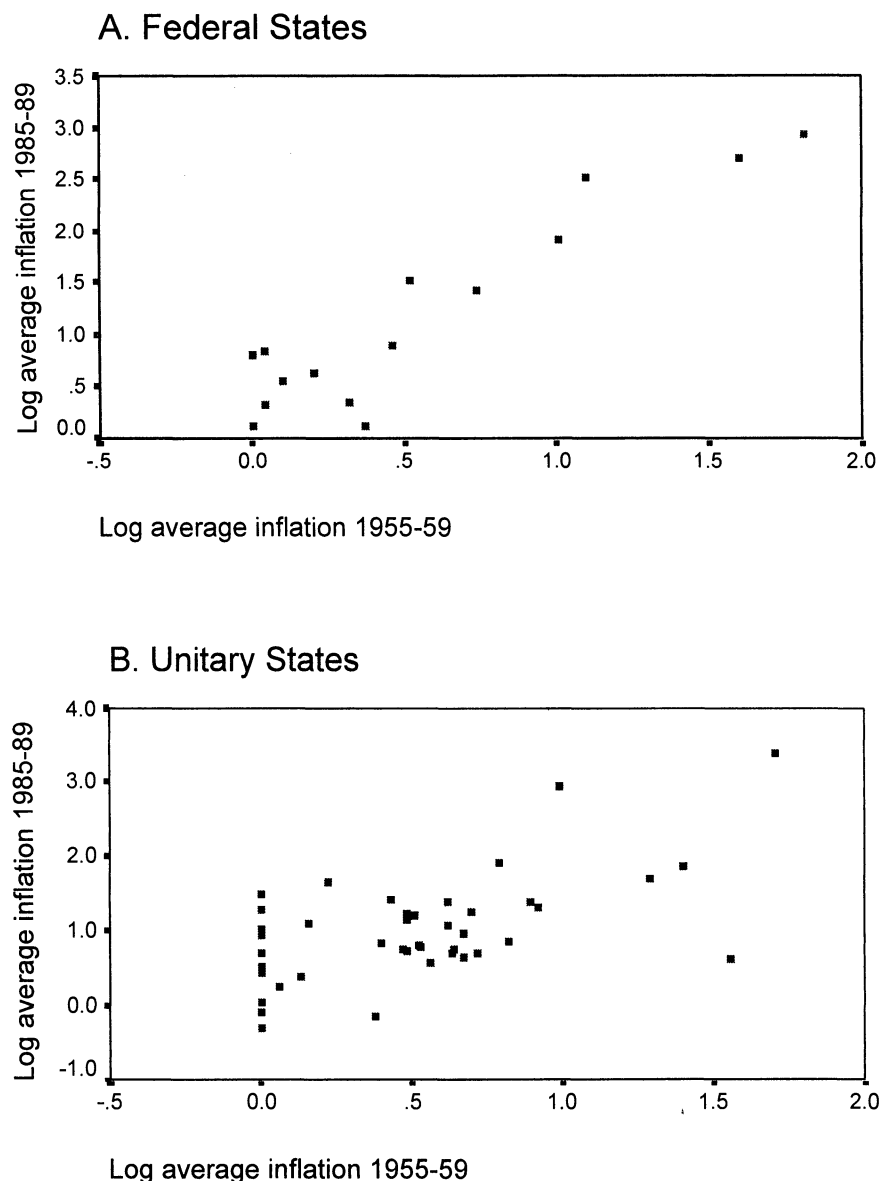
Source: IMF *International Financial Statistics Yearbook*.
Note: Log average inflation 1955–59 = log(1+ (inf. 1955 + inf. 1959)/2); when inflation < 0, coded as 0.

TRACING THE MECHANISMS

What does political decentralization perpetuate? What explains the persistently high inflation in some federal states (Argentina, Brazil, Mexico, Nigeria, and Yugoslavia) and the persistently low inflation in others (Austria, Canada, Germany, Malaysia, Switzerland, and the United States)? To answer this question, I proceed in two stages. First, I sketch a very simple model of how particular economic and political conditions as well as fiscal and monetary policies translate into inflationary outcomes. I show that the relationships assumed by this model are consistent with the evidence available in this data set. Second, I explore what elements in this policy process model are more persistent in federal than in unitary states. That con-

stancy may explain why inflation rates are likely to remain either relatively high or relatively low in federations over long periods.

Figure 3 outlines a simplified model of the causes of inflation. No claims for originality or completeness are made; the goal is merely to distill some of the important relationships assumed in the economics and political science literature. First, various economic and political conditions create pressures on the central government to indulge—or not indulge—in deficit spending. For example, strong regional and local governments that run up deficits and demand bailouts are one source. Political instability may prompt central politicians to spend unsustainably in the hope of retaining office. Some argue that the need to attract votes

FIGURE 3. A Simple Model of Fiscal and Monetary Policy and Inflation
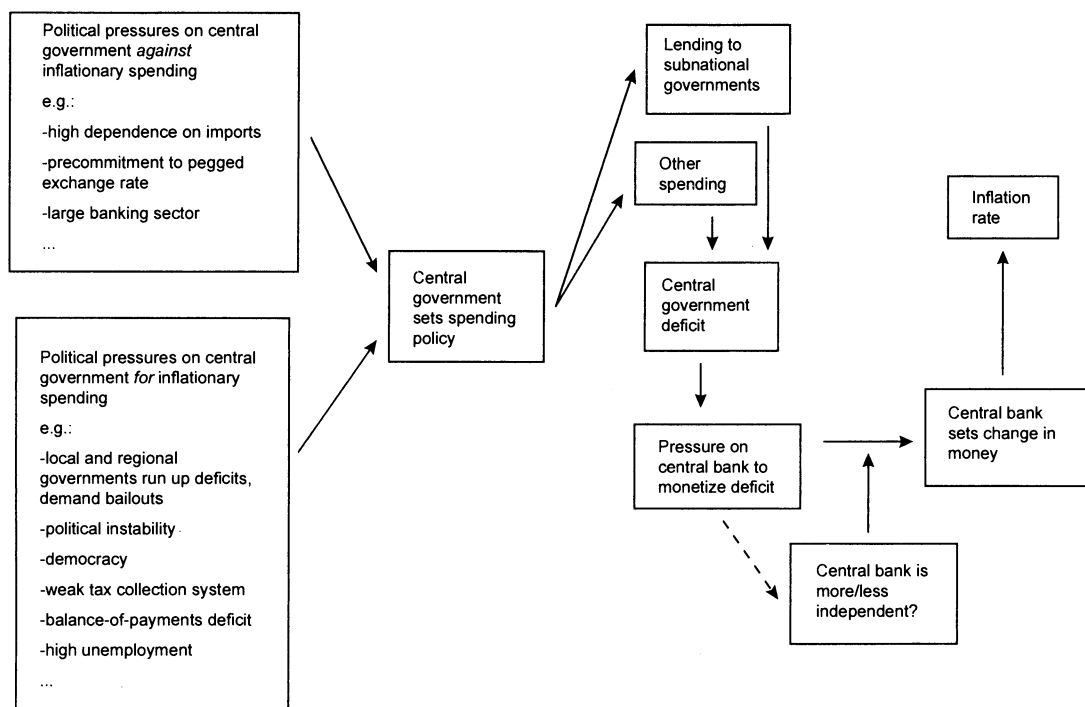
Note: The dashed line indicates that, while at a given moment more independent central banks will resist pressures more effectively, in the long run such pressures are likely to erode central bank independence.

