Weakness not Liberalisation:
The Effect of IMF Programs upon Civil War[*]

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Abstract

Previous research has suggested that IMF programs cause political violence, as a result of conditions requiring economic liberalisation. In this paper I argue that previous research does not adequately model this causal mechanism, and provide an alternative information based theory of the effect of IMF programs upon civil wars. IMF programs can lead to civil war, if implementing an IMF program signals weakness of the government to potential rebel groups. When governments sign IMF programs in not particularly severe economic conditions, rebels learn the government is weak due its need for external assistance. In this way the signing of an IMF program, rather than economic liberalisation, in and of itself can increase the likelihood of civil war. The empirical analysis casts doubt on the economic liberalisation mechanism and lends support to the theory developed in this paper. The existence of an IMF program increases the probability of civil war onset even after accounting for the number of conditions, a proxy for the extent of liberalisation required. Furthermore this effect is conditional upon whether a country is undergoing a financial crisis when implementing the program, a signal of the governments competence. As a result this paper emphasises the need to move beyond considering IMF programs as homogenous.

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1 Introduction

The IMF has often been implicated in causing increased political violence within countries. Prominent studies have demonstrated that IMF programs are associated with increased political violence, even after accounting for the non-random nature of program implementation. Hartzell, Hoddie, and Bauer (2010) show that the presence of an IMF program within a country increases the probability of experiencing civil war.[1] Relatedly, a series of papers show that structural adjustment programs lead to an increase in repression and human rights violations by governments Abouharb and Cingranelli (2006, 2009).

In contrast to the existing literature, I argue that economic liberalisation associated with IMF programs is likely not a determinant of civil war. IMF programs differ considerably in conditions related to economic liberalisation (Stone, 2008). By not accounting for this heterogeneity, the effect of IMF programs upon political violence previously demonstrated in the literature may be capturing other factors other than economic liberalisation. Instead I argue that the signing of IMF programs can signal the weakness of the government, which in turn gives potential rebel groups the incentive to engage in war. Thus whilst economic liberalisation may disrupt society, the very fact that the government had to engage in liberalisation in order to receive external financing is more important.

To do so I develop an information based theory of the effect of IMF programs

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[1]Midtgaard, Vadlamannati, and Soysa (2014) call in to question the robustness of this result. However they set ongoing years of civil war to zero without correcting for the fact that a civil war may be ongoing, which recent research has shown to lead to bias (McGrath, 2015). Correcting for this problem leads to IMF programs having a statistically significant effect upon civil war onset, as will be seen in the empirical section.

upon civil war. The economic conditions surrounding an IMF program offer information about the government to potential rebel groups. When governments implement IMF programs in periods without economic distress, this signals the economic incompetence of the government (Dreher, 2004). From this, potential rebel groups infer that the government is weak thus increasing their incentive to rebel. As a result civil war occurs, independent of economic liberalisation.

The empirical analysis calls in to question the causal mechanism that IMF programs, by inducing economic liberalisation, lead to civil war. Increasing number of conditions associated with an IMF program, a proxy for the extent of economic liberalisation, are associated with a lower likelihood of civil war. Whilst this is not statistically significant at conventional levels, it is opposite to what previous research would predict. In contrast, undergoing an IMF program is still associated with a higher likelihood of civil war whilst accounting for the number of conditions. The implications of the alternative theory developed in this paper are supported by the empirical analysis, although the effects are associated with considerable uncertainty and thus not always statistically significant at conventional levels.

The paper proceeds as follows. The second section introduces a baseline model of civil war and derives the implications of both the new information based theory I develop of the effect of IMF programs upon civil war as well as the implications of the existing literature (Hartzell, Hoddie, and Bauer, 2010). The third section discusses the empirical research design. The fourth section tests the implications of this new theory and the previous arguments about the effect of IMF programs. The final section offers concluding thoughts.

