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STRUCTURAL CHANGE, AGGREGATE GROWTH AND GOVERNMENT SERVICES

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Abstract

Recent literature studies structural change and aggregate dynamics in neoclassical multi-sector growth models. A central aspect of this literature is the explanation of “Kaldor-Kuznets-stylized-facts”, which state that massive structural change takes place while aggregate-dynamics are relatively stable in the long-run. We present a growth model analysing the role of government in structural change and aggregate growth. We show that, besides distortionary effects on the sector structure, the provision of government services has an impact on the intertemporal elasticity of substitution of the representative household and, thus, on aggregate dynamics. These results can be used to explain the Kaldor-Kuznets-facts.

Keywords

neoclassical growth models, structural change, Kaldor-facts, government services

JEL O14, O38, O41

1. Introduction

Kongsamut et al. (1997, 2001) present evidence on long-run economic dynamics showing that aggregate dynamics are “balanced” according to “Kaldor’s stylized facts”¹ while structural change² takes place according to “Kuznets’ stylized facts”.³ Kongsamut et al. (1997, 2001) argue that growth models should be consistent with these stylized facts and provide three multi-sector models which are (simultaneously) consistent with both, Kaldor-facts and Kuznets-facts. Following Kongsamut et al (2001) several authors have presented models which satisfy Kaldor-Kuznets facts: Meckl (2002), Ngai and Pissarides (2007), Acemoglu and Guerrieri (2008), Foellmi and Zweimueller (2008) and Boppart (2014).⁴ Each of these papers focuses on some property of the production/utility function⁵ and shows (a) how this property affects structural change and (b) under which conditions the model satisfies the Kaldor-Kuznets facts.⁶

In this paper we add a further aspect to this literature: the government. In a theoretical model we analyse (a) how government affects structural change and (b) under which conditions Kaldor-Kuznets facts are satisfied in presence of government action. We focus our discussion on (b); in particular, we derive the type of government behaviour which leads to satisfaction of Kaldor-Kuznets facts in our model.

¹ In general, Kaldor-facts require that aggregates (in particular, aggregate output, aggregate capital and aggregate consumption expenditures) grow at a constant rate (“balanced aggregate growth”); for discussion, see e.g. Kongsamut et al. (2001).

² Structural change stands here for labor reallocation across sectors such as agriculture, manufacturing and services.

³ Kuznets-facts state that (a) the employment share of agriculture declines over the development process, (b) employment share of services increases over the development process and (c) the manufacturing employment share is stable over the development process; see Kongsamut et al. (1997, 2001).

⁴ See Stijepic (2011) for an extensive discussion of this literature. For a general overview of structural change literature see, e.g., Herrendorf et al. (2014).

⁵ Kongsamut et al. (2001), Meckl (2002), Foellmi and Zweimueller (2008) and Boppart (2014) discuss the role of non-homothetic preferences. Kongsamut et al. (1997), Ngai and Pissarides (2007) and Acemoglu and Guerrieri (2008) discuss the role of technology (TFP-growth and capital-intensity).

⁶ Kongsamut et al. (1997, 2001) show that their models require some knife-edge parameter restrictions to satisfy Kaldor-Kuznets-facts; we show that these knife-edge parameters may be explained by government behavior. Ngai and Pissarides (2007) show that Kaldor-Kuznets-facts are satisfied in their model provided that cross-sector intermediate linkages are relatively simple, capital intensities are similar across sectors and preferences are homothetic. Foellmi and Zweimueller (2008) assume a specific utility function and independent preferences and technologies. Acemoglu and Guerrieri (2008) assume homothetic preferences and show that Kaldor-Kuznets-facts are satisfied approximately.

The reasons for studying the role of government in explaining long-run stylized facts are more or less obvious. The government is one of the most powerful (non-market) forces in the economy. There are numerous theories on the role of government in economic development.⁷ Furthermore, there are many studies which imply that government has a significant impact on structural change and growth.⁸ Yet, the previous “Kaldor-Kuznets-literature” does not study the role of government and leaves the relation between government behaviour and Kaldor-facts unexplored.