in a democratic system may encourage incumbents to inflate the economy. By contrast, import dependence is a source of inflationary restraint, as spending might depreciate the currency and drive up import prices. Also, if a central government commits to keeping inflation low, perhaps by announcing a pegged exchange rate, the desire to maintain credibility is an incentive not to renege. Large and politically powerful financial sectors are also likely to lobby for financial stability.

These various pressures affect the fiscal policy choices of central government. They help determine how much the government spends, what proportion of the budget is devoted to lending (e.g., bailouts for subnational governments), and the size of the deficit. The larger the national deficit, the greater is the pressure from government on the central bank, ceteris paribus, to finance it through money creation. The degree of independence of the central bank will determine its resistance to increasing the money supply, which in turn affects the inflation rate.

Many other sources of pressure and possible links are excluded from this simplified outline. Furthermore, isolating the importance of particular links in the causal chain is extremely difficult (both theoretically and empirically), since each actor is strategic and makes choices based on expectations about how others will act at other points. Keeping these caveats in mind, the model provides a framework for exploring inflation performance in federal states.

In the following section, I seek empirical confirmation of the links in the model. Do the hypothesized pressures encourage central government spending,

lending, and deficits? Does this lead, when central bank independence is sufficiently low, to an increase in the money supply? Does that lead, as the quantity theory of money predicts, to rising inflation? The empirical confirmation is partial, since data are not available for some variables in enough periods to permit causal modeling.[31] Instead, I will only test for the predicted controlled correlations with time-series cross-section regressions, as before. Inferences about the direction of causation must be tentative.

Then I will test whether the greater policy continuity in federal compared to unitary states remains as one pursues the data backward along the modeled causal chain. Does federal status lock in particular monetary policies, the degree of central bank independence, the size of national deficits, the central government's level of spending and net lending, or specific political and economic pressures on central governments to spend more or less?

The Sources of Inflation

To assess how well the model depicted in Figure 3 fits the evidence in this data set, I ran a series of regres-

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[31] For instance, the Cukierman, Webb, and Neyapti (1992) measures of central bank independence are only available for (roughly) ten-year periods. Even using such data, Cukierman (1992) finds evidence of Granger causality running both from high central bank independence to lower inflation and from higher inflation to lower central bank independence. It was not realistic to attempt similar causal modeling here since data on the key fiscal variables are available only since 1970, which permits the use of only two of Cukierman's decade indicators of central bank independence.

sions to estimate the effect of each "upstream" variable (economic or political conditions, fiscal or monetary policies) on "downstream" variables (e.g., the inflation rate). The goal was to trace the hypothesized causal chain backward, from inflation rates to the monetary and fiscal policies believed to generate them. In each case, I controlled for all variables assumed to cause the explanatory variable in question, but not for those assumed to be caused by it. (For example, I control for central expenditure in a regression to assess the contribution of money growth to inflation, but not for money growth when estimating the effect on inflation of central expenditure levels.) Thus, the coefficients should be interpreted as estimating the additional contribution of the key explanatory variable in determining the dependent variable. In all cases, the "causally prior" control variables are those previously used: the share of imports in GDP, the exchange rate system, civil wars, revolutions or coups, log per-capita GDP, the size of the banking sector, and democracy. Each regression also includes region and period dummies as well as a one-period lag of the dependent variable.[32]

The results, shown in Table 3, provide clear evidence for most of the links in the model. The first nine columns trace the causes of inflation backward along the hypothesized chain. (In each regression, the key explanatory variables are in boldface, to distinguish them from the causally prior controls.) First, I confirmed the quantity theory of money in this data set (column 1). Even controlling for central bank independence, central and subnational deficits, central spending, and the share of net lending in central outlays, higher money growth is very significantly related to a faster rise in inflation (coefficient of .65, significant at $p < .01$).[33] (Since the dependent variable is inflation controlled for its previous level, it makes sense to interpret this as a measure of the increase in the average inflation rate.) Second, as already replicated in an earlier section, the frequency of turnover of central bank chief executives (indicating lower independence of the central bank in practice) is positively associated with a faster rise in inflation (column 2).[34]

Are large national deficits associated with higher inflation? The estimated coefficient (.004), while positive as predicted, is not significant. Experimentation with an interaction term clarifies the relationship (see column 4). A large deficit when the central bank is very independent is not necessarily inflationary, but when the bank has little independence (i.e., frequent turn-over of chief executive), a large deficit is significantly associated with a faster rise in inflation.[35] The politically weak bank cannot resist the government's pressure to increase the money supply.

Central governments that devote a large share of outlays to net lending tend to experience significantly larger jumps in inflation (column 5: coefficient of .02, significant at $p < .01$). Central governments with higher spending as a percentage of GDP tend to have larger deficits (column 11: coefficient of .24, significant at $p < .01$). When the central bank is less independent, higher central spending is strongly associated with a rapid rise in inflation (column 7: coefficient of .015 on interaction term), but this is not the case when the bank is more independent. Finally, larger subnational deficits are accompanied by greater increases in central government expenditure (column 14); an additional 1% of GDP in subnational budget deficits is associated on average with central government layouts about 1.65% of GDP higher.[36] If the central government devotes significant resources to lending, sizable subnational deficits also lead to larger increases in the national deficit (column 13: coefficient of .10 on interaction term).[37] When the central bank is less independent, subnational deficits also are associated with higher inflation (column 9: coefficient of .83 on interaction term).

