

## **A nonlinear approach to growth and structural change:**

### **Towards a theory of the fall of the labor share**

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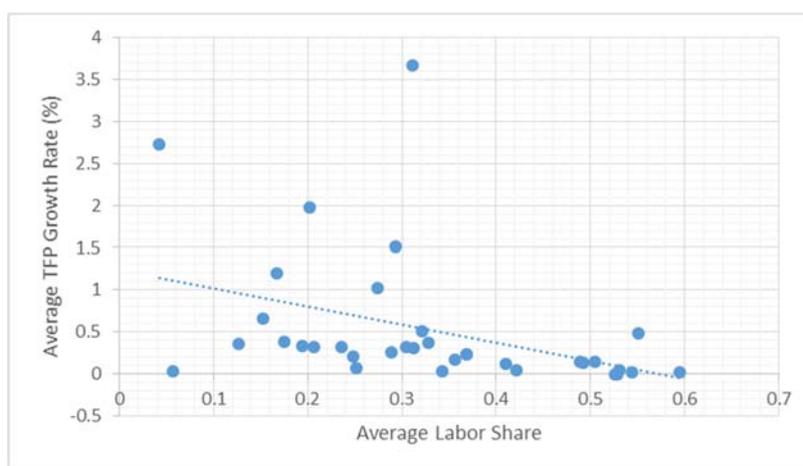
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#### **Extended Abstract**

The purpose of this research is to present an alternative growth model of economic structural change. A majority of growth models of structural change, for example Acemoglu and Guerrieri (2008), has been focused on the nonbalanced growth, and in order to establish the Kaldor and Kuznets facts simultaneously, the model is constructed in such a way that the final good is produced by combining the two intermediate goods. Furthermore for combining intermediate goods, the CES production function is commonly used. Since there is only one kind of final good, it is supposed that it can be used as investment good or consumption good interchangeably without cost. In other words, the assumed production possibility frontier (PPF) is line with the slope of -1. The nonbalanced growth models with the linear PPF will be convenient for establishing especially the “Kaldor facts.” However, new empirical studies report that the Kaldor facts, especially the constant of the labor share is not observed anymore across major countries. In fact “there is a general consensus that the fall of the labor share is real and significant” as reported by Autor, Dorn, Katz, Patterson and Van Reenen (2017).

I will show that the model presented here will provide a firm theoretical base for demonstrating this important phenomenon; the fall of the labor share. I will start to set up a multi-sector model with one consumption good and an arbitrarily number of capital goods, which are produced by the standard neoclassical production functions with the sector specific Hicks-neutral technical progress terms that exhibit the sector specific the total factor productivity (TFP). After normalizing each sector’s output by the sector specific TFP growth rate, the PPF can be derived by solving the optimal allocation problem of capital and labor among sectors. It is noteworthy that the derived PPF is not

linear but nonlinear. Combining the PPF and each sector’s accumulation equation, the normalized structural multi-sector optimal growth model can be transformed into the normalized reduced form multi-sector optimal growth model expressed by today’s and tomorrow’s capital stocks. Concerning the multi-sector reduced form optimal growth models, the local and global stabilities have been intensively studied under the title of Turnpike Theory by L. McKenzie, J. Scheinkman, K. Nishimura, M. Yano, T. Mitra and J. Benhabib, among others. Applying their results I can show that each sector’s optimal path converges its own optimal steady state path. The obtained result implies that in the non-normalized original structural model, each sector’s optimal path converges its own steady state which grows at the rate of a sector’s TFP growth. Therefore, in the end, the sector with the highest TFP growth rate, called a “superstar” sector, will dominate other sectors. Under the assumption of Cobb-Douglas technologies, if the sector with the higher TFP growth rate has the lower labor share (exhibited by Fig.1) and the superstar sector has the lowest labor share, then the aggregated labor share should gradually decline through the domination process. Thus the theoretical framework provided here will give a theoretical foundation for the recent empirical observation: the fall of the labor share indicated by Autor et al. (2017).



**Figure 1:** Average TFP Growth Rate and Labor Share in 33 industries from 1999 to 2010 in US: Corr. = - 0.39

**JEL Classification:** O14, O21, O24, O41

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