

Economic Growth and Transition: ‘D-i-D’ Approach

Marek Soukup ^{*}
Libor Žídek [†]

November 12, 2017

1 Problem statement

This paper intends to examine the macroeconomic differences between a centrally planned economy and a capitalist economy. In particular, we turn the attention to the structure of economic growth. The question is what are the main drivers of growth in both types of the economy and how they differ in both time and space.

In order to get a reliable comparison, we estimate the growth characteristics of two countries, Czech Republic and Austria, between 1970 and 2016. Therefore, we get a twofold comparison: The time dimension is the Czech Socialist Republic, which existed until 1990, when the centrally planned economy was replaced by the capitalist, market-oriented system. The question here is whether the characteristics of growth evince significantly different patterns before and after the year of so called ‘Velvet Revolution’ of 1989.

The spatial dimension lies in the comparison of the Czech Republic with a neighboring country, Austria. This country was chosen as a ‘control group’ for its geographical and historical proximity as well as for the fact that Austria’s economy is of the same size as the Czech one. What makes the difference, however, is that after the communist coup in 1948, a Soviet-style centrally planned economy was implemented in the Czech Republic, while Austria remained a part of the Western bloc.

2 The data

The methodology introduced below is to be applied on a unique dataset developed by economists from the University of Economics in Prague. This dataset comprises the yearly time series estimates of Czech GDP between the years 1970

^{*}Masaryk University in Brno, Faculty of Economics and Administration, 405170@mail.muni.cz

[†]Masaryk University in Brno, Faculty of Economics and Administration, lzidek@centrum.cz

and 1990. The uniqueness of these data lies in the fact that the macroeconomic time series of the post-communist countries usually start (at best) in 1990, that is, after the totalitarian regime was overthrown. For detailed methodology of estimating the data, see Sixta, Vltavská, Fischer (2013) and Sixta et al. (2016).

3 Methods

To describe the economic growth reached in both of the countries, we use an adjusted methodology originally developed by Jiří Mihola and his co-authors from Prague's University of Finance and Administration (references). The core of this methodology lies in computing dynamic growth parameters that break the overall growth into its intensive and extensive parts. I further develop this approach by applying it on the Solow-Swan model in intensive form and, more importantly, on the augmented Solow-Swan model by Mankiw, Romer and Weil. These parameters decompose the growth and allow us to compute the share which each of the factors has on the overall growth. The computation of the indices for the MRW model is briefly sketched below:

3.1 Mankiw, Romer & Weil model

$$Y_t = K_t^\alpha H_t^\beta (A_t L_t)^{1-\alpha-\beta} \quad (\text{the model}) \quad (1)$$

$$k = \frac{\alpha \ln I(K_t)}{Y_{abs}} \quad (\text{share of capital}) \quad (2)$$

$$l = \frac{(1-\alpha-\beta) \ln I(L_t)}{Y_{abs}} \quad (\text{share of labor}) \quad (3)$$

$$h = \frac{\beta \ln I(H_t)}{Y_{abs}} \quad (\text{share of human capital}) \quad (4)$$

$$i = \frac{(1-\alpha-\beta) \ln I(A_t)}{Y_{abs}} \quad (\text{residual}) \quad (5)$$

where

$$\begin{aligned} I(K_t) &= \frac{K_t}{K_{t-1}}; I(L_t) = \frac{L_t}{L_{t-1}}; I(H_t) = \frac{H_t}{H_{t-1}}; I(A_t) = \frac{A_t}{A_{t-1}} \\ Y_{abs} &= \alpha |\ln I(K_t)| + \beta |\ln I(H_t)| + (1-\alpha-\beta)(|\ln I(A_t)| + |\ln I(L_t)|) \\ 1 &= |k| + |l| + |h| + |i| \end{aligned}$$

We expect the following:

1. the share of physical capital on growth to be higher in Czech Republic than in Austria for corresponding time period
2. the share of human capital to be lower in Czech Republic than in Austria for corresponding time period
3. the differences between the shares before and after 1990 to be higher in Czech Republic

4 (Preliminary) results

Table 1 contains the averages of the dynamic parameters (their absolute values) over the two time periods in question. Figure 1 captures the development of growth shares over the whole period (the figure for Austria has been omitted in this abstract). The results partly meet the expectations: for the case of Czech Republic, the share of physical capital as a driver of the economic growth diminished while the importance of the human capital has risen. Also, the share of capital on Austria's growth is lower than the Czech while the human capital exceeds its counterpart.