The evidence in Table 3 suggests a plausible account of how inflation rates are determined. Fiscal pressures percolate upward through the system as expected; subnational deficits stimulate central spending, lending (presumably, in part, for bailouts), and deficits, which in turn stimulate money growth and inflation. These effects are moderated—and perhaps can even be eliminated—by a central bank that is in practice independent of government. Whether or not subnational deficits lead to central government deficits appears to depend on the extent to which the central government is in the business of extending loans.

This is a picture painted with broad strokes. The use of five-year averages limits the ability of regressions to fill in finer details, which remain to be explored with annual data, different specifications of the variables, and different lag structures. My goal is not to test each hypothesis as conclusively as possible but merely to establish empirical support for a model with which to explore the effects of political decentralization.

Two intriguing questions are left for future study. First, an independent central bank appears to act as a

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[32] Ideally, the regressions would also have controlled for unemployment, balance of payments, and quality of the tax collection system. Difficulties collecting systematically comparable data precluded this, however. Per-capita GDP should correlate with more effective tax collection and is included partly for that reason. Because neither unemployment nor the balance of payments is likely to correlate with decentralization, the results will not be biased.

[33] "Money" here is demand deposits plus currency outside banks.

[34] In this case, I am controlling for central and subnational deficits, central spending, and net lending share. It is possible that low central bank independence is not the cause of inflation but an effect of fiscal pressures that are themselves the true cause of high inflation (i.e., the dashed arrow in Figure 3). Yet, the significant negative relationship between central bank independence and inflation in Table 3 when indicators of such fiscal pressures are controlled suggests that central bank independence probably does have some direct effect.

[35] The significance of the interaction terms of fiscal variables with central bank independence also suggests that the influence of central bank independence on inflation will vary with the fiscal context (and underlying political factors). A given level of bank independence has a greater inflation-reducing effect when fiscal and political pressures to spend are weak. This point is demonstrated convincingly in Franzese 1999.

[36] Fornasari, Webb, and Zou (1998), analyzing annual data for 32 countries in the 1980s and early 90s, also find a significant relationship between subnational deficits and higher central government expenditures.

[37] Fornasari, Webb, and Zou (1998) find a significant relationship between subnational and central deficits and that this effect is larger in countries with less independent central banks.

TABLE 3. Tracing the Policy Sources of Inflation

Dependent Variable

Model

Key Policy Variable	Log Inflation									Central Government Deficit				Central Govt. Spending	Net Central Govt. Lending
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Log money growth	**.65*** (.13)**														
Central bank executive turnover	**.40** (.14)**	**.39* (.16)**													
Central government deficit (% GDP)	**.014** (.005)**	**.006 (.007)**	**.004 (.007)**	**−.009 (.009)**											
Central gov't. deficit × central bank exec. turnover				**.08** (.03)**											
Net central government lending (% total central government outlays)	**.011** (.003)**	**.02*** (.003)**	**.02*** (.004)**	**.02*** (.004)**	**.02*** (.004)**					**.06 (.05)**					
Central government spending (%GDP)	−.00 (.00)	−.00 (.00)	−.00 (.00)	−.00 (.00)	−.00 (.00)	**.004 (.004)**	**−.000 (.004)**			**.23*** (.06)**	**.24*** (.06)**				
Central gov't. spending × central bank exec. turnover							**.015* (.006)**								
Subnational government deficit (% GDP)	−.04* (.02)	−.05* (.02)	−.04 (.02)	−.05* (.02)	−.03 (.02)	−.007 (.03)	−.02 (.03)	**.02 (.03)**	**−.14*** (.04)**	−.09 (.36)	−.03 (.37)	**.27 (.32)**	**−.33 (.26)**	**1.65* (.81)**	**.12 (.53)**
Subnat. gov't. deficit × central bank exec. turnover									**.83*** (.14)**						
Subnat. gov't. deficit × net central gov't. lending													**.10*** (.02)**		
R^2	.8949	.8394	.8258	.8453	.8248	.7382	.7581	.6961	.7694	.6175	.6102	.4819	.5445	.8371	.5758
Wald χ^2	2,131	717	450	592	444	254	290	234	374	150	144	88	119	601	86
N	92	92	93	92	96	98	96	103	101	76	76	76	76	76	81

Note: All regressions include the region and period dummies, a one-period lag of the dependent variable, and the following controls: log GDP per capita, pegged exchange rate, imports/GDP, civil war, revolutions or coups, size of financial system, and democracy (not shown). Each regression examines the effect on the dependent variable of a different key fiscal or monetary policy variable (whose coefficient is in boldface type). I control for all other policy variables assumed causally prior—i.e., believed to influence the key independent variable in question but not to be significantly influenced by it. Estimation is by least squares with standard errors corrected for panel heteroskedasticity. Missing data made it difficult to adjust for contemporaneous correlation by using pcse's. Instead, I modeled the expected contemporaneous correlation directly by including a control for the lagged average value of the dependent variable in the other countries. The variable is lagged to reduce problems of endogeneity. It was not significant in any of the regressions. $*p < .05$, $**p < .01$, $***p < .001$. Substantive results were unchanged by using IMF regional classifications (including category of "industrialized countries").

circuit breaker between fiscal pressures and inflation, but we do not know for sure what causes practical independence to be higher in some countries than others. Greater *legal* independence of the central bank is clearly not sufficient; in the Cukierman, Webb, and Neyapti (1992) study indexes of practical and legal independence of central banks are not positively correlated ($r = .02$, whether or not one controls for log per-capita GDP). A complete answer requires much additional research, but this data set offers some clues about where to look. As suggested in previous work, political instability is likely to undermine the bank's independence (Cukierman and Webb 1995), as is a large outstanding domestic currency debt, which the central government will seek to devalue by pressing the bank to inflate the currency. Fiscal pressures—and the inflation they stimulate—may themselves over time erode the bank's independence.[38]

As a preliminary test of these hypotheses, I regressed the Cukierman, Webb, and Neyapti (1992) index of the frequency of central bank executive turnover (decade averages for the 1960s through 1980s) on regional and period dummies, lagged executive turnover, legal central bank independence, log average inflation rates lagged one decade (as recommended by Cukierman 1992), revolutions or coups, civil war, and the domestic debt of central government as a percentage of GDP at the beginning of the decade. The results, presented in Table 4, strongly support the conjecture that political instability reduces central bank practical independence (the more revolutions or coups occur, the greater is the turnover of central bank governors) and weakly support the notion that governments with a large domestic currency debt are more likely to pressure the central bank to inflate it away (the coefficient is positive, as predicted, but only significant if one does not control for per-capita GDP). There is little evidence that inflation ten years earlier undermines central bank independence, although there might be a stronger effect with a different lag structure. I was able to reproduce Cukierman's (1992, chap. 20) finding that lagged inflation is related to central bank governor turnover when controls are not included, but the significance of the effect falls when region and period dummies are included and when other controls are added.