Since Kaldor-Kuznets facts are related to aggregate indexes and broad sector-definitions, we choose a macroeconomic modelling approach. Our model is based on the multi-sector growth models studied by Kongsamut et al. (1997), pp.27-31, and Echevarria (1997). We choose these models as starting point since their assumptions cover some technology and utility properties which are essential for structural change modelling.⁹ The (macro-)approach which we use to integrate government into this framework is comparable to the approach used by Caselli and Ventura (2000). The government collects non-distortionary taxes, demands services from the representative household (e.g. military services) and provides services/grants to the representative household. Thus, the government sector has inputs and outputs. Its productivity grows/declines at an exogenous rate.

We show that provision of government grants/services has an impact on structural change and aggregate growth. On the one hand, (distortionary) provision of government services leads to

⁷ Examples are: (1) the development literature on the role of government as provider of infrastructure, institutions (property rights) and public goods, e.g. Barro (1990) and Acemoglu et al. (2001); see some recent book on development economics for numerous references; (2) the literature on development macroeconomics (and the role of government); see e.g. Agénor and Montiel (2008).

⁸ For example, there are papers on: industrial policy (e.g. Greenwald and Stiglitz (2006)), impact of market institutions on structural change (e.g. Messina (2006)), structural policy in planned/socialist economies (e.g. Cheremukhin et al. (2013)) and government sector as provider of “stagnant” services (in particular, the branch of literature pioneered by Baumol (1967); see Nordhaus (2008) for discussion).

⁹ As discussed by Schettkat and Yocarini (2008), empirical evidence implies that structural change is generated by two main factors: demand-shifts across sectors [caused by non-homothetic preferences] and cross-sector technology-bias [regarding TFP-growth and capital-intensity]. The relevance of cross-sector differences in TFP-growth for structural change has been studied by, e.g., Ngai and Pissarides (2007) in a theoretical framework and Baumol et al. (1985) in an empirical study. The relevance of cross-sector differences in capital intensities for structural change has been studied by, e.g., Acemoglu and Guerrieri (2006). For new empirical evidence on strong differences in capital intensities across sectors see e.g. Valentiniyi and Herrendorf (2008).

“crowding out” of private services and, thus, has (distortionary) effects on structural change; on the other hand, the provision of government services/grants affects the aggregate intertemporal elasticity of substitution of the representative household and, thus, aggregate dynamics and structural change. There exists a dynamic grant/services-provision program which places the economy on a growth path along which Kaldor-Kuznets-facts are satisfied (approximately). This program has a clear intuitive interpretation: it ensures that the basic needs of the household are covered “efficiently”. Overall, our model postulates a relationship between government services/grants-provision and GDP-growth (and aggregate dynamics in general) via structural change.

In the next section we discuss our model-assumptions. In section 3 we derive the results. In section 4 we provide some concluding remarks.

2. Model-assumptions

The representative household maximizes the following utility function by consuming heterogeneous goods ($i = 1, \dots, m$)

$$(1) \quad U = \int_0^{\infty} u(C_t^1, C_t^2, \dots, C_t^m) e^{-\rho t} dt, \quad \rho > 0$$

where

$$(2) \quad u(C_t^1, \dots, C_t^m) = \sum_{i=1}^m \beta_i \ln(C_t^i + \bar{S}_t^i + \bar{G}_t^i), \quad \beta_i > 0; \quad \sum_i \beta_i = 1$$

where t is the time index. C_t^i denotes the “market consumption” of good i (i.e. consumption of goods that are purchased on the market). \bar{S}_t^i and \bar{G}_t^i are exogenous. If \bar{S}_t^i is negative, it can be interpreted as the basic need regarding good i (e.g. food, basic education). If \bar{S}_t^i is positive, it can be interpreted as an endowment regarding good/service i , e.g. a household that can repair cars has some positive endowment regarding the service “car repairing”. The \bar{G}_t^i s

stand for the free services and grants that are provided (and guaranteed) by the government. If some \bar{G}_t^i s are assumed to be negative, they can be interpreted as goods/services that have to be provided to the government (a sort of “tax”), e.g. military service. Some \bar{S}_t^i and/or \bar{G}_t^i could be assumed to be constant and/or equal to zero. Note that the utility function (1)-(2) is a combination of the utility functions used by Kongsamut et al. (2001) and Caselli and Ventura (2000).