2 A Model of IMF Programs and Civil War

Whilst the theoretical approach in the previous literature outlined above is plausible, there are some potential issues that warrant further investigation. Importantly, IMF programs are not homogenous with regard to the demands of economic liberalisation. Stone (2008) shows that there is considerable heterogeneity with regard to the contents and extent of conditionality included in an IMF program. As examples, conditions related to public-sector reform and privatisation are included only 13% and 9% of the time respectively. Treating all IMF programs as being equal with regard to their extent of economic liberalisation, as previous research has done, misses interesting variation.

If IMF programs are heterogenous in this respect, then the strong effect of simply being under an IMF program may be capturing other mechanisms. The very act of signing an IMF program in and of itself may be the cause of civil war onset. As a result I develop an alternative theory linking IMF programs to civil war onsets, based off of the bargaining model of war developed by Fearon (1995).

2.1 A Baseline Model of Civil War

The model consists of two actors: the government (G) and a rebel group (R). Following Fearon (1995) the two actors are bargaining over a good x defined on the unit interval $x \in [0, 1]$. The probability that the government wins in the event of war, p, is common knowledge and fixed.

There are two "war types" for the government: low war competence (c_G^l) and high war competence (c_G^h). An actor's type is private information. In this application I consider this private information to be about the competence of the government for war. For simplicity I assume that there is only type of rebel group. Utilities for war are: $U_G = p - c_G^j$ and $U_R = 1 - p - c_R$ where j indexes the type of government ($j \in \{h, l\}$). I assume that $c_G^l > c_R > c_G^h$, that is low war competence types face a higher cost of going to war than the rebel group, and the rebel group faces a higher cost than the high competence government type.

The government also has an economic competence type: which is either low (e_G^l) or high (e_G^h). A government's economic and war type are correlated, with low (high) war types being more likely to be low (high) economic types.[2]

It will also be useful to define the minimal bargaining agreement the government will accept. The minimal bargaining agreement for a government of war type j is defined as $x^{mj} = p - c_G^j$

The game, illustrated in figure 1, proceeds as follows:

1. Nature draws the conflict type of the government, with the probability of the government being the low type, $Pr(c_G^l)$, being equal to q.

2. The rebel group chooses either to mobilise (M) or not mobilise ($\neg M$). If the rebel group does not mobilise the game ends and both actors receive the bargaining outcome based off of the government being the high type:

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[2]More formally the conditional probability of being a low war type given the government is a low economic type satisfies the inequality: $0.5 < Pr(c_G^l|e_G^h) < 1$. This means that knowing the government is a low (high) economic type increases belief in the government being a low (high) war type, but does not guarantee this is the case (which would be so if: $Pr(c_G^l|e_G^h) = 1$).

$(1 - x^{mh}, x^{mh})$.

3. If the rebel group chooses to mobilise, then the government can choose to either fight (F) or not fight $(\neg F)$. If the government chooses not to fight the game ends and both actors receive the bargaining outcome based off the government being the low type: $(1 - x^{ml}, x^{ml})$. If the government chooses to fight the game ends and both actors receive the expected payoff from going to war: $(1 - p - c_R, p - c_G^j)$.
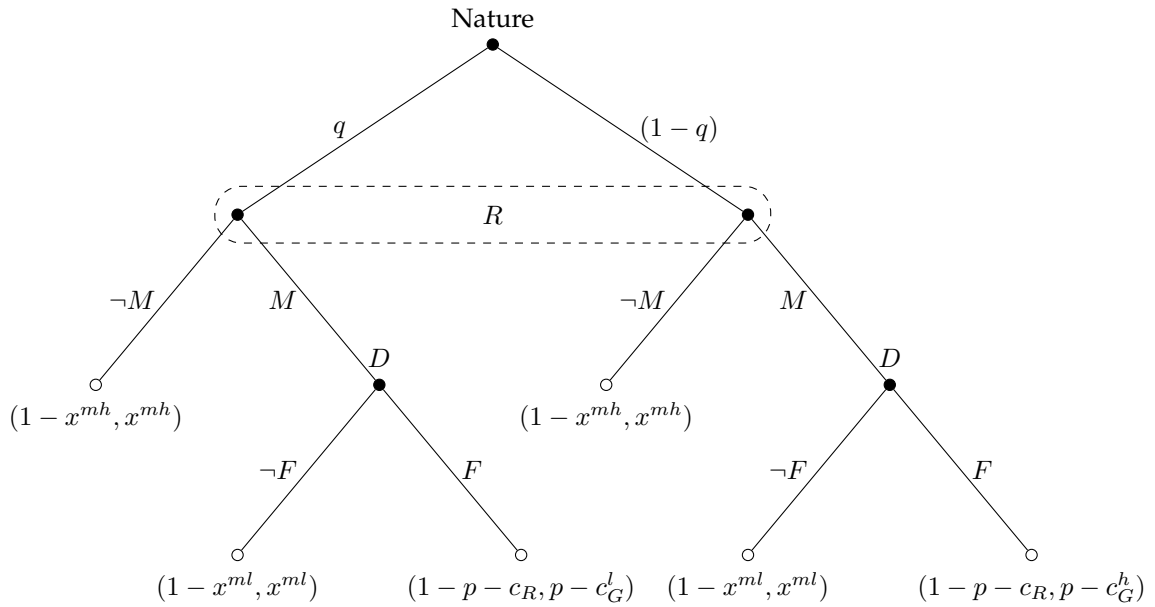