However, one would expect a significant structural break in the composition of the Czech growth and a rather continuous development in Austria's case. Instead, what we see is a similar growth in the share of the human capital (7 percentage points). For physical capital, the extent of change is even on Austria's side - 16.4 p.p. against only 5.8. Such result suggests that the transition has not led to a change to a structure of growth, since this change has rather been a result of a natural development.

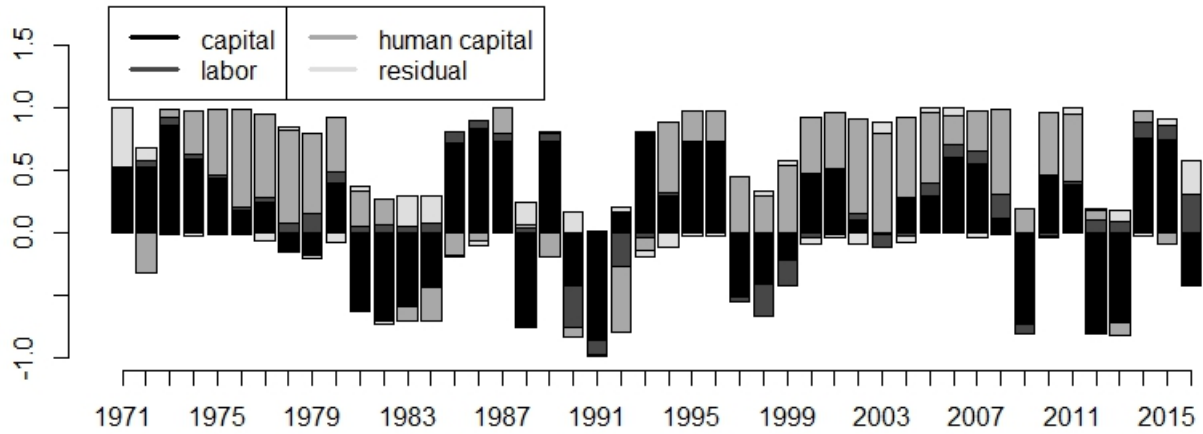
Table 1: Comparison (for $\alpha = \beta = 1/3$)

	Czech Republic		Austria	
	1971-1990	1990-2016	1971-1990	1990-2016
k	54.7%	48.9%	44.1%	27.7%
l	7.9%	9.2%	11.2%	17.8%
h	30.6%	37.7%	39.0%	46.5%
i	6.8%	4.2%	5.7%	8.1%
	100%	100%	100%	100%

5 Literature

1. Aghion, Philippe, and Peter W. Howitt. The economics of growth. MIT press, 2008.
2. Mankiw, N. Gregory, David Romer, and David N. Weil. "A contribution to the empirics of economic growth." The quarterly journal of economics 107.2 (1992): 407-437.
3. Mihola, Jiri, and Petr Wawrosz. "Analysis of the Share of Extensive and Intensive Factors on Changes of the Output on All Levels of the Economy." (2013).
4. Mojmír, Hájek, and Jiří Mihola. "Analýza vlivu souhrnné produktivity faktorů na ekonomický růst České republiky [Analysis of Total Factor Productivity Contribution to Economic Growth of the Czech Republic]." Politická ekonomie 2009.6 (2009): 740-753.
5. Sixta, Jaroslav, Kristýna Vltavská, and Jakub Fischer. "DEVELOPMENT OF GROSS DOMESTIC PRODUCT IN THE CZECH REPUB-

Figure 1: Growth structure: Czech Republic



LIC AND SLOVAKIA BETWEEN 1970 AND 1989." Ekonomický časopis (Journal of Economics) 6.61 (2013): 549-562.

6. Sixta, Jaroslav, et al. "Czech GDP between 1970 and 1989 Based on ESA 2010." Statistika: Statistics and Economy Journal 96.1 (2016): 4-12.

7. Solow, Robert M. "A contribution to the theory of economic growth." The quarterly journal of economics 70.1 (1956): 65-94.