

Civil War and Human Development: Impacts of Finance and Financial Infrastructure

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ABSTRACT

In this paper interactions between finance, development and armed conflict are explored to demonstrate that financial factors are crucial in sustaining conflict-underdevelopment feedback loops. Military expenditure drains resources, financial instability leads to conflict (and vice versa), war retards the development of financial institutions/infrastructure, and interactions between finance and conflict are exacerbated by distributional struggles. Some of these feedback effects are captured within a two-stage model of war, finance and development and this is used as the basis for an empirical analysis. Econometrically, the model is estimated using panel estimation and two stage Probit least squares (2SPLS) binary dependent variable estimation techniques to control for simultaneity and heterogeneity. The results suggest that financial constraints and financial instability increase the chances of civil war directly and, via negative impacts on development, indirectly too.

Key Words: Human development, civil conflict, military spending, financial instability, financial infrastructure

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1 Introduction

The feedback effects between poverty, underdevelopment and conflict are widely analysed (see Blattman and Miguel 2010, Goodhand 2003, Nafziger and Auvinen 2002 etc.) and the impacts of finance and financial stability on growth and development are also widely known (e.g. see Dornbusch and Reynoso 1989, Beck *et al.* 2004, Demirgüç-Kunt and Levine 2009). Civil conflict has far-reaching effects on underdeveloped countries, potentially destroying institutions and infrastructure, thereby exacerbating stagnation and underdevelopment. The impacts of armed conflict are particularly detrimental for the poorest nations because they are prone to civil conflicts for which domestic socio-political issues are crucial catalysts (Addison *et al.* 2001). Although it has been argued that conflict is not without positive impacts if it allows the accumulation of social capital (see Voors *et al.* 2010), armed conflict destroys scarce but essential institutions within poor countries, including financial institutions; it incurs indirect human and long-term development costs including the loss of entitlements, particularly amongst vulnerable groups (Stewart and Fitzgerald, 2000). Conflict also generates distributional changes, intensifying horizontal inequality across different ethnic/religious/tribal groups and vertical inequality down through different income groups (Stewart and Fitzgerald, 2000).

As the interactions between conflict and poverty, and between poverty and finance, have already been thoroughly explored elsewhere, this paper focuses specifically on the role played by financial factors in the poverty-conflict loop. Looking at both sides of the finance-conflict loop, just as war creates financial problems so too financial problems can increase the propensity for civil conflicts. Addison *et al.* (2001) argue that armed conflict, including its financing, exacerbates economic, political and social problems generating links between conflict, finance and dualistic development. Whilst narrow development is not the only cause of conflict and conflict is not the only cause of narrow development, financial instability creates social problems and these are a catalyst to further conflict.

This paper develops these ideas by constructing a theoretical and empirical framework in which the complex feedbacks between conflict, development and finance are analysed to test the hypotheses that financial factors precipitate conflict not only directly but also indirectly; underdevelopment and financial instability together increase vulnerability to ongoing conflict and financial factors play a crucial role in sustaining the feedback loops between conflict and

underdevelopment. The need to finance conflict has a direct impact on poverty by diverting government expenditure towards military goals, putting pressure not only on government balances but also on financial markets generally, exacerbating financial instability. Financial instability also contributes to general uncertainty, limiting development and directly incubating conditions for civil conflict. Indirectly, financial factors precipitate war because limited availability of finance and rudimentary financial institutions mean that vicious circles of conflict and underdevelopment persist; and ongoing socioeconomic instability contributes to ongoing civil unrest.

Given the complexity of the feedback effects between finance, poverty and conflict, the issues are examined from a number of perspectives: the direct and indirect impacts of financial factors on conflict and vice versa are explored in Section 2, addressing the insight that financial factors affect conflict directly (e.g. financial instability fosters conflict) and indirectly because financial constraints limit potential for development and therefore indirectly precipitate conflict (e.g. reflecting distributional struggles). In section 3, a model is developed in which limited opportunities create pressures for insurgency and this approach is used to identify the interactions between conflict, development and finance. In Section 4, results are presented from the analysis of a conflict-finance-development feedback model estimated using a combination of panel estimation techniques, whilst controlling for simultaneity and endogeneity in limited dependent variable estimation using a 2 Stage Probit Least Squares (2SPLS) methodology following Maddala (1983) and Keshk (2003). The conclusions and policy implications are presented in Section 5.

2 Conflict, Finance and Development

War and conflict generate financial strains for a number of reasons. Nagarajan (1998) argues that conflict affects the financial sectors of developing countries at many levels: at the macroeconomic level by disrupting general economic confidence; at the ‘meso’ level by destroying key financial institutions; and at the microeconomic level by disrupting the social relationships essential to financial transactions in developing economies. Any conflict can lead to financial instability but it is particularly problematic for poorer countries where financial infrastructure is not well developed.

2.1 War finance: military expenditure consumes scarce financial resources

Conflict generates financial strains particularly if it is associated with an increase in military expenditure and arms imports. During civil wars, unsurprisingly, the ratio of military

expenditure to GDP rises sharply and government revenues tend to be low; for example following the conflict in Mozambique, fiscal deficits were between 10-20% of GDP. Fiscal pressures from high levels of military spending devoted primarily to destruction of opponents and their resources coincide with low levels of spending on social and economic infrastructure. Military spending on arms imports will also have implications because the drain on foreign exchange reserves will mean that less foreign exchange is available to fund the imports needed for investment and infrastructure projects. Also, maintaining high levels of military expenditure will not only divert expenditure away from social and infrastructure expenditure but also will contribute to the destruction of infrastructure already in place, exacerbating stagnation, fuelling further civil unrest and ongoing conflict.

Natural resources will play a crucial role especially when internal sources of war finance are limited. Whilst it might be that conflicts are precipitated by attempts to gain control over natural resources, there is also evidence that the causality goes the other way i.e. dependence on natural resources increases when conflict is endemic (Brunnschweiler and Bulte 2009). Commercial borrowing to fund military expenditure is often based on mortgaging of future returns from resource wealth, tapping into influential international private interests; for example, the Angolan war was funded on the basis of oil reserves and diamonds, which led to 95% of Angola's oil share being used in debt servicing of loans to finance arms and mercenaries. Similar patterns were observed in Somalia and Zaire. In this way, government expenditures were deflected away from social uses, promoting dualism and narrow development rather than broad based development, fostering further conflict.