Figure 1: The game tree.

I also make a further assumption on the utilities of the actors in the game. I assume that if the utility for a bargaining agreement is equal to the expected utility from war, then an actor prefers the bargaining agreement. Thus actors in this specific situation are risk averse.

To illustrate the possible Bayesian perfect equilibrium I first outline the sub-

game perfect equilibrium based upon the two possible games given the government's type.[3] Given the assumptions made previously the sub-game perfect equilibrium are:

- Low Type Government: $(M, \neg F)$

- High Type Government: $(\neg M, F)$

Given these SPE we can examine the conditions where rebel mobilisation occurs. This is important as for a fixed distribution of types, where the frequency of each type is non-zero, an increase in mobilisation will increase the occurrence of war, ceteris paribus. The rebel group mobilises when:

$$U_R(M) > U_R(\neg M) \tag{1}$$

$$\underbrace{q(1 - x^{ml})}_{\text{Payoff given low type SPE}} + \underbrace{(1 - q)(1 - p - c_R)}_{\text{Payoff given high type SPE}} > \underbrace{q(1 - x^{mh})}_{\text{Payoff given low type SPE}} + \underbrace{(1 - q)(1 - x^{mh})}_{\text{Payoff given high type SPE}}$$
$$\tag{2}$$

$$q(1 - x^{ml}) + (1 - q)(1 - p - c_R) > 1 - x^{mh} \tag{3}$$

This states that mobilising entails a lottery between extracting a larger agreement and going to war. The payoff from this lottery must be larger than settling for a smaller bargaining agreement. An important rearrangement of this inequality for understanding the effect of the information mechanism for IMF programs upon civil war is:

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[3]See appendix for details

$$q > \frac{p + c_R - x^{mh}}{p + c_R - x^{ml}} \qquad (4)$$

As the rebel group increases its belief that it is facing the low type of government then the probability of mobilisation increases, everything else held constant.

2.2 Existing Theory: Economic Liberalisation and Civil War

Before moving to the argument that IMF programs provide information to rebel groups when deciding whether to mobilise, I briefly map the argument advanced by previous research onto the model developed here. Previous research has shown that IMF programs are associated with political violence (Abouharb and Cingranelli, 2006, 2009; Hartzell, Hoddie, and Bauer, 2010). The causal mechanism advanced by this research is that economic liberalisation, required by the IMF, leads to political violence. Hartzell, Hoddie, and Bauer (2010) argue that economic liberalisation under IMF programs leads to winners and losers. These losers face lower opportunity costs to rebellion. This provides the opportunities for potential rebel groups to challenge the state, drawing upon the new pool of disaffected people.

This argument can be translated into the model outlined above. Economic liberalisation can increase the probability of mobilisation by decreasing the probability, p, that the government wins a war. This is because the rebel group has an increased number of recruits, thus increasing its fighting power. This leads to the following testable hypothesis.