Since income-elasticity and price-elasticity of demand differ across goods i and are different from unity (as long as not all $\bar{S}_t^i + \bar{G}_t^i = 0$), the preferences allow for structural change caused by non-homothetic preferences and relative-price-changes; cf. Kongsamut et al. (2001) and Ngai and Pissarides (2007). The utility function (1)-(2) implies that, in general, the intertemporal elasticity of substitution (of market consumption) is not constant over time due to the parameters \bar{S}_t^i and \bar{G}_t^i ; this is a well-known feature of Stone-Geary type utility functions; see e.g. Barro and Sala-i-Martin (2004). Thus, the government affects the intertemporal elasticity of substitution (of market consumption) via \bar{G}_t^i . Later we will discuss the parameterizations under which the intertemporal elasticity is constant over time.

Each of the goods is produced by a sector. Each sector produces its output (Y_t^i) by a Cobb-Douglas production function

$$(3) \quad Y_t^i = B_t^i n_t^i \left(\frac{K_t}{B_t^i} \frac{k_t^i}{n_t^i} \right)^{\alpha_i}, \quad 0 < \alpha_i < 1, \quad \forall i = 1, \dots, m$$

where we have normalized the aggregate amount of labour to unity. K_t represents the aggregate amount of capital; k_t^i and n_t^i represent the fraction of capital and labour devoted to sector i , respectively; B_t^i is a sector-specific technology-parameter that grows at the exogenous, sector-specific and constant rate g_i .

All capital and labour have to be used in production

$$(4) \quad \sum_i k_t^i = 1; \quad \sum_i n_t^i = 1$$

The government levies the (non-distortionary) tax-rate τ on the output of each sector. Furthermore, like Kongsamut et al. (1997, 2001) and Ngai and Pissarides (2007), we assume that only sector m produces capital (and consumption goods)

$$(5) \quad (1 - \tau)Y_t^m = \dot{K}_t + \delta K_t + C_t^m$$

$$(6) \quad (1 - \tau)Y_t^i = C_t^i, \quad \forall i \neq m$$

where δ is the depreciation rate. We define aggregate output (Y_t) and aggregate consumption-expenditures (E_t) as follows

$$(7) \quad Y_t \equiv \sum_i p_t^i Y_t^i; \quad E_t \equiv \sum_i p_t^i C_t^i$$

where p_t^i denotes the relative price of good i . Sector $i = m$ is numéraire

$$(8) \quad p_t^m = 1$$

The government has the following “budget restriction”

$$(9) \quad g(\bar{G}_t^1, \dots, \bar{G}_t^m) \leq f\left(\tau, \{A_s\}_{s=0}^t, \{Y_s^1, \dots, Y_s^m\}_{s=0}^t, \{\bar{G}_s^1, \dots, \bar{G}_s^m\}_{s=0}^{t-1}\right) \quad \forall t, \quad \frac{\dot{A}_t}{A_t} = g_A$$

where $g(\cdot)$ and $f(\cdot)$ are functions. In each period the government provides grants and services by using (some of the) current period taxes and (if necessary) taxes that have been saved in previous periods. The exogenous variable A_t represents the productivity-level of the government. We omit government debt. Overall, government output $(\bar{G}_t^1, \bar{G}_t^2, \dots, \bar{G}_t^m)$ at time t depends on current and past income of the government and on past expenditures of the government. The current and past government income depends on current and past

government productivity $\{A_s\}_{s=0}^t$ and on current and past tax-revenue, which is given by τ and $\{Y_s^1, \dots, Y_s^m\}_{s=0}^t$. The past expenditures of the government are given by $\{\bar{G}_s^1, \dots, \bar{G}_s^m\}_{s=0}^{t-1}$.

3. Model-results

When there is free mobility of factors across sectors, the intratemporal and intertemporal optimality conditions for this model¹⁰ are given by

$$p_t^i = \frac{\partial Y_t^m / \partial (n_t^m)}{\partial Y_t^i / \partial (n_t^i)} = \frac{\partial Y_t^m / \partial (k_t^m K_t)}{\partial Y_t^i / \partial (k_t^i K_t)} = \frac{\partial u(\cdot) / \partial C_t^i}{\partial u(\cdot) / \partial C_t^m}, \forall i \quad \text{and} \quad -\frac{\dot{u}_m}{u_m} = \frac{\partial Y_t^m}{\partial (k_t^m K_t)} - \delta - \rho, \quad \text{where}$$

$u_m \equiv \partial u(\cdot) / \partial C_t^m$. These conditions imply the following equations, describing the development of aggregates and sectors

