

ACTIVITIES AND ACHIEVEMENTS QUESTIONNAIRE

1. Non-Technical Summary

A 1000 word (maximum) summary of the main research results, in non-technical language, should be provided below. The summary might be used by ESRC to publicise the research. It should cover the aims and objectives of the project, main research results and significant academic achievements, dissemination activities and potential or actual impacts on policy and practice.

Our research explores weak property rights' implications for economic development by asking two questions.

The commons with capital markets

First: what are the consequences of market liberalisation when property rights are weak? Naïvely applying the “Washington Consensus” of standard market reforms would have countries both liberalise their capital markets, and strengthen property rights. However, while the former merely requires removing existing controls, the latter requires expanding state capacity. Thus, the World Bank’s Governance Matters IV data show that countries with poor “regulatory quality” in the 1990s (a proxy for liberalisation) improved to 2004, while those with initially poor “rule of law” (a proxy for strength of property rights) deteriorated over that same period. If markets are liberalised without strengthening property rights, might this encourage capital flight, as residents of poor countries with high intrinsic returns to capital transfer funds abroad, where their rates of returns may be lower, but can at least be assured?

We first address this question in the simplest possible context: a two period model (see 2.A, #1, below). We find that a small population protects a country better from the “tragedy of the commons” than does a large one: resources are still stolen, but each agent is relatively large enough to enjoy some of the gains to conservation. While capital markets help society by allowing saving for “rainy days” rather than just hand-to-mouth living, they also allow increase the appeal of stripping resources out of the country, a negative effect. If agents are sufficient impatient (as they might be during a period of instability), this latter effect can overpower the former. We also identify circumstances under which the advantages of liberalisation outweigh its disadvantages.

We then (#2) extend this analysis by allowing agents to make decisions into the indefinite future. In this richer environment, we substantiate many of our original findings, increasing confidence in their robustness. We also identify new phenomena, including a form of “resource curse”, whereby richer societies may end up worse off: more resources can spur a fiercer competition to appropriate them, leading to their more rapid depletion. When seizing resources is costless, this is done immediately. (Demonstrating this reverses the results of Tornell & Velasco (1992, *JPE*) and Tornell & Lane (1999, *AER*.)

Our models suggest two implications for policy: first, the “second best” effect of weak property rights cannot be ignored when considering the effects of liberalisation; second, these may be particularly strong in countries with high subjective discount rates, and therefore typical to unstable poor countries.

Simple pillage models

Our second question is more fundamental: rather than deriving consequences of weak property rights, it asks how property rights arise from weak institutions. Thus, it expands the scope of standard economic analysis by deriving, rather than just assuming, property right structures.

Our analysis uses Jordan's "pillage game" formulation (2006, *JET*), which assumed coalitions to become more powerful as they gain members or resources. By using cooperative (or "coalitional") game theory, Jordan's results do not depend on possibly unrealistic assumptions about how agents act (e.g. who moves first). As their power struggles are costless, pillage games seems most applicable to situations in which power is known in advance, leading the less powerful to yield without a fight. Jordan showed what three different specifications of power imply for the distribution of resources. Jordan also proved that the contribution of resources to coalitions' power implies that "anything goes" results often found in cooperative games do not apply to pillage games: specifically, society cannot have an infinite number of choices available to it. By applying graph theory to the pillage problem, we (#3) use Jordan's initial observation to show that the number of choices available to society must be below a specific, finite number.

We also (#4) attempt to better understand Jordan's results by studying them in the simple, three player case. This allows use to derive results for a broad range of assumptions about power and to show equivalences between apparently very different assumptions. We also prove that solutions are unique under a broad range of assumptions. This allows precise predictions, and suggests that richer versions of pillage games may have this desirable property. Finally, we present an algorithm for solving three agent pillage games.

Models of exchange and pillage

We extend Jordan's analysis (#5, #6) by allowing multiple goods rather than a single "resource". This adds realism - agents may now either trade consensually, or seize non-consensually - and difficulty: when considering which coalition agents join, we cannot just assess which coalition promises them more of the good, but which gives them the most preferred bundle of goods.

The first extension (#5) parallels #3 in proving that the number of choices facing society cannot be "too big", in two senses. The first (Lebesgue measure) is already standard in economics. The second (Hausdorff dimension) is standard within mathematics, especially the study of fractals; as it is more precise than the first, we hope that increased familiarity with it will be useful to economists. As a spin-off, our results also imply that other common economic objects, including indifference curves and Pareto frontiers, cannot be "too big".

Finally (#6) parallels Jordan's paper, extending results to a two-good environment. We show circumstances under which the second good makes no real difference. Under other circumstances, the ability to trade facilitates pillage by providing another channel for gaining coalition partners. As power imbalances allow pillage, trading partners will generally not fully exploit gains from trade, instead trading to maintain balances of power; thus, outcomes are generally inefficient. As pillage models seem applicable to democracies, whose elections reveal coalitions' power, they force reconsiderations of the

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First and Second Fundamental Welfare Theorems: when property rights are weak, the ability to trade may not yield efficiency; similarly, a government's ability to redistribute resources in pursuit of equity is constrained by the coalition that it can assemble to back its policies.

Therefore, when strong property rights are not simply assumed, weak rights alter fundamental results about markets' ability to deliver equitable or efficient outcomes. Extending the pillage games environment to include production would allow proper consideration of phenomena like economic development.