H1: If economic liberalisation leads to civil war, then increasing the number of conditions attached to an IMF program increases probability of civil war

Following this logic, if the effect of IMF programs is purely that of economic liberalisation outlined above, then we can develop an additional hypothesis. If there is no change in rebels' beliefs from the existence of an IMF program, then accounting for the degree of liberalisation associated with a program fully captures changes in the level of rebel group mobilisation. This leads to the following testable hypothesis:

H1a: If IMF programs have no effect independent of liberalisation, then the effect of IMF programs upon civil war is zero once the number of conditions associated with the IMF program is accounted for.

2.3 IMF Programs as Information

The argument of this paper is that the existence of an IMF program can change the rebel group's belief about the type of government they are facing, independent of economic liberalisation, and thus leads to an increased likelihood of civil war. Within this framework, the signing of an IMF program can lead to civil war as it provides a signal of the government's type to the rebel group. In particular, the economic conditions surrounding the signing (or not) of an IMF program provides a signal about the competence of the government. Following reasoning similar to that of Dreher (2004), the combination of IMF programs and economic conditions can either separate or pool high and low economic competence governments.

Implementing an IMF program during a period of severe economic distress pools both low and high competence governments. In severe economic conditions all governments require external assistance to deal with the crisis. As a result low and high types are pooled, as both need IMF programs. Therefore the signing of an IMF program is not informative to the rebel group about the economic type of the government.

In contrast the implementation of an IMF program in a period without severe economic distress separates low and high competence governments. High competence governments are able to deal with the economic conditions without the need of an IMF program. Low competence governments are unable to manage the situation independent of help from the IMF. Thus the rebel group updates its belief regarding the economic type of the government, in the event that the government turns to the IMF in a period without a severe economic shock. As the military type and economic type are positively correlated then the rebel's belief that they are facing a low military type, q, increases.[4] Given the equilibrium conditions outlined before (equation 4), this increases the probability of mobilisation and thus the probability of civil war.[5]

This leads to the following testable hypothesis:

H2: The effect of IMF programs upon civil war onsets is stronger when the program

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[4]This event would only lead to no increase in posterior belief if $q = 1$.

[5]This occurs because the correlation between the economic and military type of the government is not perfect. Thus there will be more situations where the rebel mobilises when the government is the high military type, who will choose to fight. Whilst the signal of economic competence is informative towards the military type of the government, it is not perfect information. Thus rebel groups will be more likely to engage in governments who will be willing to go to war, due to their military type. Note decreases in q lead to less war, as there are a less mobilisation efforts made.

was signed whilst a financial crisis was not occurring.

2.4   IMF Programs as a Resource

This theory also allows for the derivation of an additional hypothesis that can be tested to increase support for the use of this theory. The theory allows us to derive an hypothesis with regard to the effect of financial crises upon civil war onset, conditional upon whether an IMF program was implemented or not.[6]

A financial crisis can affect the probability the government wins a civil war, p, by decreasing the amount of resources available to commit to a war. As a result the crisis in and of itself can lead the rebel group to mobilise due to a decreased likelihood of the government winning, p. However signing an IMF program provides resources to the government to deal with the crisis. Therefore governments with an IMF program during a financial crisis will be less constrained militarily than those who are not under an IMF program.

This leads to the following additional testable hypothesis:

H3: The effect of a financial crisis upon civil war is stronger when the government does not sign an IMF program.

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[6]This is in line with the recommendation of Berry, Golder, and Milton (2012) with regard to testing interactive hypotheses.

3 Research Design

3.1 Dependent Variables and Estimator

To test the theoretical implications outlined above, I use the empirical set up
of Midtgaard, Vadlamannati, and Soysa (2014) which draws on the research
design of Hartzell, Hoddie, and Bauer (2010). I estimate a recursive bivariate
probit model, which allows for correlation between the error terms of the two
binary outcome variables: civil war and the existence of an IMF program.