The second intriguing question is why different governments devote different shares of total outlays to net lending. When governments lend more, subnational deficits appear to get pushed upward, eroding central budget balance and worsening inflation. Central governments' lending share thus serves as a kind of proxy for soft budget constraints. But what causes this? Why, for instance, did Brazil and Egypt devote more than 10% of outlays to net lending in 1987, whereas Mexico and Romania had a net lending balance of almost zero? We do not yet know, although the literature offers plausible conjectures. More cohesive national parties may give central politicians greater leverage over regional officials demanding loans (Ordeshook 1996; Riker 1964), as may a constitution in which central government has the right to dismiss regional

officials.[39] Interregional inequality may influence the strength of pressures on the central government to extend loans to poorer regions. Data are not available to test such propositions at this point, but that is a priority for future work.

What Does Federal Structure Perpetuate?

If the model of the causes of inflation sketched above accords with the evidence, then what aspect of the process does federal structure make more durable? Political decentralization may induce stickiness at several points. It may lock in either a high or low level of central bank independence by increasing the number of veto players who can block changes in the system of appointing bank members or the statutory definition of its role. It may increase intertemporal continuity in the size of central or subnational deficits by making it difficult to change status quo spending levels. It may lock in the level of central government lending, which in this data set seems to be a proxy for the readiness to bail out subnational units. Finally, it may lock in a particular level of exposure to imports or some other economic or political determinant of inflation.

To test each of these hypotheses, I ran a series of regressions of the following form: $\Delta X_t = \alpha + \beta_1 X_{t-1} + \beta_2 \text{Federal} + \beta_3(\text{Federal} \times X_{t-1}) + \beta_4(\Delta X)_{t-1} + \beta_5 \text{regional dummies} + \varepsilon_t$. For each possible determinant of inflation, X, I regressed the change in that variable since the last period, ΔX_t, on the lagged value of that variable, X_{t-1}, expressed as the deviation from the mean. I included an interaction term for federal structure and the lagged value of the main variable, Federal $\times X_{t-1}$, as well as the federal dummy and the region dummies. To correct for serial correlation, I included a one-period lag of the change in the main variable, $(\Delta X)_{t-1}$. As before, I used panel-corrected standard errors where possible, and where not I modeled the expected contemporaneous correlation directly and corrected for panel heteroskedasticity. The results are given in Table 5.

If the variable in question adjusts after a shock by regressing toward the mean, one would expect a negative coefficient on the lag of the policy variable in these regressions. Because this variable is expressed as the deviation from the mean, it will be negative when relatively low and positive when relatively high. A negative coefficient on the lagged policy variable means that the adjustment will be upward if the variable is relatively low (a negative coefficient times a negative variable produces a positive change), but downward if the variable is relatively high (a negative coefficient times a positive variable produces a negative change). The larger the size of the negative coefficient the faster will be the adjustment. The interaction term is included to test whether adjustment is significantly different in federal than in unitary states. If the variable adjusts more slowly—i.e., is stickier—in federal than in unitary states, one would expect a significant *positive* coefficient

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[38] These hypotheses are found in Cukierman 1992.

[39] Dillinger and Webb (1998) see this as an important difference between Argentina and Brazil.

on the interaction term. That is, the positive coefficient on the interaction term when added to the negative coefficient on the lagged policy variable will reduce its size and slow down the pace of adjustment.

Of the seven variables examined in Table 5, two fit the pattern—a significant negative coefficient on the lagged value of the variable and a significant positive coefficient on the interaction with federal structure. These two variables adjust more slowly in federal states than in unitary ones.

First, the degree of practical central bank independence is stickier in federal than in unitary states (Table 5, column 1). (For this regression, I used the Cukierman, Webb, and Neyapti [1992] decade data going back to the 1950s.) In a unitary state with a high turnover rate for the central bank governor—perhaps one per year, or 1.0 on the Cukierman, Webb, and Neyapti index, above the mean—this rate would drop by the next decade, other things equal, to about .39 above the mean. In a federal state with a similar turnover rate, on average the reduction would be to about .74 above the mean.[40] The effect of this slower adjustment can be seen clearly if one compares countries across long periods. The correlation between turnover in the 1950s and in the 1980s was .86 for federal structures but just .24 for unitary states. Thus, federalism appears to slow change in the degree of central bank practical independence, which in turn entrenches inflation rates.

Second, stickiness emerges in the extent of central government net lending (Table 5, column 4). Other things equal, in a unitary state whose central government devotes 20% more of outlays to net lending than the mean state in one five-year period, the share of net lending will drop by 8.8 percentage points in the next period (i.e., 20 × −.44). In an otherwise similar federal state, on average the drop will be no more than one or two percentage points.[41] Sharp adjustments after episodes of heavy central lending are the norm in unitary states but are clearly the exception in federations. In unitary states, the share of central government outlays going to net lending can vary quite substantially from period to period; in federal states, it tends to stay either high or low. If, as suggested, this indicates in part the readiness of central government to bail out subnational units, the budget constraint in federal states appears to be generally either hard or soft but relatively constant.