Aggregates

$$(10) \quad Y_t = (B_t^m)^{1-\alpha_m} (K_t)^{\alpha_m} \left(\alpha_m \frac{n_t^m}{k_t^m} + 1 - \alpha_m \right) \left(\frac{k_t^m}{n_t^m} \right)^{\alpha_m}$$

$$(11) \quad \dot{K}_t = (1-\tau)Y_t - \delta K_t - E_t$$

$$(12) \quad \frac{\dot{E}_t + \dot{V}_t}{E_t + V_t} = \frac{\partial Y_t^m}{\partial (k_t^m K_t)} - \delta - \rho = \alpha_m \frac{\tilde{Y}_t}{K_t} \frac{n_t^m}{k_t^m} - \delta - \rho$$

$$(13) \quad \frac{n_t^m}{k_t^m} = 1 - \frac{W_t}{(1-\tau)\alpha_m} + \frac{\left(1 + \sum_i \alpha_i \beta_i\right) V_t - \left(\alpha_m - \sum_i \alpha_i \beta_i\right) E_t}{(1-\tau)\alpha_m (1-\alpha_m) \tilde{Y}_t}$$

Sectors (represented by employment shares)

$$(14) \quad n_t^i = \frac{(1-\alpha_i) \beta_i (E_t + V_t)}{(1-\alpha_m) (1-\tau) \tilde{Y}_t} \frac{\bar{S}_t^i + \bar{G}_t^i}{(1-\tau) \left(\frac{k_t^m}{n_t^m} \frac{1-\alpha_m}{\alpha_m} \frac{\alpha_i}{1-\alpha_i} \right)^{\alpha_i} (B_t^i)^{1-\alpha_i} (K_t)^{\alpha_i}}, \quad \forall i \neq m$$

¹⁰ They can be obtained by maximizing equations (1)-(2) subject to equations (3)-(8), by using the Hamiltonian.

$$(15) \quad n_t^m = \frac{\dot{K}_t + \delta K_t + \beta_m (E_t + V_t)}{(1-\tau)\tilde{Y}_t} - \frac{\bar{S}_t^m + \bar{G}_t^m}{(1-\tau)\tilde{Y}_t}$$

where

$$(16) \quad \tilde{Y}_t \equiv (B_t^m)^{1-\alpha_m} (K_t)^{\alpha_m} (k_t^m / n_t^m)^{\alpha_m}$$

$$(17) \quad V_t \equiv \sum_i p_t^i \bar{S}_t^i + \sum_i p_t^i \bar{G}_t^i$$

$$(18) \quad W_t^i \equiv \sum_i \frac{\bar{S}_t^i}{B_t^i \left(\frac{K_t k_t^i}{B_t^i n_t^i} \right)^{\alpha_i}} + \sum_i \frac{\bar{G}_t^i}{B_t^i \left(\frac{K_t k_t^i}{B_t^i n_t^i} \right)^{\alpha_i}}$$

$$(19) \quad p_t^i = \frac{\alpha_m \left(\frac{K_t k_t^m}{B_t^m n_t^m} \right)^{\alpha_m - 1}}{\alpha_i \left(\frac{K_t k_t^i}{B_t^i n_t^i} \right)^{\alpha_i - 1}}, \quad \forall i$$

$$(20) \quad \frac{k_t^i}{n_t^i} = \frac{k_t^m}{n_t^m} \frac{1-\alpha_m}{\alpha_m} \frac{\alpha_i}{1-\alpha_i}$$

Equations (10)-(12) are the same as in the “standard” (one-sector) Ramsey-model, beside of the fact that they contain the terms k_t^m / n_t^m and V_t . Furthermore, government grants have an impact on the growth rates of aggregates via V_t and W_t in equations (10)-(13).

Equations (14) and (15) describe structural change. They indicate that employment shares change over time. Government affects the employment dynamics via two channels:

(a) *Distribution of government services across sectors:* We can see in equations (14)

and (15) that distribution of labour across sectors $(n_t^1, n_t^2, \dots, n_t^m)$ depends on distribution of government services across sectors $(\bar{G}_t^1, \bar{G}_t^2, \dots, \bar{G}_t^m)$. If \bar{G}_t^i is relatively great, the employment share of sector i is relatively small (“crowding out”). Thus, the provision of services/grants by the government can have a distortionary effect on the employment structure.

