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## Further evidence on finance-growth causality: A panel data analysis

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## ABSTRACT

This paper reassesses the causal relationship between financial development and economic growth. Using recently developed panel methods on a data set of 71 developed and developing countries over the period 1960–2004, our study confirms previous results of a bidirectional causality between finance and growth. In addition, we show significant differences among country groups when considering both long-run and short-run causality. While in low and middle income countries there is no supportive evidence of short-run causality between financial development and economic growth, in high income countries economic growth significantly affects financial development.

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### 1. Introduction

Does financial development promote economic growth, or does economic growth cause financial development? Although this question dates back at least to Schumpeter (1911), the seminal contribution of King and Levine (1993a, 1993b) contributes to renew the debate and give a boost to increasing academic researches. There are numerous empirical analyses which address the relationship between financial development and economic growth (e.g. Roubini and Sala-i-Martin, 1992; Odedokun, 1996; Beck et al., 2000; Levine et al., 2000). However, cross-section and panel data

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studies addressing the impact of financial development and growth have failed to provide a consensus on the issue or a clear direction. Furthermore, these results rely more on the correlation than the causality relationship between both variables.

The direction of causality between financial development and economic growth is crucial because two opposite streams of research have held different points of view: the *supply-leading* and *demand-following* hypothesis (Patrick, 1966). The *supply-leading* hypothesis argues that financial development is a necessary pre-condition for economic growth. The idea is that financial institutions and markets boost the supply of financial services, thus leading to improved real economic growth. However, the *demand-following* hypothesis assumes that finance is led by, rather than leads, economic growth. In this approach, finance plays a minor role in economic growth and is merely considered a by-product or an outcome of growth. Nevertheless, Patrick (1966) points out that the finance-growth causality might be accurately explored. Although many empirical studies have investigated the causal relationship between financial development and economic growth, the results are still ambiguous.

On the one hand, it is difficult to deal with various aspects of finance-growth links simply using cross-countries studies. Levine and Zervos (1998) acknowledge that “cross country regressions do not resolve the issues of causality ...” (p. 325). Arestis and Demetriades (1997) and Demetriades and Hussein (1996) also argue along these lines. On the other hand, studies using times series and bivariate causality tests between financial development indicators and growth variables suffer from omitted variable problems and lead to erroneous causal inferences (e.g. Luintel and Khan, 1999; Arestis et al., 2001; Al-Yousif, 2002).

The goal of our study is to contribute to the debate on the relationship between financial development and economic growth. First, we use recently developed panel methods to test for unit roots, cointegration and Granger causality. This method avoids problems of low power associated with traditional unit root and cointegration tests. It also reduces collinearity between regressors.

As far as we know, only Apergis et al. (2007) and Christopoulos and Tsionas (2004) use panel cointegration tests, but our study differs from theirs in several ways. While the latter used Fully Modified Ordinary Least Square (FMOLS) estimators in cointegrated regression models in panel data and one measure of financial development, the former do not analyse panel VECM.

The second contribution of our paper refers to the distinction between long-run and short-run causality. Most previous studies only focus on the long-run relationship between financial development and economic growth via panel cointegration estimation. However, testing only for the long-run relationship could cause misleading conclusions. To solve this problem, we make use of panel VECM in order to analyse both short- and long-run causality and check for the robustness of our empirical results.

The third contribution lies in the use of Dynamic Ordinary Least Square (DOLS) estimators. Kao and Chiang (2000) show that OLS and FMOLS are biased and both outperformed by the DOLS estimator. The DOLS method allows for consistent and efficient estimators of the long-run relationship. It also deals with the endogeneity of regressors and accounts for integration and cointegration properties of data.

The fourth contribution consists in analysing the effects of financial development on economic growth for different country groups: low, medium, and high income countries, depending on the relative ranking of their income per capita. Indeed, recent theoretical and empirical work shows that financial development may affect economic growth and capital accumulation in different ways in industrial versus developing countries.

The remainder of the paper is organized as follows: In Section 2, we present the literature review. Econometric methodology is provided in Section 3. Section 4 discusses data and empirical results while Section 5 concludes.

## 2. Literature review

The issue of causality between financial development and economic growth is theoretically controversial. Schumpeter (1911) points out the role of financial intermediaries in mobilizing

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