The data do not support the conjecture that federal structure locks in larger or smaller central or subnational deficits. And there was no evidence that federal states adjust expenditure levels more slowly than unitary states. Federal structure might lock in some aspect of economic or political conditions that affect the strength of inflationary political pressures. The last two columns in Table 5 suggest, however, that neither the level of economic development nor the degree of exposure to imports is more persistent in federal than in unitary states. In both cases, the interaction term is

not at all significant. The discontinuous indicators of exchange rate system and political instability are not suitable for regression analysis. Instead, I compared

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TABLE 4. Determinants of the Practical Independence of Central Banks

	Model (1)	Model (2)
Legal central bank independence	.19 (.18)	.19 (.18)
Log average inflation previous decade	.03 (.07)	.03 (.06)
Number of revolutions or coups in decade	.14** (.03)	.14** (.03)
Civil war in decade	.02 (.01)	.02 (.02)
Domestic debt of central govt. (% GDP) beginning of decade	.0011** (.0004)	.0011 (.0008)
Controls		
Central bank governor turnover previous period	.25*** (.05)	.25** (.09)
Log per-capita GDP beginning of the decade		.01 (.11)
Dummies		
Asia	.08** (.03)	.09 (.08)
Latin America + Caribbean	.20*** (.05)	.20** (.05)
Sub-Saharan Africa	.03*** (.01)	.04 (.09)
Middle East + N. Africa	−.03 (.05)	−.03 (.13)
E. Europe + former Soviet Union	no cases left in	no cases left in
1972–79	.01 (.06)	.01 (.08)
1980–89	.02 (.06)	.02 (.12)
Constant	−.04 (.05)	−.07 (.31)
R^2	.3424	.3426
Wald χ^2	18.01	80.08
$p<$	.001	.001
N	101	101

Note: The dependent variable is the Cukierman, Webb, and Neyapti (1992) index of turnover of central bank chief executive, over roughly ten-year periods. Model 2 controls for log per-capita GDP. Estimation is by least squares dummy variables; panel-corrected standard errors are in parentheses (adjusted for heteroskedasticity and contemporaneous correlation). *$p < .05$, **$p < .01$, ***$p < .001$. For data sources, see the Appendix. Periods: 1960–71, 1972–79, 1980–89. Log average inflation previous decade is calculated as follows: 1950s = average of 1950 and (1955+59)/2; 1960s = average of 1960–64 and 1965–69; 1970s = average of 1970–74 and 1975–79; in each case, log of 1 + average inflation, all countries for which average inflation < 0 coded as 0. Domestic debt of central government is from IMF, *International Financial Statistics Yearbook*, 1994, lines 88b or 88a, as % of GDP, figures for 1960, 1970, and 1980. Log per-capita GDP in purchasing power parity terms, for 1960, 1970, 1980, is from Penn World Tables 5.6a.

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[40] The estimated change is .04 (i.e., the federal dummy effect) + (−.61 + .31) × 1.

[41] The estimates imply a change of (−.44 + .43) × 20 = −.2.

the mean change in each indicator between periods for federal and unitary states (in absolute value terms). In the case of exchange rate, the figures are almost identical (.339 federal, .342 unitary). As for political instability, federal states had a larger average absolute value change in the number of revolutions and coups between decades, which suggests that the level of instability is not locked in by federal structure, although the difference is not at all significant.

What can we conclude about how federal structure entrenches either high or low inflation? I did not find convincing evidence that federalism systematically influences the stability of either central government deficits or spending levels. These wax and wane in both federal and unitary states. There does seem to be some influence on the relative degree to which fiscal imbalances pass upward through the system and induce change in monetary policy. This occurs at two key points in the process. First, governments in federal states apparently find it harder than those of unitary states to change the share of outlays they devote to lending, whether low or high. The problem is serious in the latter case, as subnational government deficits are pushed upward, adding to central deficits. Second, central banks that are in practice more independent are less likely to respond to fiscal pressures from large subnational or central deficits by increasing the money supply. Federal structure, by increasing the number of veto players required to change the system of control over central bankers, tends to lock in the degree of central bank independence, whether high or low. In the United States and Germany, where federalism has helped to preserve high central bank independence, this has served to keep inflation low, exactly as Lohmann (1998) argues. But in countries with weak central banks, federal structure makes it hard to reduce the inflation-causing politicization.

A few examples illustrate. Argentina and Brazil, two non-OECD federations, experienced high inflation rates in the 1970s and 1980s and had particular difficulty stabilizing (although both achieved some success in the 1990s). In both countries, the restraints on fiscal pressure afforded by low lending share and a strong bank were ineffective. Each had a high level of central lending, substantially above the median for developing countries, for most of the 1970s and 1980s.[42] In that situation, subnational deficits tend to correlate closely with central deficits. Also, the extension of credit by the federal government or central bank was a major cause of inflation. In Argentina in the 1970s and 1980s, provincial governments borrowed heavily from provincial banks, which then discounted the loans to the central bank. In Brazil, the federal government bailed out subnational governments' debt to foreign investors and to domestic credit institutions, such as the federal housing and savings bank (Dillinger and Webb 1998).

Furthermore, throughout the whole postwar period, the governorship of the central bank in both countries turned over with far greater frequency than the average for developing countries.[43] Practical independence of the central bank was low in the 1950s and remained low in the 1980s. In each country, the central bank governor was particularly likely to be replaced during the six months after a change of government (Cukierman and Webb 1995). This article suggests why Brazil and Argentina had to struggle so painfully and ineffectively to stabilize an unbalanced fiscal and monetary system: Federal structure locked in the failures of the past.

Malaysia, by contrast, shows how a strong central bank can break the link between fiscal imbalances and inflation. In this case, federal structure may have helped preserve central bank independence. The country had large subnational deficits in the 1970s and 1980s (14.3% of subnational outlays in 1972), the central government devoted a relatively large proportion of outlays to net lending (11% in the early 1970s, 15% in the early 1980s), and central deficits were high (10% in the early 1970s, 16% in the early 1980s). Yet, despite fiscal pressures, monetary policy remained tight, and inflation stayed low (less than 10% in the 1970s and 1980s). The secret of success appears to be the high degree of central bank practical independence.[44] In the 1970s, the Cukierman, Webb, and Neyapti (1992) index of turnover for Malaysia is zero, and in the 1980s it is .20. The Cukierman and Webb (1995) index of the political vulnerability of the central bank—the average number of changes in central bank governor during the six months after a change of government—for 1950–90 is zero.

To see how low central government lending can block the upward passage of deficits, consider Germany in the 1970s and 1980s. The deficits of Länder and localities in both decades were relatively high, reaching 2.1% of GDP in 1982, compared to a median that year of .5 for all countries in the data set. Yet, central government net lending did not exceed 2% of total outlays.[45] Consistent with this relatively hard budget constraint, central deficits stayed low (a surplus of .7% of GDP in 1972, deficits of 2.1%, 2.0%, and 1.1% of GDP in 1977, 1982, and 1987, respectively; median central deficits those years were 2.6%, 3.6%,

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[42] Average annual share of net lending in central government outlays was 10.2%, 20.6%, 24.8%, and 46.8% in Brazil in 1972, 1977, 1982, and 1987, respectively. In Argentina, comparable figures were 2.1%, 7.9%, 11.8%, and 9.6% in 1973, 1977, 1982, and 1987 (1972 data were unavailable). The median share of net lending share among developing countries in the four periods was 4.8%, 5.0%, 4.9%, and 1.7%.

