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# TOTAL FACTOR PRODUCTIVITY AND THE INSTITUTIONAL POSSIBILITY FRONTIER: AN OUTLINE OF A LINK BETWEEN TWO THEORETICAL PERSPECTIVES ON INSTITUTIONS, CULTURE AND LONG RUN GROWTH

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# TOTAL FACTOR PRODUCTIVITY AND THE INSTITUTIONAL POSSIBILITY FRONTIER: AN OUTLINE OF A LINK BETWEEN TWO THEORETICAL PERSPECTIVES ON INSTITUTIONS, CULTURE AND LONG RUN GROWTH[2]

This paper outlines a link between two theoretical perspectives on the prerequisites of high institutional quality and long run growth. One framework is based on the trade-off between disorder and dictatorship, and introduces the notion of the institutional possibility frontier (IPF), the other perspective focuses upon the role of total factor productivity (TFP) as a parameter underlying long run growth. A connection between these frameworks is proposed and elaborated. The paper sheds some light on the nature of TFP and designates directions for further research on the fundamental conditions for high-quality development.

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## I. Introduction

Over the last 30 years or so, our understanding of the prerequisites for economic and social development has deepened significantly. One of the improvements is concerned with the way we think about the role of political and economic decisions: they do not happen in a vacuum and their effectiveness depends not only on their compliance with the prescriptions of the Washington Consensus or certain expert knowledge but also with the quality of political and economic institutions which are involved in the implementation of decisions. This idea, although simple, is sometimes regarded as a basis for a theoretical shift which puts "good governance" and the institutional framework of societies at the centre of attention for social scientists[3].

However, it is not at all obvious that taking institutions into account is the final theoretical step. At the outset of 1990s another research agenda gained momentum, though it has never been as influential as (neo)institutional theory. Different but deeply related perspectives on the most fundamental conditions of social performance developed across social sciences: the theory of social capital has been the object of much attention in sociology[4] and political science[5]; cultural beliefs have been considered the basic structure which determines the way institutions function[6]; later, economics and the new political economy became interested in the way culture affects ultimate social arrangements[7]. This interest in culture suggests that it may play the same role for the functioning of institutions as institutions play for the performance of decisions: it provides the context which is necessary to understand why some institutions succeed and others fail. Therefore, we need theoretical frameworks which allow for thinking about institutions and the conditions of their performance in a coherent and clear way.

This paper sketches one possible strategy for developing such a framework (it is worth stressing that the subsequent analysis is purely exploratory in its nature and does not lead to any definite conclusions; rather it suggests directions for future research). Two theories serve as a point of departure: 1) the theory of Institutional Possibility Frontier (IPF) as elaborated by Djankov et al.[8]; 2) and the role of total factor productivity (TFP) as a variable which affects the sustainability of economies to bad decisions, crises and differences in the interests of social groups[9].

The second section of the paper provides brief descriptions of these theories. In the third section, I show that they can be regarded as tightly interconnected and that the idea of the "stabilizing" role of TFP may be used for a partial formalization of theoretical insights about the IPF. The fourth section considers the possible interpretations of TFP in the light of the preceding

[3] Rothstein B. (2012). Good Governance. In David Levi-Faur (Ed.) *The Oxford Handbook of Governance* (p. 143-154). Oxford, Oxford University Press.
[4] See, for example, a seminal work by Joseph Coleman: Coleman J. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology, 94*, p. 95-120.
[5] Putnam R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton: Princeton University Press.
[6] Greif A. (1994). Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies. *Journal of Political Economy, 102*(5), p. 912-950.
[7] Tabellini G. (2008). Presidential Address: Institutions and Culture. *Journal of the European Economic Association, 6*(2/3), p. 255-294.
[8] Djankov S., Glaeser E., La Porta R. et al. (2003). The New Comparative Economics. *Journal of Comparative Economics, 31*, p. 595-619.
[9] Akhremenko A., Petrov A. (2014). Efficiency, Policy Selection, and Growth in Democracy and Autocracy: A Formal Dynamical Model. *NRU HSE Working Paper*; Ахременко А.С., Локшин И.М., Юрескул Е.А. (2015). Экономический рост и выбор политического курса в авторитарных режимах: "недостающее звено". *Полития, 78*(3), с. 50-74.

analysis and some questions are posed about the nature of the fundamental prerequisites for efficient institutions.

## II. The review of two theories

### *II.1. The dictatorship-disorder trade-off and the IPF*

Djankov et al.[10] base their framework for thinking about institutional efficiency on the trade-off between dictatorship and disorder[11]. All societies confront this fundamental trade-off but it has different consequences for them: some societies suffer from it much more than others. Djankov et al. focus upon the performance of institutions in the context of this trade-off and they account for better institutional performance in certain countries by two factors: 1) the extent to which institutions manage to control and decrease social losses from the associated degree of disorder and dictatorship; 2) the location and the shape if the IPF[12].

