



Land tenure, price shocks, and insurgency: Evidence from Peru and Colombia

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ABSTRACT

The paper examines how property arrangements – a key determinant of rural income – influence armed conflict in the presence of commodity price shocks. Using detailed data on district level land tenure, crop produce, and conflict intensity in Peru and Colombia, estimates show that exogenous negative price shocks increase the intensity of conflict in districts with a greater presence of individual ownership, relative to other types of land tenure. The finding is consistent with small landowners in the export sector experiencing a sharper downturn in labor market outcomes thus reducing the opportunity cost of participating in insurgent groups.

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1. Introduction

Civil conflict undermines development prospects by slowing human capital accumulation, worsening health outcomes, and creating more poverty. While the underlying causes of civil conflict can be numerous and complex, it shows a robust correlation with income shocks (Bazzi & Blattman, 2014, p. 1),¹ particularly those driven by changes in the international price of agricultural traded commodities such as coffee (Bruckner & Ciccone, 2010; Bazzi & Blattman, 2014; Dube & Vargas, 2013). But, why is this the case? Given the ubiquity of agricultural export economies in the developing world (Aksoy & Beghin, 2004, p. 21), it is important to understand the mechanisms linking commodity prices and armed conflict.

This paper explores how land tenure – the single most important determinant of individual incomes in rural areas – shapes the impact of international commodity prices in conflict settings. While agricultural production has been generally associated with individual or family-owned properties, this is far from the only type of land tenure in the developing world. Sharecropping, where land is lent in exchange for a proportion of the outcome, and communal arrangements, where land is owned by peasant communities for joint use, are widespread in the developing world. For example, in 1972 only 41% of farms were classified as single-owned by

individuals or families in Peru. The rest were farmed under sharecropping or communal arrangements, or had a mixture of different tenure types. In Colombia, around 40% of households report not owning their land but either renting it or relying on other types of arrangements.² But this is not unique to South America. In West Africa, collective ownership is quite common despite ample efforts to “modernize” property rights (Colin et al., 2006, p. 1).

Given land tenure is essentially a risk-sharing contract between those who own the land and those who use it, it shapes the incentives of individuals to participate in different activities (including conflict). Specifically, land arrangements such as sharecropping and communal land (henceforth “shared”) reduce ex-ante household risk by limiting variation in income *relative* to contracts based on individual ownership (Bardhan & Udry, 1999; Ray, 1998; Stiglitz, 1974). That is, shared land arrangements shift part of the risk either to individuals less likely to join insurgent movements (e.g. large landowners) or to the whole community, limiting the exposure of individual members to income volatility.³ This means that an exogenous decline in crop prices would lead to higher losses among those fully bearing the risks of agricultural production (i.e. individual owners) compared to those less exposed, such as sharecroppers or farmers belonging to a peasant community. In other words, when the state of the economy is bad the opportunity cost of conflict will fall disproportionately among small landowners compared to other land

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¹ A large literature associates income shocks with different forms of conflict such as persecution against minorities (Anderson, Johnson, & Koyama, 2017; Grosfeld, Sakalli, & Zhuravskaya, 2017); killings of “witches” (Miguel, 2005); Sino-nomadic incursions (Bai & Kung, 2011); land invasions (Hidalgo, Naidu, Nichter, & Richardson, 2010) and civil war more generally (Miguel, Satyanath, & Sergenti, 2004; Hodler & Raschky, 2014).

² According to the 1993 Household Census.

³ This is assuming that income covariance in the community is low and the most important source of variation is idiosyncratic to the household. There is some evidence for this assumption (Carter 1997 cited by Bardhan & Udry, 1999, p. 97).

tenure types. At the margin, these shocks would render conflict more attractive to those most affected by the shock.

Empirically, this mechanism implies that, *all else equal*, regions with a higher prevalence of shared land arrangements (e.g. sharecropping, communal) are more likely to mitigate income shocks driven by commodity prices than those where individual ownership prevails, thus weakening its relationship to conflict.

To examine this claim I investigate the Peruvian civil conflict (1980–2000), which provides a good testing ground for this relationship: first, the country exhibits a wide range of land arrangements; second, income from coffee exports is quite sizeable in rural areas, which, together with the labor-intensive nature of coffee production and the fact that it is harvested annually, means that changes in coffee prices are likely to affect the income of entire communities. Third, Peruvian producers are essentially price-takers in international markets, such that changes in the international price best captures the exogenous variation in the returns to coffee cultivation. Finally, Peru endured a longstanding Maoist insurgency, the Shining Path, which overlaps with its period of trade liberalization and major declines in coffee prices.