[43] For the 1950s, 1960s, 1970s, and 1980s, the Cukierman, Webb, and Neyapti (1992) index of turnover had values of .71, 1.08, .88, and 1.00 for Argentina and 1.01, .50, .38, and .80 for Brazil, respectively. The median for developing countries in the four periods was .20, .26, .25, and .20.

[44] Malaysia's access to credit markets also may have helped. Deficits were financed by heavy borrowing, first on domestic and then on foreign markets, before a sharp adjustment triggered by high interest rates brought the deficit down to manageable levels (Demery and Demery 1992). But credit may have been forthcoming in part *because* the markets believed in the central bank's conservatism. At the same time, that very high interest rates were sustained long enough to induce a major adjustment suggests the effective shielding of monetary policy from fiscal pressures.

[45] The net lending share came to 1.3%, .64%, 1.1%, and .54% of central outlays in 1972, 1977, 1982, and 1987, compared to median values these years of 5.5%, 4.3%, 3.3%, and 1.2%, respectively, for all countries in the data set, and 5.3%, 4.2%, 2.8%, and .57% for the OECD countries.

TABLE 5.   What a Federal Structure Perpetuates

Dependent Variable: *Change In...*
Model

	(1) Central Bank Practical Independence	(2) Central Gov't. Deficit (% GDP)	(3) Subnational Gov't. Deficit (% GDP)	(4) Central Gov't. Net Lending	(5) Central Gov't. Spending (% GDP)	(6) Log GDP Per Capita	(7) Imports (% GDP)
Lagged variable (expressed as deviation from mean)	−.61*** (.08)	−.18 (.13)	.52 (.34)	−.44*** (.11)	−.05 (.12)	.17* (.08)	−.11 (.16)
Federal × lagged variable (as deviation from mean)	.31** (.10)	−.15 (.32)	−.20 (.38)	.43* (.20)	−.05 (.25)	.01 (.04)	−.04 (.18)
Federal structure	.04*** (.01)	.14 (.89)	−.04 (.32)	1.44 (1.05)	.84 (2.23)	.01 (.01)	−.40 (2.32)
Lag of change in variable	−.19** (.06)	−.48** (.14)	.16 (.17)	−.12 (.11)	−.35 (.19)	−.24** (.08)	−.03 (.17)
Dummies							
Asia	.01 (.04)	−.50 (.94)	.08 (.49)	−.13 (1.49)	−1.22 (2.42)	−.01 (.02)	−.50 (3.80)
Sub-Saharan Africa	−.02 (.03)	−1.14 (1.32)	.41 (.37)	−.16 (1.18)	−7.67* (3.45)	−.11* (.05)	−4.17 (2.66)
Latin America + Caribbean	.14*** (.01)	.84 (1.18)	−.25 (.43)	.94 (.97)	−4.53 (3.62)	−.06 (.04)	−2.85 (3.25)
Middle East + N. Africa	−.00 (.05)	−2.26 (1.77)	.34 (.45)	1.71 (1.26)	−10.75* (5.32)	−.02 (.07)	−2.57 (2.56)
E. Europe and former Soviet Union	.02 (.05)	6.52*** (.95)	−.23 (.45)	.63 (.80)	no cases left in	−.00 (.04)	−2.33 (2.68)
Constant	−.04** (.01)	3.56*** (.94)	−.26 (.28)	−2.35*** (.60)	1.75 (1.72)	.99*** (.26)	−32.04*** (3.48)
R^2	.4513	.4439	.3255	.2596	.2266	.2927	.4337
Wald χ^2	93.23	225.51	50.81	32.24	25.55	14.00	99.43
$p <$	.001	.001	.001	.001	.003	.02	.001
N	112	125	36	137	121	259	152

Note: Estimation is by least squares dummy variables; *$p < .05$, **$p < .01$, ***$p < .001$. For data sources, see the Appendix. Models 1 and 6: panel-corrected standard errors. Models 2–5, 7: standard errors corrected for panel heteroskedasticity and controlling for average of dependent variable in other countries in previous period (to correct for contemporaneous correlation). The coefficient on this was significantly positive in models 5 and 7 and significantly negative in model 2. *Ns* vary across models because of gaps in the data.

4.7%, and 4.0% of GDP for all countries in the data set, and 1.5%, 3.4%, 4.8%, and 2.3% of GDP for just the OECD). The knowledge that the Bundesbank was highly independent and unlikely to monetize the national deficit may have helped focus the minds of central policymakers as they resisted fiscal pressures from below. German federalism also may have helped lock in the government's low lending policies. If an opposition majority in the Bundesrat could prevent the federal government from pressuring the Bundesbank to ease monetary policy and keep voters happy (Lohmann 1998), the same majority presumably could limit the government's freedom to lend irresponsibly to its allies in Land governments.

CONCLUSION

Scholars from Tiebout (1956) and Buchanan (1950) to Oates (1972) and Weingast (1997) have described the economic benefits to be expected from political and fiscal decentralization. Their work informs current efforts to restructure political and economic institutions in the postauthoritarian and postcommunist world. Recently, however, some scholars have raised fears that the widely understood benefits of decentralization may be accompanied by poorly understood but serious dangers (Davoodi and Zou 1998; Prud'homme 1995; Tanzi 1995).

One unresolved question concerns macroeconomic policy. There are several ways that decentralization may affect inflation in theory. On the one hand, decentralization may provide a useful restraint on central profligacy. On the other hand, it may create dangerous incentives for local fiscal free-riding. Or it may lock in current patterns of fiscal and monetary policy, whether profligate or conservative, by increasing the number of actors with a veto over changing the system of macroeconomic governance.