A key question is why are military expenditures particularly large in poorer countries? Political institutions can play an important role and the proportion of military expenditure to GDP tends to be lower in democracies (Collier and Hoeffler 2004). Collier (2006) argues that a range of strategic and economic interests are important and military expenditures will have different impacts during peacetime and during wartime. The real issue is not the scale of military expenditure or the power of the military institution but the activities that are being funded. The impacts of military institutions engaged in peaceful activities versus those involved in armed conflict will differ according to the level of development of a country and according to social and institutional factors. If military expenditure is used to fund a well-organised and productive institution, then it can have positive impacts in countries with otherwise underdeveloped institutions, at least in peacetime. It may promote economic growth by boosting aggregate demand; it can be a crucial catalyst to development if it is used to build essential infrastructure and develop human skills; the military can play a role in

education, building roads/hospitals and other forms of infrastructure – with broadly based socio-economic benefits – all of which boost growth and development (Benoit 1972, 1978). Feedback effects may operate if growth reduces risk of further conflicts by raising levels of income (Collier 2008, Collier and Hoeffler 2006, 2004, 2002). The extent of benefit will depend on the severity of security threats because military expenditures may have positive output effects when threats are high but negative output effects when threats are low (Dunne, Smith and Willenbockel 2005). Also, negative associations between military expenditure and growth can persist during peacetimes (Knight, Loayza and Villaneuva 1996, Collier and Hoeffler 2006). In post-conflict phases, Addison et al (2001) also argue that military expenditures may be high, not only because of demobilisation costs but also as a deterrent to further rebel activity.

Strategic issues affect military expenditure and the availability of external and internal finance determines length and outcome of wars and conflicts (Addison *et al.*, 2001). Collier and Hoeffler (2006) argue that dynamic inconsistency effects, operating at both a micro and a macro level, generate interactions between military spending and repeated conflict / fragile peacetimes.² They argue that military expenditure can be used as a signal by governments or a screen by insurgents to indicate a commitment to peace agreements: low levels of post-conflict spending signal intentions to honour peace agreements and high levels of post-conflict spending signal intentions to renege. Governments have incentives to renege on peace agreements because the military capability and therefore bargaining power of rebel groups decays during peacetime. Resultant incentives to renege by the incumbent government i.e. diversion of finance away from government expenditures to help broadly based development, can contribute to the fragility of peace settlements (Collier and Hoeffler, 2006, p. 6). There are also incentives not to renege, for example the fear of losing access to foreign aid. So a separating equilibrium emerges: on one hand, peace-loving governments honour peace agreements, signalling this intention by lowering military expenditure, reducing the probability of further conflict; on the other hand, governments which plan to pursue a renege strategy will maintain military spending at a high level in the immediate post-conflict stage and, because this signals a government's intention to renege, this will increase the probability of further conflict. The selection of strategies is determined by the relative

² This type of game will not necessarily take place in a world of rational agents. Collier and Hoeffler (2006) cite Hirschleifer (2001), who notes the problem of different and imperfect perceptions of military success with a tendency for over-optimism in perception of military prospects.

benefits and costs of reversion to conflict and high levels of military spending are associated with increased risk of renewed conflict (Collier and Hoeffler, 2004).

2.2 *War exacerbates financial instability and uncertainty*

The interactions between armed conflict and financial instability are complex. Empirical evidence from Magnusson and Wydick (2001) compares the efficiency of markets in 8 largest African stock markets in comparison with emerging stock markets in South East Asia and Latin America; their results suggest that emerging African markets are no less efficient than other emerging markets even though generally these countries are more conflict ridden. Assessing the empirical evidence on the comparative efficiency of international stock markets is problematic however, because a complex range of factors will be affecting stock market performance. The pessimism and uncertainty that emerge in times of conflict will contribute to financial instability because it generates socio-political uncertainty which impacts on the confidence of entrepreneurs and investors, particularly if the collapse of financial markets destroys paper value generating the appearance of a widespread loss in accumulated capital (Keynes 1914).

Fiscal pressures contribute to financial instability though the relationships are complex; financial instability impacts on war not only directly but indirectly too. War may contribute to financial instability if monetary and financial policies are unsustainable. On the other hand, in the face of financial instability, anti-inflationary macro stabilisation policies may exacerbate ongoing poverty and unemployment as debts and deficits are reduced in the process; tight monetary and fiscal policies will have a disproportionate adverse impact on the poor because less will be spent on employment generation and development projects. Policy tradeoffs emerge between expansionary policies to promote employment and contractionary policies to control instability generated by inflation and capital flight. These trade-offs are not always well managed, e.g. IMF conditionality packages can worsen civil conflicts in the short-run as was seen in Greece in May 2010. In the longer term, contractionary government policies may lead to rising structural unemployment, again exacerbating civil unrest. These factors together with general uncertainty generate some of the pre-conditions for conflict.

The import of arms to enable the protection of the vested interests of governing groups may create external financing pressures with further implications for financial stability and the exchange rate. The development of national and sub-national currencies is crucial because currencies provide a means of raising revenue via seigniorage (e.g. in Eritrea) but the printing of money may fuel hyperinflation and uncertainty (e.g. Mugabe's regime in

Zimbabwe). War financing instruments may be used at unofficial level with rebel groups running financial systems and informal currencies in occupied areas, sometimes instigated under duress (Addison et al. 2001, Collier 2008). If corruption and cronyism limit the sustainability of underdeveloped financial systems then banking crises can generate massive uncertainty plus economic and financial shocks. Resolving these financial shocks in conflict prone countries can involve large fiscal costs, taking money away from reconstruction and destabilising already fragile societies and economies.

