

# Granular Identification\*

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## Abstract

In many settings, there is a dearth of instruments, which hampers economists’ ability to investigate causal relations. In this paper we propose a general way to construct instruments: “granular instrumental variables” (GIVs). In the economies we study, a few large firms or countries account for a large share of economic activity. As they are large, their idiosyncratic shocks (e.g., productivity shocks) affect the aggregate. This makes those idiosyncratic shocks valid instruments for the aggregate shocks. We provide a methodology to extract idiosyncratic shocks from the data, this way creating GIVs. Those GIVs allow then to estimate parameters of interest, including causal relations.

We first illustrate the idea in a basic static setup. We show how, even in the classic supply and demand framework, we can achieve a novel identification of supply and demand elasticities. In contexts of social or economic influence (with the “reflection problem”), we show how to achieve identification where it previously seemed hopeless. Then, we show how the procedure can be adapted to handle many enrichments, such as arbitrary feedback loops, heterogeneity, and multiple factors.

We illustrate the procedure in detail in some applications. First, we study the impact of mega-firms on aggregates, such as aggregate competition (as idiosyncratic shocks to large firms change concentration ratios). This allows us to find a causal relationship between the rise of mega firms and lower investment. Second, we measure how shocks to domestic banks causally affect sovereign yields. We document how negative shocks to Italian banks adversely affect Italian government bond yields, and vice-versa. This gives the first causal measure of the “doom loop” between banks and sovereign yields.

We delineate how GIVs can offer ways to identify a host of causal relations, e.g. growth spillovers from one country to the rest in the Eurozone; supply and demand elasticities for oil; going from local to general-equilibrium impact in cross-state regressions; the effects of shocks to financial intermediary on asset pricing. We conclude that the GIVs are a good candidate to supplement the empirical economists’ toolbox.

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