My empirical analysis finds support for the third hypothesis. In decentralized countries, average inflation rates tend to stay either consistently high or consistently low over quite long periods. In centralized states, by contrast, it appears easier for low inflation economies to slip into macroeconomic imbalance and for high inflation economies to stabilize. Average inflation in the late 1960s and the late 1980s correlates at .85 among federations, compared to −.02 among unitary states. In five of six tests, the difference is significant, whether an indicator of political decentralization (federal structure) or indicators of fiscal decentralization (the subnational expenditure or tax shares) are used, and controlling for numerous other possible causes of inflation. In some (mostly developed) countries, such as Germany and the United States, decentralization appears to lock in macroeconomic stability. In other (mostly developing) countries, such as Argentina and Brazil, decentralization has preserved high inflation.

Evidence from the 1970s and 1980s identifies two points in the fiscal and monetary policy process at which decentralization creates stickiness. I find that, as various scholars have argued, greater practical (not necessarily legal) independence of the central bank is associated with lower inflation. It turns out that the central bank's degree of practical independence is far more constant over time in federal than in unitary states. In Germany, for example, the division of power between central and regional governments has insulated the Bundesbank. Regional governments police the center, preventing any change to the established arm's-length relationship between the federal government and the central bank that would benefit federal politicians but not their regional counterparts. In other federations, such as Brazil, a norm of central bailouts of regional governments has developed, and regional governors use their considerable powers to defend the politicized nature of monetary policy.

The second point of stickiness in federal states is the degree to which central government uses its resources to extend loans—a plausible proxy for the hardness or softness of budget constraints. The share of government outlays devoted to net lending ranged in the late 1980s from −7% in New Zealand to 47% in Brazil. When net lending is high, large subnational deficits are associated with large central government deficits, which suggests that deficits are pushed upward for bailout. And when lending is high, so is inflation. The extent of central government lending is far more constant in federal than in unitary states. Some federal systems, such as Germany and Austria, were consistently low lenders in the 1970s and 1980s, but others, such as Brazil and India, were consistently high lenders. Political systems differ in their "fiscal conductivity"—the degree to which imbalances are pushed upward from local and regional to central budgets. Decentralization does not itself cause this, but it does appear to reduce change in the degree of conductivity, whether high or low. In countries like Brazil, with soft budget constraints, federal politics can hamper a shift to harder policy. In countries like Germany, with hard budget constraints, the status quo is preserved by decentralized political institutions that impede change to policies.

Developing countries tend to have weaker central banks and more central government lending than developed countries. As a result, decentralization correlates with lower inflation in the OECD but higher inflation among non-OECD members, although there are exceptions. In the federation of Malaysia, for instance, a very independent central bank apparently resisted fiscal pressures to boost monetary growth to inflationary levels in the 1970s and 1980s. Malaysia had average inflation of 1% in the late 1960s and 1.3% in the late 1980s. Low central bank independence in some developing countries is probably explained in part by their political instability. Revolutions or coups tend to be more frequent in poorer countries and are positively related to central bank director turnover. Malaysia, unlike a good number of Third World nations, experienced none of these events in the 1970s and 1980s.

Constitutional fragmentation is a major reason that political decentralization is associated with a persistent pattern of inflation, high or low. Decentralized systems increase the number of powerful political actors with

influence over such areas as fiscal and monetary policy. But other ways of fragmenting political authority also exist. In Chile, for example, one of the more centralized developing countries, a system of elaborate checks and balances was set up by the Pinochet regime before leaving office. Some important administrative posts, including the head of the central bank, are insulated from control by elected officials, and a supermajority is necessary to overturn the laws guaranteeing that insulation (Londregan 2000). Such provisions arguably have helped preserve central bank independence and low inflation in Chile, *without* political decentralization. A study of whether kinds of political fragmentation other than those produced by decentralization also perpetuate macroeconomic policy would be valuable.

Constitutional fragmentation can be overcome if actors in the different power centers belong to a single cohesive party, and one might expect less policy persistence in federal states under that condition. This may explain the Menem regime's surprisingly successful reforms to the Argentine monetary system in the early 1990s. For the first time since democratization, the president, a majority in both legislative chambers, and a majority of state governors were all from the same party (Jones 1997). Exploring interactions between political decentralization and party dominance is an obvious direction for future research.

Several other questions await further study. First, is a high level of central government lending a symptom or cause of soft budget constraints? I suspect the answer is "both," but more the former than the latter. Second, the kinds of decentralization I was able to examine conflate decentralization to regions or states with decentralization to localities. The dangers created by strengthening intermediate units may be reduced if authority is decentralized even further, to the municipal level. Third, and most important, more research is needed to discover precisely how the institutions of specific federal systems impede changes in the degree of central bank independence or central government lending policies. This article establishes a general answer—the large number of veto players in federal systems—but the details of institutional mechanisms are likely to vary from case to case. Ultimately, the association of political decentralization with a large number of veto players, and of more veto players with more stable monetary policy, should be tested directly in a worldwide sample. This will require the construction of a data set, including both developed and developing countries, of the number of veto players with leverage over central policy enactment and implementation in specific areas. That is a gargantuan task, but an important one.

If my analysis is correct, important policy implications follow from it. Attempts to reduce inflation by introducing federal institutions into countries with soft budget constraints on subnational governments and a politically dependent central bank are likely to prove disastrous. Such institutions will not reduce inflationary pressures, and they will tend to lock in the existing politicization of monetary policy and make stabilization considerably harder. Lessons derived from low-inflation, developed federal states, such as Germany, Switzerland, or the United States, may have perverse consequences if applied in many developing world settings.

Furthermore, the order in which political and economic reforms are implemented appears to be extremely important. Successful stabilization of monetary policy followed by political decentralization can maximize the advantages of both. Political decentralization followed by macroeconomic stabilization is likely to fail and risks a speedier slide into hyperinflation. This parallels the logic of my game-theoretic treatment of decentralization and economic reform (Treisman 1999). Modeling the interactions between center and regions in two-level states, I found that the same political and economic reforms can have drastically different results when implemented in the opposite order. Political decentralization followed by an increase in the center's rate of public good provision can prompt a vicious cycle of fiscal redistribution, regional challenges, and increasing deficits, whereas the same reforms in reverse order can leave the state as fiscally solvent and peaceful as when they started.

Decentralization has many advantages, but my findings suggest at least caution in recommending it to developing countries that face major macroeconomic stresses. As Poland embarks on a plan to create stronger regional governments, South Africa struggles to impose financial discipline on its new provinces, and similar projects are debated in countries around the globe, these issues are likely to become increasingly important.