(b) *Impact on intertemporal elasticity of substitution*: The overall-extent of government services/grants-provision (indicated by V_t and W_t) affects the dynamics of aggregates (cf. eq. (10)-(13)) and, thus, the dynamics of labour-allocation (cf. eq. (14)-(15)). As noted in the previous section, our utility function features a non-constant intertemporal elasticity of substitution (of market consumption) and government provision of services/grants has an impact on this elasticity. It is easy to prove that, if $V_t = W_t = 0 \forall t$, the intertemporal elasticity of substitution (of market consumption E_t) is constant in our model.

We define now a “generalized balanced growth path” (“GBGP”) as follows (cf. Kongsamut et al. (2001)): a GBGP is a growth path along which aggregates (E_t, K_t, \tilde{Y}_t and Y_t) grow at a constant rate (“balanced aggregate growth”). Equations (10)-(13) imply that, if $V_t = W_t = 0 \forall t$, a unique GBGP exists along which k_t^m / n_t^m is constant and aggregates (E_t, K_t, \tilde{Y}_t and Y_t) grow at the constant rate g_m . Thus, Kaldor-facts are satisfied along the GBGP; see footnote 1. Furthermore, equations (14) and (15) imply that structural change takes place along the GBGP, i.e. the employment shares of sectors (n_t^i) change over time. Along the GBGP the changes in the employment shares can be monotonous (increasing, decreasing or constant) or non-monotonous depending on the setting of parameters B_t^i, \bar{S}_t^i and \bar{G}_t^i . Hence, the model can satisfy Kuznets’ stylized facts of structural change (see footnote 3).

Equations (17) and (18) imply that there exists a government program $\{\bar{G}_t^1, \dots, \bar{G}_t^m\}_{t=0}^\infty$ such that $V_t = W_t = 0 \forall t$. Henceforth, we denote this program by $\{\bar{G}_t^{1*}, \dots, \bar{G}_t^{m*}\}_{t=0}^\infty$. Later we will discuss the conditions under which $\{\bar{G}_t^{1*}, \dots, \bar{G}_t^{m*}\}_{t=0}^\infty$ does not violate restriction (9).

Overall, Kaldor-Kuznets-facts can be satisfied, provided that the government chooses the program $\{\bar{G}_t^{1*}, \dots, \bar{G}_t^{m*}\}_{t=0}^{\infty}$, which ensures that $V_t = W_t = 0 \forall t$. Now, we discuss the intuition behind the condition $V_t = W_t = 0$.

Assume that the directive of the government is to ensure that the representative household can cover basic needs (the negative \bar{S}_t^i s) by using endowments (the positive \bar{S}_t^i s) and by using government grants (\bar{G}_t^i s). Furthermore, assume that the government seeks to satisfy its directive “efficiently”, i.e. by providing as few grants as possible. To do so, the government must choose $\bar{G}_t^1, \dots, \bar{G}_t^m$ such that $V_t = W_t = 0, \forall t$. The reason is the following. If (in the real world) an average household has to cover its basic needs by its endowments and grants, it has two possibilities: (1) it can sell the endowments and grants and buy basic-needs-goods for this “money” and/or (2) it can use the labour, that is intrinsic in its endowments, to produce basic-goods for itself (planting vegetables instead of repairing neighbours car). Condition $V_t \equiv \sum_i p_t^i \bar{S}_t^i + \sum_i p_t^i \bar{G}_t^i = 0$ ensures that the household can exactly cover its basic needs by

strategy (1). Condition $W_t \equiv \sum_i \frac{\bar{S}_t^i + \bar{G}_t^i}{B_t^i \left(\frac{K_t k_t^i}{B_t^i n_t^i} \right)^{\alpha_i}} = 0$ ensures that it can cover its basic needs by

strategy (2), since $B_t^i \left(\frac{K_t k_t^i}{B_t^i n_t^i} \right)^{\alpha_i}$ is the average productivity of labour (Y_t^i / n_t^i) regarding good

i.¹¹ Both conditions ($V_t = 0$ and $W_t = 0$) must be satisfied, since otherwise the household could cover more than its basic needs by combining the two strategies (a kind of “arbitrage”); e.g. repairing a car “for money” instead of planting vegetables and afterwards buying vegetables.

¹¹ If we divide the endowment of good i by the labour-productivity (associated with the production of this endowment), we obtain the labour embodied in the endowment of good i . We can use this labour to produce another endowment (e.g. endowment of good j).