Thus, the institution of independent judges may imply approximately the same scope of social losses due to the relative proximity to the pole of disorder as a regulatory state due to the proximity to the pole of dictatorship. As far as the second factor is concerned, Djankov et al. describe Sweden and China as countries with comparatively better conditions for institutional performance than Albania or Congo[13]. In former countries social losses due to dictatorship and disorder turn out to be less than in the latter, *ceteris paribus*.

This conceptual framework is illustrated by a scheme which depicts the IPF as a curve reflecting the scope of social losses emanating from excessive disorder or dictatorship (see Figure 1).

In the context of the present paper I am mostly interested in the location of the IPF and in the extent to which it fits the total loss maximization line. Both parameters determine the acuteness of the trade-off between disorder and dictatorship and have an obvious relation wtih the fundamental factors upon which institutional performance depends in general. In other words, these parameters suggest a way to formalize cultural influence on the functioning of institutions.

What, then, is the nature of these parameters? Djankov et al. refer to the location of the IPF as civic capital. They argue that "societies with more such capital, and an IPF closer to the origin, are more capable of achieving cooperation among other members"[14]. Hence, the location of the IPF is concerned with the extent to which individuals in a given society cooperate with each other, and cooperation is regarded as a major factor affecting the severity of the trade-off between dictatorship and disorder.

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[10] Djankov S., Glaeser E., La Porta R. et al. Op. cit.

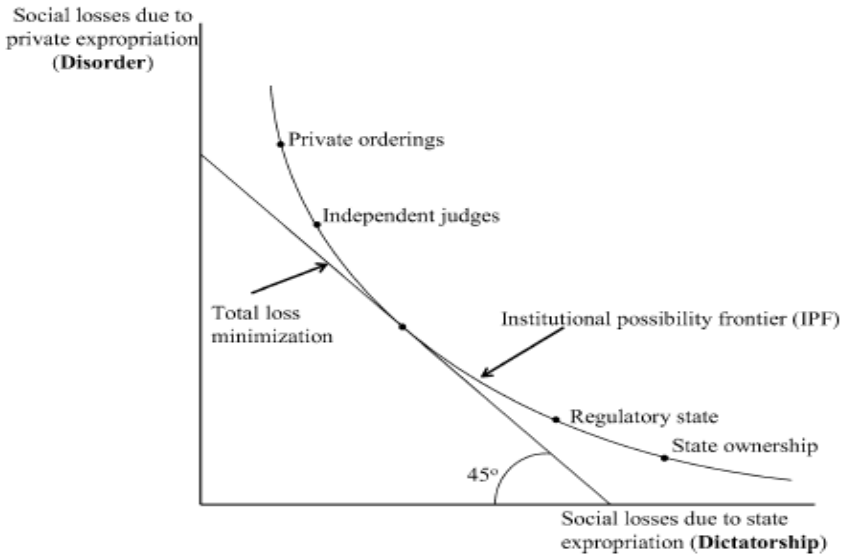
[11] To some extent, the same tradeoff can be found in contemporary studies in political science about two types of democracy: adversarial democracy implies less checks on power but more responsible government, while consensual democracy puts emphasis on the representativeness rather than responsibility of government with a potential of political deadlock as a reverse side. See, e.g.: Norris P. (2004). *Electoral Engineering: Voting Rules and Political Behavior*. Cambridge: Cambridge University Press, p. 69; Lijphart A. (1999). *Patterns of Democracy: Government Forms and Performance in Thirty-Six Countries.* New Haven: Yale University Press, p. 9-47.

[12] Djankov S., Glaeser E., La Porta R. et al. Op. cit., p. 600.

[13] Ibid.

[14] Ibid., p. 600.

*Figure 1. Institutional possibilities*[15]




It is this assertion which paves the way for thinking about this trade-off in terms of TFP.

*II.2. TFP and some of its effects*

Technically, TFP is the parameter $A$ in the Cobb-Douglas production function. It is a residual "measure of our ignorance"[16] which appears due to production factors not taken into account in the Cobb-Douglas function. The debates about the nature of TFP have lasted for several decades and pose an important question about the sources of economic growth.

One strategy to clarify the nature of TFP is to try to understand its effects better. In this section, I restrict discussion to the possible political effects of TFP which are largely overlooked in the existing literature.

The framework for this discussion is based upon a version of Cobb-Douglas function, namely:

$$Y(t) = A_t K^{\alpha}(t) G^{1-\alpha}(t), \qquad (1)$$

where $Y$ is the total output, $A$ is TFP, $K$ is the input of private capital, $G$ is the input of public capital, $\alpha$ is the output elasticity, and $t$ is the period. Note that the subscript for $A$ implies that TFP can change through time but, in contrast to private and public capital, we do not have an explicit formula for variation of $A$ across different periods.