Civil war is defined by 25 battle deaths occurring in a year using the UCDP/PRIO
Armed Conflict Database. One important difference to previous research is the
coding of the dependent variable. In contrast to Midtgaard, Vadlamannati, and
Soysa (2014) I restrict the sample to countries that did not experience a conflict
in the previous year, as previous research has shown that setting ongoing years
to zero leads to bias (McGrath, 2015).

Participation in an IMF program follows the stricter definition of Midtgaard,
Vadlamannati, and Soysa (2014). A country receives a value of 1 if the coun-
try has been under an IMF program for than 5 months in a given year, and 0
otherwise. This data comes from Dreher (2006).

3.2 Main Independent Variables

To proxy for economic liberalisation that is the result of an IMF program, I use
data on the number of conditions associated with an IMF program from Stone

(2008). As Stone's data is monthly I use the average number of conditions in a year.

Related to hypotheses 2 and 2a, I create a binary variable that indicates whether any form of financial crisis is occurring in a given year to account for the severity of current economic conditions. This variable takes a value of 1 whenever a currency crisis, banking crisis, or debt crisis is occurring and 0 otherwise. All of this data is from Laeven and Valencia (2008).

3.3   Other Independent Variables

The civil war onset equation includes the log of total population, the log of GDP per capita, and trade openness from the World Bank's World Development Indicators (World Bank, 2011). A binary variable for whether a country is a democracy or not is included Cheibub, Gandhi, and Vreeland (2010). I also include the number of years since the last civil war onset and whether a neighbouring state is undergoing a civil war (Midtgaard, Vadlamannati, and Soysa, 2014). Finally data on whether the country is an oil exporter (Midtgaard, Vadlamannati, and Soysa, 2014), and the mountainous terrain of a country are included Fearon and Laitin (2003).

The IMF program equation includes the log of GDP per capita, GDP growth, foreign exchange reserves as months of imports, and trade openness from the World Development Indicators (World Bank, 2011). In addition data on whether a country is experiencing a currency crisis, a debt crisis and a systemic banking crisis from Laeven and Valencia (2008). Finally the number of consecutive

years a country has been under an IMF program is included (Abouharb and Cingranelli, 2007).

Whilst Midtgaard, Vadlamannati, and Soysa (2014) use year fixed effects in their empirical models, I replace these with a cubic polynomial time trend to improve efficiency of the estimation and avoid problems of separation.

4 Results

Table 1 displays the results of the estimation. Model 1 first replicates the main empirical model of Midtgaard, Vadlamannati, and Soysa (2014), but does not set ongoing years to zero. Doing so reiterates the finding of Hartzell, Hoddie, and Bauer (2010), the existence of an IMF program leads to an increased probability of experiencing civil war.

Model 2 attempts to more explicitly model the hypothesis that economic liberalisation as a result of IMF programs is what leads to civil war. To do so I include the number of conditions associated with the IMF program. The results do not support the economic liberalisation hypothesis. There is no statistically significant effect of the number of conditions upon civil war onset. Furthermore, the point estimate is in fact opposite to what we would expect under the economic liberalisation hypothesis, more IMF conditions are associated with a lower likelihood of experiencing a civil war onset. In contrast the coefficient for whether a country is undergoing an IMF program is positive and statistically significant at conventional levels.