The negative impacts of war on business confidence and pessimism and uncertainty will be magnified within a highly liquid financial sector. Collier and Gunning (1995) explore the interactions between conflict and propensities to hold money in describing the process by which investors save profits in liquid form during wars, switching them to fixed investment projects in peace-time. These forces will complicate monetary policy; it is difficult to target money supply given shifting and unstable money demand. Also, war may necessitate the sale of real assets to finance a war effort because government liabilities become difficult if not impossible to sell given erratic demand (Collier and Gunning, 1995). Rises in the cost of finance may be exacerbated if higher risk premia affect countries' credit ratings, contributing to ongoing financial problems. As growth is slowed by financial uncertainty and employment dwindles, the economic opportunities available for the poor will also shrink, contributing to persistent poverty and inequality and generating socio-economic instability and the potential for ongoing civilian unrest. Globalisation may exacerbate these pressures if it facilitates capital flows. Also, financial instability will not necessarily be moderated by government intervention because regulatory capture is common in poor, war-prone nations; with the exception of Korea, state control of financial systems in conflict-prone countries has been poor (Addison et al, 2001). The democratic institutions needed to protect impartial financial regulation are limited, particularly in the poorest, most conflict-prone countries and this may feed into the conflict-finance-poverty nexus.

2.3 Conflict and distributional struggles

Financial constraints limit economic opportunities amongst poorer groups precipitating distributional struggles over financial resources, including foreign exchange and natural resources such as gold, diamonds and oil. It is particularly common in underdeveloped countries because growth is stagnant, levels of income are low and natural resources such as diamonds, oil and drug crops provide one of the few economic opportunities available to impoverished groups. Civil conflict is therefore as much about

alternative opportunities given poverty and stagnant growth as it is about political motivations for rebellious action (Collier and Hoeffler 2004, Collier 2008).

Poverty and discrimination emerge in dual economies as governing groups seek to protect their economic and/or socio-political interests using violent techniques (Grossman 1999, Hirschleifer 2001, Collier and Hoeffler 2004). Recurrent insurrections are often the product of the nexus between financial control by elites and oppression (Addison et al, 2001). Overall, the poor are excluded from ordinary economic opportunities as they cannot control financial systems and their recourse is conflict. Finance plays a crucial role in this: vicious cycles become entrenched because financial problems lead to underdevelopment and stagnation, exacerbating social and economic unrest thus increasing the probability of future conflicts. War destroys factors of production (Collier 1999) and temporarily diminishes the usefulness of natural resources and accumulated capital, affecting poorer groups disproportionately because it generates income losses, absorbs savings and depletes consumption. As a consequence, the relative values of capital goods, money and consumable goods will shift during war-time.³ There will be a shift towards consumption reflecting the urgency of needs for present goods to reduce distress and poverty in the present and near future, eroding the value of capital goods and raising discount rates, reflecting shifts in people's inter-temporal preferences towards the short-term: "Not even the Prussian army can eat rails and embankments or clothe itself in bricks and mortar" (Keynes 1914, p. 486).⁴ Increased demand for finance and foreign exchange to fund military expenditure will feed through into higher interest rates, dampening investment activity and slowing economic growth (Voors *et al.* 2010). According to Keynes (1914) all this does not necessarily mean "we are ruined for life" but wars do lead to changes in the distribution of income and wealth.

War financing fuels corruption and military spending for personal gain is often financed by sale of public assets (Collier and Gunning, 1995). In dualistic economies, elites often control financial systems and state banking may evolve to finance private accumulation, particularly in agrarian economies, and this exacerbates economic inequality and discrimination. Financial systems may be used by elite groups to leverage existing wealth – e.g. in the coffee economies of Central America. In Indonesia, the 1997 financial crisis emerged in the context of widespread crony capitalism as elite groups sought to protect their own political interests in the face of financial instability, sparking widespread violence

³ See Keynes (1940) and Fitzgerald (1997) for further detail on Keynes's analyses of the economic implications of war.

⁴ See also Voors et al. (2010) for experimental evidence about war raising discount rates .

against ethnic Chinese and exacerbating regional conflicts (Addison et al., 2001). Overall these distributional struggles have fostered the growth of insurgency as poverty and financial constraints have tipped excluded people over the edge into rebellion.

Addison et al. (2001) argue that financial reforms are less likely to be effective in undemocratic systems. One reason will be the presence of political bias; when political systems move away from pure democracy then mutually acceptable transfer payments between different groups cannot remove the threat of war, particularly as such agreements will be unenforceable (Jackson and Morelli 2007). Similarly, Garfinkel (1994) argues that the political competition that characterises democracies introduces a negative bias into nations' military spending patterns and, given a strategic approach to military policy, this reduces other nations' incentives to arm as well. Thus Garfinkel argues that democratic institutions are a pre-commitment mechanism reducing the severity of conflicts and releasing resources for consumption.

2.4 *War retards the evolution of financial institutions and infrastructure*

Financial institutions and infrastructure are crucial to development; if savings cannot be channelled to those planning to invest then growth and development will slow (Dornbusch and Reynoso 1989). At a macro level and historically, wars have sometimes been periods of financial innovation because the need for war finance may introduce institutional changes as states increase control over banking to generate funds for war efforts (Kindleberger, 1993). There may be compulsory purchases of government debt and nationalization of financial institutions, creating periods of financial innovation, e.g. in Angola and Croatia (Addison et al., 2001). Conversely, macro stabilisation policies may exacerbate ongoing poverty if they involve distortions to financial infrastructure, limiting financial depth and intermediation and reducing opportunities for legitimate economic activity.

In the face of deficient domestic financial infrastructure, financial deregulation and globalisation have enabled the financing of armed conflict because the removal of capital controls and the reduction in the financial information required about borrowers has enabled easier and quicker transfer of money to fund armed conflict (Fitzgerald, 2003, p. 3).⁵ Technological innovations have overcome some of the problems with otherwise deficient infrastructure in poor countries. Addison *et al.* (2001) argue that, in funding wars, external capital inflows from legitimate diasporas (e.g. payroll tax paid by Kosovar Albanians

⁵ Also see Fitzgerald (2003) for a discussion of global financial information about conflict funding and the problems and solutions associated with and international regulation of conflict funding, particularly in the context of the funding of self-determination movements.

working in Germany, also transfers to Tamil Tigers during Sri Lankan conflicts and in Eritrea) are crucial but moving money internationally requires knowledge and, sometimes illegal, technical assistance (e.g. from organised crime). Computerisation has facilitated the transfer of financial innovations, and globalisation has facilitated war financing even in the poorest countries, though with financial liberalisation on an international scale, it is harder to track financial flows.

