



# The role of capital market efficiency in long-term growth: A quantitative exploration

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## ABSTRACT

A computable neoclassical model with financial intermediation is used first to explain the falling Euler equation tax wedge of S. Korea and Taiwan between 1966 and 2006 and then to explore the hypothesis that more efficient financial intermediation enhances growth. The analysis reveals that improved efficiency reduces the tax wedge of 1966–1980 by more than 58%. Moreover an improvement in financial efficiency generally results in a higher steady state output by raising the percentage of household savings intermediated and not by raising saving rates. Accordingly, financial efficiency improves welfare and positively contributes to long-term growth.

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## 1. Introduction

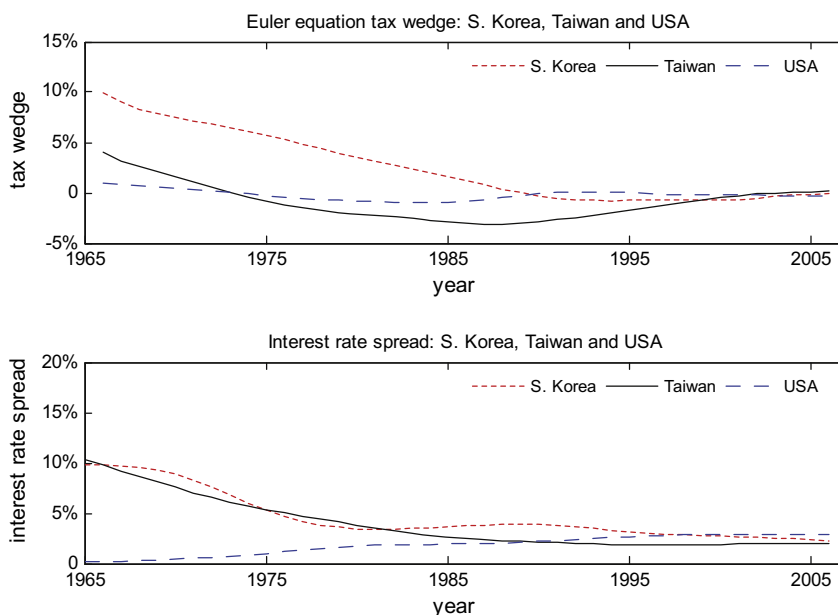
The business cycle accounting “wedge” methodology suggests that the major drivers of business cycles and growth are different. Chari et al. (2002, 2007), Cole and Ohanian (1999, 2002) and Ohanian (2010) point out that the specification error of the Euler equation, the Euler equation tax wedge, is not important in accounting for the US business cycles. However, this wedge is important in accounting for the earlier growth of developing countries like S. Korea and Taiwan (Lu, 2012). Their wedge values significantly deviated from zero and have declined during their growth episodes.<sup>1</sup> This pattern of decline differs significantly from the relatively flat pattern of the US (See the upper panel of Fig. 1) and implies that there are significant distortions in the equilibrium investment decisions of agents operating in otherwise competitive capital markets, especially in their earlier stages of economic development. Changes in these distortions, which the falling tax wedges reveal, play a role in accounting for the long-term growth in these countries.

We interpret the decline of the Euler equation tax wedge over time as reflecting the efficiency improvement of financial intermediation during growth. Accordingly, we build a model with financial intermediation to quantitatively examine how

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<sup>1</sup> Here, we focus on the growth trend. Thus, all the variables are filtered using the Hodrick–Prescott filter with a smoothing parameter equal to 100. Moreover, we assume the Euler equation tax wedge in the steady state equals zero for all countries and then calibrate  $\beta$ . The value of parameters used for  $\beta$ ,  $\theta$ ,  $\delta$  are as follows: S. Korea:  $\beta = 0.998$ ,  $\theta = 0.3$ , and  $\delta = 0.049$ ; Taiwan:  $\beta = 0.971$ ,  $\theta = 0.26$ , and  $\delta = 0.061$ ; USA:  $\beta = 0.962$ ,  $\theta = 1/3$ , and  $\delta = 0.05$ . The choice of the parameter value affects only the level of the wedge; the falling patterns of S. Korea and Taiwan relative to the stable pattern of the US remain the same. Please see the Technical Appendix for the detailed discussion on how the wedges evolve over time.



**Fig. 1.** Euler equation tax wedges and interest rate spreads for S. Korea, Taiwan, and the US: Both indicators show that the financial distortion decreases in S. Korea and Taiwan and that of the US remains roughly constant.

improvement in the efficiency of financial intermediation contributes to the wedge change and the long-term growth of S. Korea and Taiwan. The model results support our interpretation and suggest that the efficiency improvement enhances growth by reducing the “losses” attributable to the process of financial intermediation rather than by increasing saving rates.

This particular interpretation is motivated by the high correlation between the wedge value and the commonly used measurement for financial efficiency—the interest rate spread between lending and deposit rates, the spread.<sup>2</sup> For S. Korea and Taiwan, both the wedge values and spreads have fallen (see the lower panel of Fig. 1) and the correlation coefficients are high (S. Korea: 0.90; Taiwan: 0.75).

Furthermore, this particular focus reflects the well-known (e.g., Schumpeter, 1934; McKinnon, 1973, among others) yet disputed view in the literature on finance and growth that financial development positively influences growth. Much evidence from cross-country studies supports such a view (e.g., King and Levine, 1993a,b; Beck et al., 2000; Levine et al., 2000), whereas some evidence suggests the contrary view that this role is not always significant—as summarized in Deidda (2006). Our quantitative result supports the view that financial development enhances growth, as the efficiency improvement in financial intermediation is a particular form of financial development.

Our study differs from the existing theoretical and empirical work on finance and growth. We consider the firm’s financing structure and focus on bank operational efficiency and growth, and thus differ from the previous theoretical models on this topic. For example, earlier works by Bencivenga and Smith (1991, 1998), Greenwood and Jovanovic (1990), and Greenwood and Smith (1997) focus on financial intermediation’s role in the sharing of risk and in allocating capital to more productive but illiquid assets. More recent work has focused on its role in boosting R&D (e.g., Morales, 2003; Aghion et al., 2005) and in monitoring projects (e.g., Greenwood et al., 2010, 2012). Although these theoretical papers support the view that financial development has a positive impact on long-term growth, Deidda (2006) further justifies the existence of financial intermediaries and finds that the growth effect is ambiguous when an economy transitions from financial autarky to financial intermediation. An extensive literature review on finance and growth can be found in Pagano (1993), Levine (1997), and Demirguc-Kunt and Levine (2008).

Moreover, our study differs from the existing empirical work in that we quantitatively address how much a model with financial intermediaries can explain the relationship between the mitigation of financial distortion and the long-term economic growth rate. Most empirical work applies econometric techniques to identify the role of financial development in growth. We instead quantitatively explore to what extent efficiency improvement of financial intermediation can explain the reduction of the Euler equation tax wedge and show to what extent it affects growth based on the growth experience of S. Korea and Taiwan.

The model used in this study adds a banking sector into a Ramsey–Cass–Koopmans type of deterministic, discrete time growth model with firms owning assets. We also allow firms to “foster capital”, i.e., choose a combination of firm-owned

<sup>2</sup> The values reported are the trend of the interest rate spread for S. Korea and Taiwan, which is filtered using the Hodrick–Prescott filter with a smoothing parameter equal to 100.

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