APPENDIX

Inflation Data: Average of annual inflation rates of CPI 1970–74, 1975–79, 1980–84, 1985–89. Unless otherwise indicated, from IMF, *International Financial Statistics Yearbook*, 1994, 106–9 (line 64). Notes: Poland 1971–74; Czechoslovakia 1971–74; Hungary 1973–74; China 1971–74; Kuwait 1973–74; Nicaragua 1973–74; Romania 1971, 1973, 1974; Uganda 1981–84; Jordan 1985, 1987–89.

Subnational Expenditure Shares: Unless otherwise noted these are calculated as (state + local government total expenditures)/(consolidated central government total expenditures + state + local government total expenditures) 1972, 1977, 1982, 1987, from IMF, *Government Finance Statistics Yearbook*, 1977, 1978, 1979.

Subnational Tax Shares: Unless otherwise noted these are calculated as (state + local government total tax revenues)/(consolidated central government total tax revenues + state + local government total tax revenues) 1972, 1977, 1982, 1987, from IMF, *Government Finance Statistics Yearbook*, 1977, 1978, 1979, 1986, 1988, 1990, 1997.

Notes on Expenditure and Tax Variables

For 1972 Variables: Canada 1973, 1974 for expenditures; Netherlands 1973, 1974 for expenditures; USA 1973; Austria 1973; France 1974; Korea 1974; Jordan 1974 (budgetary central government); Chile 1974; Spain 1973, 1972 for expenditures; Italy 1973; Ecuador 1974 (tax variables 1975); Mexico 1974 for tax; Brazil expenditure 1974 from Garman, Haggard, and Willis (1996), tax 1972 from Shah (1991, 16);

Colombia 1974; India 1974; Kenya budgetary central government; Zaire 1973; Pakistan 1975; Cameroon 1975 and local revenue is all revenue, not just tax; Iran 1973; Indonesia 1975; Bangladesh 1974 for expenditures, for others 1975 (central is "budgetary central government," local is total revenue); Taiwan (ROC) 1973; Uruguay 1973 (total revenue instead of tax, both levels); Zimbabwe from World Bank (1997) for 1974; Japan 1975, from Shibata (1993, 145).

For 1977 Variables: Belgium 1978; Malaysia local revenue is total revenue, not tax revenue; note Greece unit change from 1972; Italy 1975; Uganda 1980 and "budgetary central government"; Bangladesh central is "budgetary central government," local is "total revenue"; Trinidad and Tobago 1979; Uruguay local is total revenue; Honduras 1976; Zambia is "budgetary central government"; Bolivia 1980; Philippines 1978; Japan 1974; Taiwan 1977; Uruguay both levels are "total revenue"; Japan 1975 from Shibata (1993, 145); Indonesia 1975–76 from Shah (1994, 196); Brazil tax 1977 from Shah (1991, 16).

For 1982 Variables: New Zealand 1981 "budgetary central government"; Poland 1984; Bolivia 1985; Uruguay local is total revenue; Ethiopia 1981; Italy 1985; Ecuador 1980; Italy tax 1985; Japan 1980 from Shibata (1993, 145); Mexico from Garman, Haggard, and Willis (1996); Argentina 1983 from Garman, Haggard, and Willis (1996); Brazil expenditure from Fundacion de Investigaciones Economicas Latinoamericanas (1993), tax 1982 from Shah (1991, 16); Venezuela 1980 from Garman, Haggard, and Willis (1996); Taiwan from *Statistical Yearbook of the ROC*, 1995; Honduras from Nickson (1995), figures are for 1984; Indonesia 1980–81 from Shah (1994, 196).

For 1987 Variables: New Zealand 1987 tax figure is imputed from 1990 figure of 6.9 in World Bank (2000, 217). Switzerland 1987 tax figure is imputed from 1990 figure of 37.0 in World Bank (2000, 217). Malaysia 1988 tax figure used. Japan 1985 from Shibata (1993, 145). Argentina 1987 tax figure imputed from 1990 figure of 38.2 in World Bank (2000, 217). Colombia tax figure for 1986 used. Indonesia 1985–86 from Shah (1994, 196). Venezuela 1989 from Garman, Haggard, and Willis (1996); 1977 tax figure imputed from 1972 and 1982 ones. Pakistan and Nigeria from Shah (1994, 52). Kenya 1986. Taiwan from *Statistical Yearbook of the ROC*, 1995. Dominican Republic from Nickson (1995) for 1986. Nicaragua from Nickson (1995) for 1989. Peru is figure for 1990 from World Bank (2000, 217). Panama from Nickson (1995) for 1991. Costa Rica from Nickson (1995) for 1984. Brazil tax 1987 from Shah (1991, 16); expenditure for 1988, from Shah (1991, 18). Ethiopia 1987 tax figure is imputed from 1990 figure of 1.6 in World Bank (2000, 217). Costa Rica 1990 tax figure from World Bank (2000, 217) used for 1987; 1977 and 82 figures imputed from 1972 and 1990 figures.

GDP per Capita: From Penn World Tables 5.6a, ppp, 1970, 1975, 1980, 1985.

Imports: From IMF, *International Financial Statistics Yearbook*, 1994 and 1990, 1970, 1975, 1980, 1985.

Money Growth: Average annual money growth in % (IMF, *International Financial Statistics Yearbooks*, line 34); "money" = demand deposits + currency outside banks.

Central Government Budget Deficit (−), Surplus (+): As percentage of GDP 1972, 1977, 1982, 1987 from IMF, *International Financial Statistics Yearbook*, 1987 and 1994.

Central Government Expenditure: As percentage of GDP 1972, 1977, 1982, 1987 from IMF, *International Financial Statistics Yearbook*, 1987 and 1994.

Central Government Net Lending: As percentage of central government expenditure plus lending minus repayments, from IMF, *Government Finance Statistics Yearbooks*, 1972, 1977, 1982, 1987, or a close year.

Subnational Budget Deficit (−), Surplus (+): GDP from World Bank 1992; subnational deficit = deficit of state budgets plus deficit of local budgets, from IMF, *Government Finance Statistics Yearbook*, 1972, 1977, 1982, 1987.

Domestic Debt of Central Government: As percentage of GDP, domestic debt of government as of 1960, IMF, *International Financial Statistics Yearbook*, 1994, line 88b or 88a. GDP also from IMF, *International Financial Statistics Yearbook*, 1987 and 1994.

Revolutions and Coups: From Easterly and Levine (1997) data set. Yugoslavia coded as no revolutions or coups in 1970s or 1980s.

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