Government rent-seeking activities will also distort financial infrastructure, for example the Bank of Cambodia encouraged the development of many banks in order to gather the fees and fines associated with the licensing of a bank (Addison et al, 2001). Systems are designed not to increase access to financial infrastructure but to circumvent exchange controls on international transfers – e.g. Hawala systems in South Asia (Addison et al, 2001, p. 3). Controls on financial systems, such as ceilings on interest rates (for example, in Angola and Mozambique) operate to favour certain groups. Powerful politicians often own the private banks - for example in Liberia, Charles Taylor owned the Bong Bank. Bank credit may be directed towards enterprises run by political elites generating an increased risk of bad loans. Privately owned banks may be involved in criminal activity, e.g. in Cambodia only 12 of 33 private banks were legitimate; all others were involved in criminal activities. These financial distortions destroy savings, lower living standards and spark conflict; for example, during the 1997 collapse of Albanian pyramid schemes; the central bank was unable to act given the political connections of pyramid bankers; as deposits slowed, the banks could not meet their commitments and the resultant banking collapse sent the country into a downward spiral of poverty and conflict (Jarvis, 1999).

At a micro level, war and conflict destabilise the evolution of fragile and embryonic financial structures, exacerbating financial instability in poorer countries (Nagarajan 1998). Conflict has a negative impact because, as Collier and Gunning (1995) observes: ‘conflicts weaken or incapacitate institutions and encourage opportunistic behaviour’. Limited financial depth and intermediation, associated with rudimentary or absent financial institutions, will limit economic opportunities e.g. for entrepreneurship, making insurgency a relatively tempting alternative. Weak financial regulation in underdeveloped economics promotes wealth accumulation via fraud, generating institutional constraints on the availability of financial infrastructure to ordinary people. As a consequence, the depth of financial intermediation is limited in poor, conflict-prone countries and so access to finance entrepreneurship and/or short-term consumption needs are limited. When the microlevel financial infrastructure is distorted, financial depth and financial intermediation will be

limited and so the poor will not have access to finance for small-scale agricultural investment, the development of small businesses and/or to provide short-term finance when crops fail. In agricultural communities, the absence of alternative economic opportunities will fuel dissatisfaction and for some insurgency will be the alternative.

3. A model of conflict, finance and development

Building upon the ideas outlined above, in this section a theoretical model is constructed which focuses on the role played by financial factors in feedback effects between conflict and under-development. As explored in the preceding section, finance plays its role not only directly but also indirectly: financial factors have a direct impact in inflaming conflicts, e.g. by draining government expenditure, generating financial instability and uncertainty. Financial factors also have an indirect impact on propensity for conflict by limiting legitimate economic opportunities, exacerbating poverty and socio-economic unrest, incubating future conflicts. These feedbacks can be analysed building upon the insights from Collier and Hoeffler (2004) and Collier et al. (2009) amongst others, who argue that civil conflict is as much about opportunities as it is about political motivations, particularly in very underdeveloped economies with large illiterate populations. Rebellion is not necessarily about political activism in the face of legitimate socio-economic grievances. Feasibility of insurgency is a key factor because rebellions can only occur given certain pre-conditions (Collier et al. 2009).

This approach can be captured using a model capturing pressures for insurgency and tipping points for conflict. Assuming that civil conflicts emerge from a dispute between an incumbent government and an insurgent group(s), a number of factors will affect each side's propensity to fight. Incumbent governments with greater tendencies to fight dissent using military means will have proportionately higher military expenditures; military action will only be successful if governments can build strong armies (Acemoglu *et al.* 2009). Also, higher military expenditures can indicate governments' commitments to fight rebellions; over-sized armies are a signal that governments will meet opposition with force.

On the other side, insurgency will be more likely when there is uncertainty and financial instability as these will feed through into socio-political uncertainty. The effectiveness of insurgent groups will be determined by the number of people they can recruit and the supply of new recruits will be higher at lower levels of development and/or at higher rates of population growth. If a country is relatively underdeveloped then there may be limited legitimate opportunities for earning money and if population pressures are high then

insurgent groups will have the critical mass need to provoke a conflict. Financial variables will be important because recruits to insurgent groups will be seeking economic and financial rewards e.g. from the sale of diamonds, oil, drugs etc. (Collier 2008). Overall, as rebel action can bring financial as well as political rewards, there will be more new recruits willing to join insurgent groups if populations are growing, alternative economic opportunities are limited and/or access to finance is limited in the civilian economy.

Together, these interactions between the incentives facing insurgent groups determine the states of war and development, with the probability of war expressed as a non-linear function:

$$\Pr(W = 1 | [w > w^*]) \quad (1)$$

where $W = 1 | [w > w^*]$ is an indicator function taking the value 1 if $w > w^*$ and 0 otherwise, and w is a latent variable capturing propensity for conflict and reflecting the composite influences of financial resources and development. Overall, this propensity to conflict will be determined linearly as follows:

$$w = \beta_0 + \beta_1 fstab + \beta_2 g_M + \beta_3 i + \beta_4 d + \varepsilon \quad (2)$$

$$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0 \text{ and } \beta_4 < 0$$

where $fstab$ is some macro measure of financial stability; g_M is military expenditure, acting as a proxy for government aggression as explained above; i – is the interest rate (also capturing financial instability because higher interest rates are associated with larger risk premia); d is the level of development and ε is a random error term.