4. Concluding remarks

We have shown that government has two different effects on structural change: (a) provision of government services leads to crowding out of private services; in general, this effect has a distortionary impact on the sector structure and on structural change; (b) the provision (guarantee) of government grants and services affects the intertemporal elasticity of substitution (regarding market services) of the representative household and, thus, income dynamics and structural change (via income elasticity of demand). The channel (b) postulates an impact of government action on aggregate dynamics and, thus, determines whether an economy satisfies Kaldor-facts.

An intuitive explanation for the fact that Kaldor-facts are satisfied in our model only if the government guarantees basic-needs-coverage is the following. The value of overall consumption-expenditures (E_t) is equal to the sum of the net-value of basic-needs-expenditures¹² ($-V_t$) and the net-value of “surplus-expenditures”¹³ ($E_t + V_t$). Equation (12) is the same as in the “standard” Ramsey-model, beside of the fact that in our model only the

growth rate of surplus-expenditures depends on the real interest rate ($\frac{\partial Y_t^m}{\partial (k_t^m K_t)}$). This seems

to be plausible, since the household seeks to cover its basic needs irrespective of how high/low the real interest rate is. It is well known from the “standard” Ramsey-model (and in this respect our model is the same) that satisfaction of Kaldor-facts requires that the real interest rate and the growth rate of (*overall*) consumption-expenditures are constant. This requirement and equation (12) imply that Kaldor-fact can be satisfied only if $V_t = 0$.¹⁴ In other words: if the government does not ensure basic-needs-coverage, consumption-expenditures contain a basic-needs-component that is independent of the real interest rate;

¹² This term means the value of basic needs minus the value of endowments and government grants.

¹³ This term means the value of consumption-expenditures that exceeds the net-value of basic-needs-expenditures, i.e. the part of the consumption-expenditures-value that is not necessary to cover basic needs.

¹⁴ This is a mathematical truth: ($E_t + V_t$) and E_t can grow at constant rates only if $V_t = 0$.

therefore, consumption-expenditures do not grow at constant rate when the real interest rate is constant (Kaldor-facts are not satisfied).

An alternative way to understand why coverage of basic needs by the government is required for the satisfaction of Kaldor-facts in our model is the following. The existence of basic needs (and natural household endowments) in our Stone-Geary utility function entails a non-constant (aggregate) intertemporal elasticity of substitution, which, in general, prevents balanced growth of aggregates (Kaldor-facts). If the government covers the fraction of the aggregate value of basic needs which is not covered by the value of natural household endowments, the aggregate intertemporal elasticity of substitution is constant; thus, Kaldor-facts can be satisfied. Furthermore, since the government covers the *aggregate* value of basic needs but not necessarily all good-specific basic needs, basic-need-coverage differs across goods and, thus, the intertemporal elasticity of substitution differs across goods, which yields structural change (Kuznets-facts).

Note that analogous argumentation applies if the representative household has very rich natural endowments, i.e. if endowments exceed basic needs. In this case, Kaldor-facts are satisfied only if the government withdraws some natural endowments-value from the representative household, ensuring that basic needs are not exceeded by natural endowments.

It should be mentioned that equations (9) and (17)-(19) imply that the growth rate of the government-efficiency-parameter (g_A) must be sufficiently high to ensure that government can satisfy the condition $V_t = W_t = 0$ for ever. In some cases, even a negative g_A may be sufficient to ensure $V_t = W_t = 0$. Everything depends on the relation between the value of basic needs, household endowments and government services.

It is difficult to estimate whether g_A is positive or negative. On the one hand, government becomes more and more important for market functioning over time, since complexity¹⁵ of

¹⁵ Compare the institutional requirements of an underdeveloped agricultural economy to the institutional requirements of a modern services economy.

the economy increases over the development process and, thus, the government becomes more and more important as a provider of institutional infrastructure (e.g. property rights). This argument implies that the value of the government for the economy increases over the development process, i.e. $g_A > 0$. On the other hand, government may be plagued by stagnating or even decreasing efficiency, due to, e.g., lack of competition in the government sector or Baumol's cost disease.

Overall, government action may increase or reduce the degree of satisfaction of Kaldor-facts, depending on whether government action reduces or increases the gap between household endowments and basic needs. Thus, the relation between basic needs, household endowments and government action is a potential explanation for the fact that some countries satisfy the Kaldor-facts and others do not.

Needless to say that the degree of grants-system-efficiency (as defined in our paper) is only one factor among many factors that cause the coexistence of Kaldor-facts and structural change in reality. Finding further factors and testing for relative importance among factors is left for further research.

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