The main empirical challenge to examine the role of land tenure in civil conflict is that agricultural contracts are not randomly allocated. To alleviate this concern, the paper combines time-varying information on international prices with the cross-sectional distribution of district-level land tenure arrangements (i.e. individual, communal, or sharecroppers) *prior* to the start of the conflict. Focusing on land tenure measured before the conflict episode reduces concerns that these are endogenously responding to conflict dynamics or land productivity (Besley, 1995). I thus interact the previous year's coffee price with the share of different land tenure arrangements in the 1970s. Baseline estimates also include district-level fixed effects that control for time-invariant differences, as well as year fixed effects, and other time-trends. Identification of the main effect is based on the interaction term being exogenous, conditional on these controls, thus following a *difference-in-differences* logic.

Results. Using this strategy, this paper shows that an increase in conflict intensity due to negative price shocks is differentially larger among districts with a greater prevalence of small individual owners, relative to other districts. Specifically, estimates show that a decrease of 67% in the value of coffee production – roughly the size of the crash in coffee prices observed between 1987 and 1993 – leads to an average increase of 9% in Shining Path attacks and 25% in the number of victims in districts where individual ownership prevails. However, this estimate becomes statistically indistinguishable from zero for districts with a larger proportion of shared arrangements (i.e. communal and sharecroppers). The result implies that most of the effect of coffee price shocks on violence is driven by districts with a greater presence of small landowners.

Crucially, these findings are not driven by traits correlated with land tenure such as geography, the political environment, the economic structure of the district, or the reliance on outside income. Similarly, alternative explanations based on the role of targeted land reform in reducing conflict are not behind the results: estimates are robust to examining periods where reforms are not taking place as well as to more recent measures of land tenure, which would already capture the effect of reforms. Finally, explanations based on the role of coca production in fueling conflict are not borne out in the data: results are robust to excluding all coca cultivating regions and to including an indicator of coca production interacted with the international price of coffee in all specifications. Other explanations and robustness checks are discussed in the text.

Moreover, the findings from the Peruvian conflict appear to be cross-validated in a different setting and time period: the Colombian civil conflict (1988–2005). As shown by Dube and Vargas (2013), a ten log-point fall in the price of coffee leads to an increase of 0.09 more FARC guerrilla attacks – or a 18% increase, evaluated at means. This paper shows that this effect of coffee prices on conflict in Colombia is primarily driven by coffee-producing municipalities in which individual property arrangements prevail. The consistency of results across different armed conflicts and contexts reduce the concern that these findings are limited to Peru.

Finally, this paper shows that the results are likely to be driven by how land tenure institutions impact labor opportunities at times of crisis. The effect of income shocks on conflict is not only greater in districts with more individual owners, but it also intensifies during months of high labor demand (harvesting) and where strong community institutions are lacking. This suggests that shared property arrangements are better able to cushion the impact of negative price shocks on employment and wages during periods of high labor demand. A similar pattern emerges for the case of Colombia, where municipalities with greater individual ownership see a larger drop in reported wages and working hours in the presence of negative coffee price shocks.

Contribution. The paper relates to the current literature in several ways. First, to the best of my knowledge, this is the first paper that looks at the relationship between land tenure arrangements – a key institution in rural areas – and the effect of international commodity prices on civil conflict. A growing literature shows that the relationship between income shocks and different forms of conflict can be weakened in the presence of weather-resistance crops (Jia, 2014), social insurance programs (Fetzer, 2014), peaceful political conditions (Grosfeld et al., 2017), and low land inequality (Hidalgo et al., 2010). The paper complements this literature by stressing the role of risk-reducing agricultural contracts in the form of land tenure.

Second, the findings also suggest that the impact of income shocks on conflict could be theoretically larger and more robust than currently documented in the literature. This is because shared land arrangements may attenuate the effect of income shocks. Take the case of sub-Saharan Africa, where income shocks are associated with the intensification of civil conflict (Bruckner & Ciccone, 2010; Miguel et al., 2004) but which also exhibits enormous variation in land arrangements. Results from this paper imply that the latter estimates are a lower bound of the true effect of income shocks on conflict.

Third, results shown here also call for a closer look of property arrangements deemed economically “inefficient” (such as sharecropping and communal land) but which may potentially contribute to social stability at times of crisis. In theory, individual owners would find it easier to switch to alternative crops (Bardhan & Udry, 1999) or to use land in other ways to offset adverse shocks (Besley, 1995; Deininger & Jin, 2006; Feder & Nishio, 1998), thus finding conflict less attractive. In practice, districts with greater individual ownership exhibit lower wages and working hours when coffee prices plummet, suggesting that small landowners bear the brunt of the shock.

Finally, the paper also relates to a longstanding literature in sociology and history, whereby rural unrest is linked to the type of contractual arrangement prevailing (Paige, 1975; Popkin, 1979; Scott, 1977; Skocpol, 1979; Wickham-Crowley, 1992; Wolf, 1999). Although prolific, this literature has been unable to disentangle the effect of different land arrangements from other conditions associated with violence. This paper contributes to this agenda by examining the role of land tenure on conflict in the presence of negative income shocks.

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