Financial factors, including the allocation of government expenditure, will also have indirect impacts on the propensity to conflict via their impacts of economic development. Overall government expenditure will be allocated as follows:

$$g_T = g_S + g_M = 1 \quad (3)$$

g_S is the proportion of government spending on public non-military projects. Assuming underdeveloped financial institutions, government expenditure will be a key source of funding for most development infrastructure projects and so higher military expenditure will mean less social expenditure. With less public sector money available to fund projects that will improve human capital accumulation (*viz.* health and education spending) the potential for development will be eroded and human development will slow. Also, conflict will destroy

institutions and infrastructure thereby slowing development. Overall the level of development (d) will be determined as follows:

$$d = \alpha_0 + \alpha_1 W + \alpha_2 g_s + \alpha_3 i + \alpha_4 \Delta K + \alpha_5 \Delta pop + \alpha_6 f + \sum \gamma_j z_j + \nu \quad (4)$$

$$\alpha_1 < 0, \alpha_2 > 0, \alpha_3 < 0, \alpha_4 > 0, \alpha_5 < 0 \text{ and } \alpha_6 > 0$$

where W is a binary variable capturing the state of conflict (as explained above), i is the interest rate and, in terms of development, is a simple measure of opportunity cost of consumption and investment in capital assets. ΔK captures capital accumulation and, according to growth theory, this balanced against population growth (Δpop), will be a key determinant of economic growth; assuming that the benefits from economic growth trickle down, if ΔK is large (relative to Δpop) then it will foster more broadly based development too. Financial infrastructure (f) will affect development because financing constraints, e.g. limited availability of banking services, will limit economic opportunities for ordinary people. Finally, z_j is a vector of other variables affecting development (which might include geographical features, degree of economic diversification, fractionalisation, income growth, size of the economy, infrastructure and institutional variables) and ν is a random error term.

4 Results and Discussion

Previous empirical studies have explored some of the relationships between risk of war and socio-economic variables, identifying a positive relationship between military expenditure and the risk of civil war, though some evidence suggests that this association is spurious (e.g. Djankov and Reynal-Querol 2008). Collier and Hoeffler (1998) find that initial income and population size, ethno-linguistic fractionalisation and natural resource wealth are significant determinants of the severity and duration of civil wars. In later studies, using data for 55 civil wars from 1960-99, they estimate the risk of reversion to conflict and find that growth, political/social/ethnic factors, primary resource abundance, external threat, years of peace, population and geographic dispersion and military expenditure affect the probability of conflict (Collier and Hoeffler 2004, 2006; Collier *et al.* 2009). Whilst these (and other) previous analyses identify a role for many socioeconomic factors, more evidence is needed about the impact of financial factors on conflict and development and, using the framework outlined above, equations (1), (2) and (4) are estimated using the variables outlined above. The data codes and definitions used to capture the variables outlined above are explained in Appendix 1.

Some specific points about the variables used to estimate Equations (1), (2) and (4): the state of conflict is given by the variable W which equals 1 when there were 25 or more war deaths from internal conflicts in a given year and 0 otherwise; development is measured using the human development index (HDI); the lending rate is used as the interest rate because it is available for a wide selection of countries, central bank assets as a % of GDP (CBA) is used as a proxy for $fstab$ assuming that financial systems are more stable when the central bank has more reserves including foreign exchange reserves. The remaining variables are self-explanatory.

The data coverage was sometimes patchy and for this reason, two types of models were estimated: first, a “macro” model using data available on all variables except financial infrastructure – this was possible for a relatively large number of countries and years (i.e. 44 countries over the period 1995-2007); but because financial infrastructure variables are likely to be crucial to development a second set of “micro” models was estimated for a smaller number of countries and years (i.e. 31 countries over the period 2004-2007) but with richer financial infrastructure variables. Financial infrastructure captured in 4 ways: number of commercial bank borrowers; number of commercial bank depositors; number of automatic teller machines and number of bank branches. Data limitations preclude a regional analysis to capture heterogeneity at a more disaggregated level and it is important to note that national patterns may obscure many inter-regional differences.

Models were estimated using STATA 10 and panel estimation techniques were employed throughout to control for heterogeneity bias across the samples. The models were estimated in two stages: First, the dependent variables HDI and W were estimated independently using random effects panel single equation techniques (see Tables 1 and 3). Second, a simultaneous equation modelling strategy was employed using a Two Stage Probit Least Squares (2SPLS) techniques adopting Stata command CDSIMEQ to control for simultaneity between a continuous and a binary dependent variable, a method which incorporates instrumental variable estimation with corrected standard errors (following Maddala 1983 and Keshk 2003). The results for the independent and simultaneous estimations of the “macrofinancial” model (which excludes financial infrastructure) are outlined in Tables 1 and 2.

TABLE 1: MACROFINANCIAL MODEL (LARGE SAMPLE)**N= 572 (44 countries, 1995-2007)****1a Random effects probit estimation***Dependent variable: Civil conflict (Y=1, N=0)*

	<i>Parameter</i>		
	<i>Estimate</i>	<i>z score</i>	<i>p value</i>
HDI	-4.919	-2.250	0.025**
CBA	-4.399	-1.380	0.166
LR	0.003	0.460	0.648
MILEX	0.326	3.210	0.001***
Constant	0.190	0.120	0.907

Wald $\chi^2(4) = 18.12$ [p=0.001]**1b Random effects GLS estimation***Dependent variable: HDI*

	<i>Parameter</i>		
	<i>estimate</i>	<i>t test</i>	<i>p value</i>
W	-0.001	-0.140	0.885
SOCEXP	0.008	6.630	0.000***
GKF	0.001	5.820	0.000***
POPG	-0.006	-3.310	0.001***
LR	0.000	-6.210	0.000***
Constant	0.670	36.460	0.000***

Wald $\chi^2(5) = 139.36$ [p=0.000]* $H_0 : \beta = 0, H_1 \beta \neq 0$ H_0 rejected at a 10% significance level** As above but reject H_0 at a 5% significance level*** As above but reject H_0 at a 1% significance level

Overall, the results from the independent estimation of the conflict and development equations confirm the hypotheses outlined above that financial instability and diversion of resources to military spending have direct, significant and positive impacts on the probability of civil conflict. In addition, confirming previous evidence as well as the hypotheses outlined above, the level of human development has a significant and negative association with the probability of conflict; conflict is less likely at higher levels of development. Development is affected by financial variables, with the results above showing that social expenditure has a positive and significant impact on human development and interest rates have a negative and significant impact. Overall this confirms that financial variables have an indirect impact on the probability of conflict, via their impact on development.

The results from the 2SPLS estimation of the simultaneous system of equations (Table 2) broadly confirm the findings from the separate estimations suggesting that these findings are robust across estimation techniques. Whilst the lending rate is insignificant in both estimations, this will reflect multicollinearity because its influence is already captured within the fitted values of the conflict and development variables.

