Factor Substitution and Changes in Labor Share in Korea*

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Extended Abstract

Over the last three decades, the world has witnessed significant declining trend in labor share of income as documented in Karabarbounis and Neiman (2014). Observing this declining labor share, many economists, at least, raise doubts on the stability of labor share that is a fundamental feature for macroeconomic models. Concerning on the declining labor share, South Korea (henceforth, Korea) is not the exception in recent decades. It is well known that Korea enjoyed a rapid economic growth with relatively equal income distribution over its rapid industrialization period. However, since the Asian financial crisis in 1997 and 1998, the economy witnessed a significant fall in its labor share, that is a crude measure for income distribution.

This paper aims to produce aggregate- and industry-level estimates of the elasticity of substitution between capital and labor σ in Korea, by estimating constant elasticity of substitution (CES) production function incorporating labor-augmenting technological progress over the period between 1980 and 2012. By estimating the substitution elasticities, we attempt to explain the declining labor share in Korea at an aggregate level and the differences in the labor share trend across industries.

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Despite revival of interest in estimating the substitution elasticity for the advanced economies including the U.S. and EU countries and debates on sources of declining labor shares (Klump et al., 2007; Piketty, 2014; Karabarbounis and Neiman, 2014; Oberfield and Raval, 2014; León-Ledesma et al., 2015; Herrendorf et al., 2015; Mück, 2017), there have been a limited discussion on developing economies. Given a limited number of studies, it is difficult to draw consensus on the value of substitution in the case of developing economies including Korea (Mallick, 2012; Manu et al. 2018; Shin, 2005; Jeong, 2015). Thus, this paper attempts to fill the gap in the literature by providing a more robust estimates of the elasticity of substitution between capital and labor for the Korean economy. To our knowledge, this is the first study that employ a three-equation approach, using the Korean data. This approach jointly estimates a CES production function and the two first order conditions of profit maximization (i.e. prices equation). As proved by León-Ledesma et al. (2010), this three-equation system produces more robust estimates, compared to the single prices equations that many previous studies adopted.

For the analyses, we employ two sets of data - the national accounts of Korea and the industry-level data from World KLEMS, over the period, 1980-2012 and adopt the CES production function incorporating labor augmenting technological progress only, following Klump et al (2007) and León-Ledesm et al (2010).

The paper first documented the declining trend in labor since 1980 in Korea at an aggregate level. The overall labor share was at around 72.9% in 1980, declined significantly in the 1980s and became constant until it peaked at around 68.34% in 1996. It was followed with the greatest decline during the Asian financial crisis in 1997-98, and eventually reached around 58.9% in 2012. Along with the rise of capital-intensive industries and the fall of labor-intensive industries, there have been considerable differences across industries in the trends in labor shares.

The aggregate-level analysis reported that the substitution elasticity of substitution between capital and labor is estimated around 1.18 and the growth rate of labor-augmenting technological progress around 4.0%. This result is consistent with Mallick (2012)’s. The estimated substitution elasticity above one indicates gross substitutability between capital and labor. This suggests that capital accumulation with the substitution elasticity greater than one leads to a fall in the labor share at an aggregate level. This result is consistent with the argument made by Villacorta (2017) that increased capital accumulation served as a dominant force
towards the labor share of income.

Meanwhile, the industry-level analysis found that the substitution elasticities and labor-augmenting technological progress vary across the industries, as shown in Young (2013). The estimates of elasticity substitution range between 0.478 and 4.85, with a value-added weighted mean of 1.26 in manufacturing sector, whereas they range between 0.47 and 3.82 with the weighted mean of 1.11 in services sector. The substitutability in manufacturing is higher, compared to services on average. The growth rate of labor augmenting technological progress is estimated to be larger in manufacturing sector, compared to services. The differences in labor share at an industry level are due to the degree of substitutability and the pace of capital accumulation and labor-augmenting technological progress.

To sum up, the findings of this paper confirmed the instability of labor share over the period 1980-2012 in Korea by estimating the substitution elasticity between capital and labor above one. Overall, this declining average trend of labor share can be a result of capital accumulation and relatively high substitutability, especially at the later period, under the CES production function with labor-augmenting technological progress only. In addition, this paper also found considerable differences across industries in the elasticity of substitution, and thereby labor shares.

References