Table 1: Effect of IMF Programs upon Civil War Onset

	(1)	(2)	(3)	(4)
Civil War Equation				
IMF Participation > 5 Months	0.613*	0.843*	0.403	0.505
	(0.348)	(0.507)	(0.406)	(0.636)
Number of IMF Conditions		-0.001		-0.009
		(0.028)		(0.030)
Financial Crisis			0.472*	0.777**
			(0.261)	(0.342)
IMF Participation > 5 Months × Financial Crisis			-0.301	-0.316
			(0.332)	(0.433)
Total Population (log)	0.061	-0.032	0.062	-0.036
	(0.047)	(0.063)	(0.047)	(0.065)
GDP per-capita (log)	-0.137	-0.080	-0.177**	-0.143
	(0.084)	(0.130)	(0.088)	(0.154)
Trade Openness	-0.000	-0.003	-0.000	-0.004
	(0.002)	(0.003)	(0.002)	(0.003)
Democracy (Cheibub et al.)	-0.039	-0.318	-0.024	-0.308
	(0.145)	(0.214)	(0.146)	(0.224)
Oil Exporting Country	0.368**	0.472*	0.351**	0.414*
	(0.147)	(0.249)	(0.152)	(0.245)
Neighbour at War	0.127	0.377**	0.142	0.407**
	(0.125)	(0.174)	(0.129)	(0.188)
Mountaineous Terrain	0.001	0.003	0.001	0.004
	(0.003)	(0.004)	(0.003)	(0.004)
Constant	-2.616**	32.656	-2.364**	41.823
	(1.111)	(41.322)	(1.125)	(42.951)
IMF Program Equation				
GDP per-capita (log)	-0.550***	-0.607***	-0.551***	-0.609***
	(0.059)	(0.086)	(0.059)	(0.087)
GDP Growth Rate	-0.006	0.007	-0.006	0.007
	(0.004)	(0.012)	(0.005)	(0.013)
Trade Openness	0.001	0.001	0.001	0.001
	(0.002)	(0.003)	(0.002)	(0.003)
Foreign Exchange Reserves	-0.038	-0.025	-0.039	-0.027
	(0.026)	(0.032)	(0.026)	(0.032)
Currency Crisis	0.376**	0.438	0.369**	0.426
	(0.180)	(0.275)	(0.183)	(0.292)
Debt Crisis	1.441***	7.183***	1.432***	6.774***
	(0.281)	(0.288)	(0.279)	(0.436)
Banking Crisis	0.234	0.237	0.208	0.190
	(0.167)	(0.229)	(0.170)	(0.236)
UNGA Voting Alignment Index	2.452***	3.686***	2.481***	3.722***
	(0.699)	(1.042)	(0.698)	(1.046)
Years in IMF Program	0.048***	0.047***	0.048***	0.048***
	(0.007)	(0.010)	(0.007)	(0.010)
Constant	-1.584*	8.418	-1.600*	8.280
	(0.929)	(24.903)	(0.931)	(25.089)
ρ	-0.336	-0.501	-0.175	-0.202
	(0.218)	(0.347)	(0.234)	(0.371)
Observations	2361	1018	2361	1018
BIC	2847.692	1428.678	2860.004	1437.761

Country clustered standard errors in parentheses
The time trend cubic polynomial and the cubic polynomial of time since last conflict are omitted from the table of coefficients.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Model 3 allows for the effect of IMF programs to be conditional upon whether a country is undergoing a financial crisis. Doing so finds some support for the hypothesis that IMF programs can lead to civil war if they provide a signal of the government's competency (H2). As expected the effect of an IMF program upon civil war onset if the program was signed when there was no financial crisis is stronger than the effect when there was a financial crisis. This suggests turning to the IMF for economic assistance in a period without economic distress signals that the government is incompetent, thus increasing the likelihood that groups will choose to initiate a civil war. However these coefficient estimates come with considerable uncertainty and are not statistically significant at conventional levels.

Model 4 further tests this implication by also controlling for the number of conditions. The results remain in the expected direction from the signalling hypothesis. IMF programs have a stronger effect upon civil war onset when undertaken in periods without financial crisis. However, as before the results are not statistically significant at conventional levels.

Both model 3 and 4 also allow us to examine the additional hypothesis that the effect of financial crises upon civil war should be weaker when governments sign an IMF program (H3). These models support this hypothesis, governments undergoing an financial crisis without an IMF program are more likely to experience civil war than if a financial crisis occurs and an IMF program is signed. This support for the additional hypothesis increases the overall support for the alternative theory of the effect of IMF programs upon civil war developed in this paper.