**TABLE 2: MACROFINANCIAL MODEL SIMULTANEOUS ESTIMATION:
2SPLS Second Stage Estimation Results (corrected standard errors)
N= 572 (44 countries, 1995-2007)**

Dependent variable: HDI

	<i>Parameter</i>		
	<i>estimate</i>	<i>t test</i>	<i>p value</i>
W (fitted)	0.032	1.620	0.106
GKF	0.002	2.430	0.015**
LR	0.000	1.060	0.289
POPG	-0.068	-12.940	0.000***
Constant	0.753	29.270	0.000***
R-squared	0.334		
R-squared (adjusted)	0.329		
F test explanatory power	F(4,566)=71.01 [p=0.000]		

Dependent variable: Conflict

	<i>Parameter</i>		
	<i>estimate</i>	<i>z score</i>	<i>p value</i>
HDI (fitted)	-2.580	-3.240	0.001***
LR	0.002	0.590	0.554
MILEX	0.173	4.390	0.000***
CBA	-0.020	-0.020	0.981
Constant	0.375	0.700	0.485
Log likelihood	-260.386		
Pseudo R ²	0.060		
LR test	$\chi^2(4)=33.07$ [p=0.000]		

* $H_0 : \beta = 0, H_1 \beta \neq 0$ H_0 rejected at a 10% significance level

** As above but reject H_0 at a 5% significance level

*** As above but reject H_0 at a 1% significance level

The results from the “microfinancial” model, which incorporates financial infrastructure variables (though with a necessarily smaller sample as explained above) are outlined in Table 3. Unsurprisingly perhaps (given the smaller sample) the statistical power is lower for the microfinancial models, with fewer significant explanatory variables (and no significant explanatory variables for the conflict model). In addition, for the development model the population growth variable, whilst statistically insignificant, has a counterintuitive sign.

The 2SPLS model is estimated in a restricted, as well as unrestricted, form (see Table 4). The results from the 2SPLS estimation confirm (as identified above) not only that population growth and capital formation are significant determinants of development but also to show that financial infrastructure, as measured by the number of bank branches per capita has a significant impact on development. Given the fact that development is a significant determinant of conflict in the simultaneous model, this suggests that financial infrastructure has an indirect negative impact on conflict propensity because it boosts development, and development lowers conflict propensity.

TABLE 3: MICROFINANCIAL MODEL (SMALL SAMPLE)**N=124 (31 countries, 2004-2007)****3a Random effects probit estimation***Dependent variable: Civil conflict (Y=1, N=0)*

	<i>Parameter</i>		
	<i>estimate</i>	<i>z score</i>	<i>p value</i>
HDI	-2.004	-0.480	0.634
CBA	12.188	0.980	0.325
LR	-0.023	-0.370	0.712
Constant	-3.226	-1.060	0.291

Wald χ^2 (df=3) = 0.98 [p=0.806]**3b Random effects GLS estimation***Dependent variable: HDI*

N=66 (17 countries, 2004-2007)

	<i>Parameter</i>		
	<i>estimate</i>	<i>t test</i>	<i>p value</i>
W	0.008	1.890	0.059*
SOCEXP	0.000	0.260	0.794
GKF	0.000	0.350	0.725
POPG	0.012	2.090	0.037**
LR	-0.001	-2.250	0.024**
BORROW	0.126	2.370	0.018**
BRANCH	421.249	2.050	0.041**
DEPOSIT	-0.015	-0.550	0.581
ATM	9.263	0.480	0.631
Constant	0.642	20.140	0.000***

Wald χ^2 (df=9) = 51.83 [p=0.000]

* Statistically significant at a 10%, ** at 5%, *** at 1% significance level

TABLE 4: MICROFINANCIAL MODEL SIMULTANEOUS ESTIMATION**2SPLS: Second Stage Estimation Results (corrected standard errors)****N= 572 (44 countries, 1995-2007)**

	UNRESTRICTED			RESTRICTED		
Dependent variable: HDI	<i>Parameter</i>		<i>p</i>	<i>Parameter</i>		<i>p</i>
	<i>Estimate</i>	<i>t test</i>	<i>value</i>	<i>estimate</i>	<i>t test</i>	<i>value</i>
W (fitted)	-0.003	-0.010	0.994	-0.015	-1.40	0.165
GKF	0.005	0.010	0.989	0.004	1.86	0.066*
POPG	-0.011	-0.010	0.994	-0.036	-3.35	0.001***
LR	0.004	0.020	0.986	... ..	...
SOCEXP	0.016	0.010	0.995	... ..	...
BORROW	0.202	0.010	0.990	... ..	...
BRANCH	2912.4	0.050	0.958	1150.45	4.64	0.000***
DEPOSIT	0.175	0.010	0.990	... ..	...
ATMs	-421.8	-0.010	0.989	... ..	...
Constant	0.374	0.040	0.971	0.533	9.03	0.000***
R-squared	0.708			0.56		
Adj R-squared	0.661			0.54		
F test of explanatory power:	F(9.56) = 15.06 [p=0.000]			F(3,111) = 45.33 [p=0.000]		

Dependent variable: Conflict

	<i>Parameter</i>			<i>Parameter</i>		
	<i>estimate</i>	<i>t test</i>	<i>p value</i>	<i>estimate</i>	<i>t test</i>	<i>p value</i>
HDI (fitted)	-0.654	0.000	0.997	-4.079	-2.01	0.044**
LR	-0.024	-0.010	0.994	-0.070	-2.46	0.014**
CBA	-4.790	-0.010	0.994	...	...	...
Constant	-0.021	0.000	1.000	2.573	1.93	0.054**
Log likelihood	-29.040			-42.0		
Pseudo R2	0.023			0.16		
Likelihood	$\chi^2 (3) = 1.39$			$\chi^2 (2) = 14.47$		
Ratio test	[p=0.7069]			[p=0.000]		

* Statistically significant at a 10%, ** at 5%, *** at 1% significance level

Whilst the results from the microfinancial model are less robust than those from the macrofinancial model, nonetheless they are consistent with the hypothesis that, by boosting development prospects, micro-level financial infrastructure has an impact in reducing the probability of civil conflict. Overall these estimations have confirmed the overriding hypothesis that financial factors increase the probability of conflict not only directly but also because financial variables have their impact on conflict via impacts on development.

5. Conclusions

Complex interactions between civil conflict and financial factors suggest that a number of feedback effects will operate to ensure that financial instability in conflict-prone underdeveloped countries creates further problems of poverty and underdevelopment. Thus poverty and underdevelopment are the outcome of the vicious cycle between social and political unrest, armed conflict and financial instability. In this paper, the relationships between armed conflict, finance and inequality have been analysed and indicate that conflict, financial instability and poverty may feed into each other, reinforcing destabilising political, socio-economic and financial forces in underdeveloped countries. Whilst military institutions may bestow some benefits on developing economies, if their actions foster financial instability then this will have substantial ramifications for the macroeconomies of stagnant nations because feedback processes will retard/reverse the evolution of financial institutions, creating prolonged constraints on the availability of finance in developing economies.

Designing effective financial policies to overcome conflict-finance-poverty traps may be problematic, for example because possibilities for currency reform may be limited partly because currencies are perceived as nationalistic symbols and partly because they are desirable as a source of seigniorage revenue. Given the fiscal deficits generated by ongoing conflict, the market for public debt becomes crucial but capital markets in post-conflict underdeveloped countries tend to be thin because of financial repression. For this reason, effective financial reform is critical to the effective resurrecting of domestic capital markets in post conflict stages. If financial problems are severe enough to necessitate IMF involvement, then the financial stringency associated with IMF conditionality may put pressures on broadly based development: the poorest groups will suffer the most from fiscal and monetary tightening – particularly if elites are making military rather than social expenditure their first priority.

In reducing the negative consequences of military interventions, particularly when these are precipitated by the actions of corrupt groups, the evolution of new financial

institutions within a democratic structure is important. Effective financial reform will be affected by political factors and governance: the regressive effects of conflict and corruption may be ameliorated in the presence of democratic institutions. But regardless of political systems, a crucial element in breaking the vicious cycles between poverty, conflict and financial instability lies in the effective regulation and supervision of financial systems, particularly in countries that have experienced repeated conflict. Even when conflicts are finally resolved, during post-conflict phases there will be pressing needs to rebuild domestic capital markets for reconstruction and if this financial reconstruction is constrained by institutional weaknesses and weak regulation then financial fragility will increase susceptibility to future conflicts. Financial reforms can ameliorate persistent conflict both directly and indirectly: macroeconomic strategies can moderate financial instability thereby directly lowering the chance of civil conflict; and microeconomic strategies can develop and deepen financial institutions and infrastructure, promoting growth and development and thereby reducing the pressures for persistent civil conflict.

APPENDIX 1: DATA CODES AND SOURCES

Variable	Data code	Definition	Source
W	W	= 1 if 25 or more battle-related deaths in given year (internal, internationalized internal conflicts)	Uppsala Conflict Database UCDP/PRIO (Gleditsch et al. 2002) http://www.pcr.uu.se/research/UCDP/data_and_publications/datasets.htm
<i>d</i>	HDI	Average of GDP p.c., literacy, life expectancy indices	UNDP Human Development Report, http://hdrstats.undp.org/en/indicators/74.html
<i>finstab</i>	CBA	Central bank assets as a % of GDP	Financial Structure Database, Beck and Demirgüç-Kunt (2009), Beck <i>et al.</i> (2000). http://econ.worldbank.org/ ,
<i>Lending rate</i>	LR	Lending rate	IMF International Financial Statistics, from http://data.un.org/
<i>g_M</i>	MILEX		World Development Indicators 2009, from http://data.un.org/
<i>g_s</i>	SOCEXP		World Development Indicators 2009, from http://data.un.org/
ΔK	GKF		World Development Indicators 2009, from http://data.un.org/
Δpop	POPG		World Development Indicators 2009, from http://data.un.org/
<i>f</i>	BORROW	Commercial bank borrowers –as % of population	IMF Financial Access Survey (FAS) Downloaded from http://fas.imf.org/
<i>f</i>	BRANCH	No. of bank branches –as % of population	IMF Financial Access Survey (FAS) Downloaded from http://fas.imf.org/
<i>F</i>	DEPOSIT	Commercial bank depositors – as % of population)	IMF Financial Access Survey (FAS) Downloaded from http://fas.imf.org/
<i>F</i>	ATM	No. of automatic teller machines (ATMs) – as % of population	IMF Financial Access Survey (FAS) Downloaded from http://fas.imf.org/
Population estimates used to convert FAS data into <i>per capita</i> terms			UN <i>Demographic Yearbook</i> http://data.un.org/

REFERENCES

- Acemoglu D, Ticchi D and Vindigni A (2009), 'Persistence of Civil Wars', NBER Working Paper No. 15378, National Bureau of Economic Research.
- Addison, T., Le Billon, P., and Murshed, S.M. (2001) 'Finance in Conflict and Reconstruction, World Institute for Development Economics Research (WIDER) DP 2001/44, UN University, August 2001,.
- Beck T and Demirgüç-Kunt A (2009), 'Financial Institutions and Markets Across Countries and over Time: Data and Analysis', *World Bank Policy Research Working Paper No 4943*, World Bank.
- Beck T, Demirgüç-Kunt A and Levine R, (2004), 'Finance, Inequality, and Poverty: Cross-Country Evidence, NBER Working Paper No. W10979, National Bureau of Economic Research.
- Beck T, Demirgüç-Kunt A and Levine R, (2000), "A New Database on Financial Development and Structure," *World Bank Economic Review* 14, 597-605.
- Benoit, E. (1972), 'Growth Effects of defence in Developing Countries', *International Development Review*, Vol. 1, pp. 2-10.
- Benoit, E. (1978), 'Growth and Defense in Developing Countries', *Economic Development and Cultural Change*, vol. 26, pp. 271-80.
- Blattman C. and Miguel E. (2010), 'Civil War', *Journal of Economic Literature*, vol. 48(1), pp. 3-57.
- Brunnschweiler C N and Bulte E H (2009), 'Natural resources and violent conflict: resource abundance, dependence, and the onset of civil wars', *Oxford Economic Papers*, vol. 61(4), pp. 651-674.
- Collier, P. (2008), *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done about It*, Oxford: Oxford University Press.
- Collier, P. (2006), 'War and military expenditure in developing countries and their consequences for development', *The Economics of Peace and Security Journal*, vol. 1(1), pp. 9-13.
- Collier, P (1999), 'On the economic consequences of civil war', *Oxford Economic Papers*, vol. 51(1), pp. 168-83.
- Collier, P. and Dercon, S. (2006). 'The Complementarities of Poverty, Equity and Growth', *Economic Development and Cultural Change*, vol. 55, pp. 223-36.