16

In summary, the results cast doubt on the argument that economic liberalisation that is the result of IMF programs leads to civil war. The effect of IMF programs upon civil war remains significantly positive when controlling for the number of conditions attached to the program. Furthermore the effect of the number of conditions upon civil war onset is opposite to what would be expected if the economic liberalisation hypothesis were to hold. IMF programs with more conditions lead to a decreased probability of civil war onset. There is some support for the argument that IMF programs increase the likelihood of civil war onset if signing the program signals the weakness of the government. The estimations find that IMF programs implemented when there was not a financial crisis have a stronger effect upon the probability of civil war onset, compared to IMF programs signed when there was a financial crisis. Whilst these point estimates are in line with the signalling hypothesis they are not statistically significant at conventional levels. However an additional hypothesis derived from the theory also is supported by the empirical models, lending greater support to this information theory of the effect of IMF programs upon civil war onset.

5   Robustness

I also perform a series of robustness tests. There are three forms that these take. First, I account for the number of years a country has been under an IMF program in the civil war equation. Second, I exclude OECD countries from the statistical analysis. Third I use more a conservative dependent variable, where a country is classified as undergoing a civil war if 1000 battle deaths are observed

Table 2: Robustness Tests for the Effect of IMF Programs upon Civil War Onset

	(5)	(6)	(7)	(8)	(9)	(10)
	Including Years Under IMF		Excluding OECD Countries		Battle Deaths > 1000	
Civil War Equation						
IMF Participation > 5 Months	1.044**	0.788	0.932*	0.562	1.276**	1.536*
	(0.468)	(0.712)	(0.556)	(0.712)	(0.571)	(0.815)
Number of IMF Conditions	0.001	-0.008	-0.002	-0.011	-0.149**	-0.159**
	(0.026)	(0.029)	(0.027)	(0.030)	(0.059)	(0.066)
Financial Crisis		0.743**		0.821**		0.892*
		(0.333)		(0.362)		(0.538)
IMF × Financial Crisis		-0.384		-0.345		-1.308*
		(0.440)		(0.447)		(0.694)
Years in IMF Program	-0.014	-0.011				
	(0.013)	(0.016)				
Total Population (log)	-0.021	-0.027	-0.036	-0.040	0.090	0.134
	(0.060)	(0.063)	(0.063)	(0.067)	(0.081)	(0.086)
GDP per-capita (log)	-0.069	-0.107	-0.085	-0.157	-0.004	0.013
	(0.116)	(0.133)	(0.158)	(0.175)	(0.123)	(0.158)
Trade Openness	-0.004	-0.004	-0.002	-0.003	-0.007	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
Democracy (Cheibub et al.)	-0.265	-0.287	-0.309	-0.305	-0.212	-0.290
	(0.228)	(0.234)	(0.204)	(0.221)	(0.247)	(0.258)
Oil Exporting Country	0.443*	0.399*	0.470*	0.431	0.608*	0.625*
	(0.247)	(0.241)	(0.268)	(0.268)	(0.333)	(0.327)
Neighbour at War	0.373**	0.404**	0.401**	0.441**	0.144	0.192
	(0.168)	(0.184)	(0.174)	(0.192)	(0.298)	(0.301)
Mountaineous Terrain	0.003	0.005	0.003	0.004	0.008	0.009*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
Constant	26.554	35.812	29.890	40.255	94.403	103.728
	(40.152)	(42.466)	(43.383)	(45.350)	(61.663)	(70.425)
IMF Program Equation						
GDP per-capita (log)	-0.604***	-0.608***	-0.512***	-0.515***	-0.561***	-0.561***
	(0.087)	(0.087)	(0.101)	(0.102)	(0.079)	(0.079)
GDP Growth Rate	0.007	0.007	0.012	0.012	0.006	0.006
	(0.012)	(0.013)	(0.012)	(0.013)	(0.011)	(0.011)
Trade Openness	0.001	0.001	-0.000	0.000	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Foreign Exchange Reserves	-0.025	-0.026	-0.033	-0.035	-0.035	-0.035
	(0.031)	(0.032)	(0.032)	(0.032)	(0.032)	(0.034)
Currency Crisis	0.433	0.408	0.387	0.375	0.238	0.224
	(0.272)	(0.293)	(0.282)	(0.306)	(0.221)	(0.223)
Debt Crisis	7.519***	6.985***	7.336***	7.127***	6.794***	6.876***
	(0.294)	(0.294)	(0.334)	(0.411)	(0.589)	(0.712)
Banking Crisis	0.241	0.189	0.083	0.024	0.146	0.134
	(0.224)	(0.233)	(0.243)	(0.254)	(0.206)	(0.210)
UNGA Voting Alignment Index	3.659***	3.697***	4.875***	4.932***	3.367***	3.366***
	(1.038)	(1.050)	(1.134)	(1.139)	(0.912)	(0.912)
Years in IMF Program	0.047***	0.048***	0.037***	0.038***	0.048***	0.048***
	(0.010)	(0.010)	(0.011)	(0.011)	(0.009)	(0.009)
Constant	8.769	8.441	5.899	5.907	9.275	9.167
	(24.832)	(25.012)	(25.660)	(25.955)	(22.135)	(22.147)
ρ	-0.639*	-0.373	-0.588	-0.232	-0.475	-0.513
	(0.326)	(0.415)	(0.426)	(0.433)	(0.327)	(0.553)
Observations	1018	1018	788	788	1178	1178
BIC	1434.376	1444.180	1311.094	1319.431	1512.275	1523.088

Country clustered standard errors in parentheses
The time trend cubic polynomial and the cubic polynomial of time since last conflict
are omitted from the table of coefficients.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

in a given year.

Table 2 displays the results of these robustness tests. In summary the main results found, located in table 1, are consistent with the robustness tests. If anything the effect of IMF programs upon civil war become stronger in these models, lending evidence to the theory presented in this paper. In contrast the effect of the number of conditions associated with an IMF program remains small, and is opposite to its expected direction in cases where it is statistically significant. Thus the empirical analysis casts doubt on the mechanism that IMF programs increase the probability of civil war due to the requirements of economic liberalisation. Rather the results suggest that undergoing an IMF program signals weakness to potential rebel groups, is a more plausible mechanism.

6 Conclusion

Economic liberalisation, as the result of IMF programs, has often been shown to be a contributing factor to political violence within countries (Abouharb and Cingranelli, 2006, 2009; Hartzell, Hoddie, and Bauer, 2010). The fact that economic liberalisation can lead to winners and losers, at least in the short term, intuitively implies increased political violence.

This paper offers an alternative explanation that runs counter to this economic liberalisation argument. The implementation of an IMF program can reveal information about the government to potential rebel groups. Governments that have to turn to the fund in not so hard times reveal themselves to be weak. As a result potential rebel groups update their beliefs about the strength of the

government and are more likely to challenge the government, leading to civil war.

The empirical results lend support to the alternative theory developed in this paper. IMF programs increase the likelihood of civil war, even after accounting for the number of conditions associated with the program. This suggests that economic liberalisation as the result of an IMF program is unlikely to be the reason why civil war occurs. Rather IMF programs signal the weakness of governments when they are undertaken in periods where there is not severe economic distress, leading to increased rebellion.

More generally this paper highlights how it is important to recognise that IMF programs are not homogenous. As IMF programs vary considerably in the number and scope of conditions it is important to not the existence of a program as having a homogenous effect. Further exploration of the heterogeneity of IMF programs, and how this can affect outcomes within other countries, provides many opportunities for future research.

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7 Appendix

7.1 Sub-game Perfect Equilibrium for Low and High Types

7.1.1 Low Type SPE

Starting from the final node, where G makes a choice, then G chooses $\neg F$ given the assumption that an actor prefers a bargaining outcome to war outcome if the payoffs are the same. As R knows this then R chooses M as the payoff of $(1 - x^{ml})$ is greater than the payoff from $\neg M$ which is $(1 - x^{mh})$. Thus the SPE is $(M, \neg F)$.

7.1.2 High Type SPE

Starting from the final node, where G makes a choice, then G chooses F as the payoff of $p - c_G^h$ is greater than x^{ml} as $c_G^h < c_G^l$. Given this R choose $\neg M$ as $c_G^h < c_R$. Therefore the SPE is $(\neg M, F)$.