- Collier, P. and Gunning, J.W. (1995), 'War, peace and private portfolios', *World Development*, Volume 23, Issue 2, February, Pages 233-241.
- Collier P, Hoeffler A and Rohner D (2009), 'Beyond greed and grievance: feasibility and civil war', *Oxford Economic Papers*, vol. 61(1), pp. 1-27. Collier, P. and Hoeffler, A. (2006), 'Military Expenditure in Post-Conflict Societies', *Economics of Governance*, vol. 7, pp. 89-107.
- Collier, P. and Hoeffler, A. (2006), 'Military expenditure in post-conflict societies', *Economics of Governance*, vol. 7(1), pp. 89-107,
- Collier, P. and Hoeffler, A. (2004), 'Greed and Grievance in Civil War', *Oxford Economic Papers*, vol. 56(4), pp.563-95.
- Collier, P. and Hoeffler, A. (2002), 'On the incidence of civil war in Africa', *Journal of Conflict Resolution*, Vol. 46 (1), pp. 13-28.
- Collier, P. and Hoeffler, A. (1998), 'On economic causes of civil war', *Oxford Economic Papers*, Vol. 50 (4), pp. 563-573.
- Demirgüç-Kunt A and Levine R (2009), 'Finance and Inequality: Theory and Evidence', NBER Working Paper No. W15275, National Bureau of Economic Research.
- Djankov S and Reynal-Querol (2008), 'Poverty and Civil War: Revising the Evidence', CEPR Discussion Paper No. 6980, Centre for Economic Policy Research.
- Dornbusch R and Reynoso A (1989), 'Financial Factors in Economic Development', *American Economic Review*, vol. 79(2), pp. 204-209.
- Dunne, P., Smith, R., And Willenbockel, D. (2005). 'Models of Military Expenditure and Growth: A Critical Review', *Defence and Peace Economics*, Vol. 16, No. 6, pp. 449 - 461.
- Fitzgerald, E.V.K. (2003) 'Global financial information, compliance incentives and conflict funding', Queen Elizabeth House Working Paper Series, WP No. 96, Oxford.
- Fitzgerald, E.V.K. (1997) 'Paying for the war: macroeconomic stabilization in poor countries under conflict conditions', *Oxford Development Studies*, 25(1), pp. 43-65.
- Garfinkel, M.R. (1994), 'Domestic Politics and International Conflict', *American Economic Review*, Vol. 84, No. 5. (Dec., 1994), pp. 1294-1309.
- Gleditsch, Nils Petter; Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg & Håvard Strand, 2002. 'Armed Conflict 1946–2001: A New Dataset', *Journal of Peace Research* 39(5): 615–637.

- Goodhand, J. (2003), 'Enduring Disorder and Persistent Poverty: A Review of the Linkages Between War and Chronic Poverty', *World Development*, Volume 31, Issue 3, March 2003, Pages 629-646.
- Grossman, H.I. (1999), 'Kleptocracy and revolutions', *Oxford Economic Papers*, vol. 51(2), pp. 267-83.
- Hirschleifer, J. (2001), *The Dark Side of the Force: Economic Foundations of Conflict Theory*, Cambridge University Press: Cambridge.
- Jackson M O and Morelli M (2007), 'Political Bias and War', *American Economic Review*, 97(4), pp. 1353-1373.
- Jarvis C (1999) 'The Rise and Fall of Pyramid Schemes in Albania', IMF Working Paper No. 99/98, International Monetary Fund.
- Keshk, O.M.G. (2003) CDSIMEQ: A Program to Implement Two-state Probit Least Squares, *Stata Journal*, 3(2), pp. 157-67.
- Keynes J. M. (1914) 'War and the Financial System', *Economic Journal*, vol. 24, no. 95, pp. 460-486.
- Kindleberger, C. (1993), *A Financial History of Western Europe*, Oxford: Oxford University Press.
- Knight, M. Loayza, N. and Villaneuva, D. (1996), 'The peace dividend: military spending cuts and economic growth', IMF Staff Papers, vol. 43, no. 1, pp. 1-37.
- Maddala, G. S. 1983. *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge, MA: Cambridge University Press.
- Magnusson, M.A. and Wydick, B. (2001), 'How efficient are Africa's emerging stock markets?' *Journal of Development Studies*, Volume 38, Number 4, pp. 141-56.
- Nafziger, E.W. and Auvinen, J. (2002) 'Economic Development, Inequality, War, and State Violence', *World Development*, Volume 30, Issue 2, February 2002, Pages 153-163.
- Nagarajan, G. (1998), *Developing Micro-Finance Institutions in Conflict-Affected Countries: Emerging Issues, First Lessons Learnt and Challenges Ahead*, International Labour Organization, Enterprise and Cooperative Development Department, <http://www.ilo.org/public/english/employment/recon/crisis/papers/naga.htm>
- Stewart, F. and Fitzgerald, E.V.K. (2000), 'Introduction: Assessing the Economic Costs of War'. In *War and Underdevelopment*, Stewart, F. and Fitzgerald, E.V.K. (eds), Queen Elizabeth House Series in Development Studies.

Voors M, Nillesen E, Verwimp P, Bulte E, Lensink R, van Soest D (2010), 'Does Conflict Affect Preferences: Results from Field Experiments in Burundi', ECARES Working Paper 2010-006, downloaded from EconPapers/REPEC 1 April 2010.

Wallensteen and Sollenberg (2000) Armed Conflict, 1989-99, *Journal of Peace Research*, 37(5), pp. 635-49.