There is a tax rate $\tau$ which determines the size of state budget $I(t)$:

$$I(t) = \tau Y(t). \qquad (2)$$

The input of private capital in the next period is expressed as:

[15] Source: Djankov S., Glaeser E., La Porta R. et al. Op. cit., p. 599.
[16] Hulten C. (2001). *Total Factor Productivity: A Short Biography*. Retrieved June 29 2015 from NBER Working Papers, http://www.nber.org/chapters/c10122.pdf.

$$K(t+1) = (1-\tau)Y(t), \quad (3)$$

and the input of public capital in the next period is:

$$G(t) = (1-\delta)G(t) + \gamma I(t), \quad (4)$$

where $\delta$ is the rate of depreciation and $\gamma$ is the investment parameter which determines the share of the budget which is "effectively" used. $1-\gamma$ is the share of the budget which is "wasted" from the point of view of public capital. Some substantial interpretations of $1-\gamma$ will be proposed later. Parameters $\tau$, $\delta$ and $\gamma$ vary between 0 and 1.

Assume that the government can determine the values of $\tau$ and $\gamma$ under fixed $A$, so that $(\tau, \gamma)$ constitutes the space of policies. What are the combinations of these parameters which lead to sustainable economic growth in the long run? The answer depends partially (albeit significantly) on $A$. The form of this dependence was analysed via a computational experiment[17]; Figure 2 presents the results. In other words, the increase in TFP broadens the space of successful policies.

Another effect of TFP is revealed if the model above is interpreted in terms of the conflicting interests of social groups. Recall that $\gamma I(t)$ is the share of the budget invested in public capital. What is the residual share of the budget $(1-\gamma)I(t)$? One interpretation is to associate it with the rent which is gained by actors involved in budget (re)allocation. To put it in other way, $(1-\gamma)I(t)$ can be regarded as the share of the budget that is "privatized" by public officials (government and/or bureaucracy); they comprise an interest group called "rentiers" for brevity of presentation[18]. The utility function of a representative individual from rentiers is

$$U_R = \sum_{t=1}^{\infty} \sigma^{t-1}[(1-\gamma)I(t)],$$

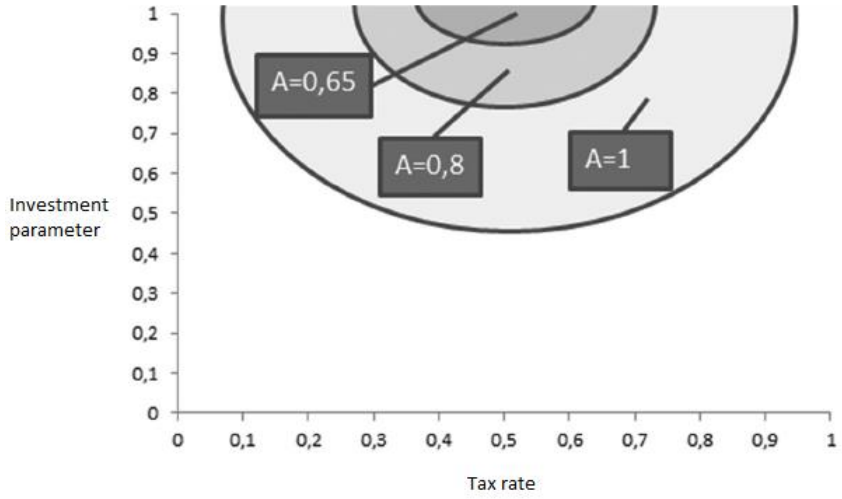
where $\sigma$ is the discount factor for rentiers[19].

Consider another group which is interested in the increase of private capital input $K$. In what follows, they are called "capitalists". The utility function of a representative capitalist is given by:

$$U_C = \sum_{t=1}^{\infty} \psi^{t-1} K(t),$$

*Figure 2. The space of policies leading to the long run growth*[20]

[17] Ахременко А.С., Локшин И.М., Юрескул Е.А. Op. cit.
[18] The assumption that no share of the rent returns to the budget is an obvious simplification of the model; however, it does not affect the interpretation of TFP and therefore can be tolerated in this paper.
[19] Ахременко А.С., Локшин И.М., Юрескул Е.А. Op. cit., с. 59.
[20] Source: Ахременко А.С., Локшин И.М., Юрескул Е.А. Op. cit., с. 58.




where $\psi$ denotes the discount factor for capitalists[21].

As long as capitalists and rentiers have different utility functions, their optimal combinations of $\tau$ and $\gamma$ may differ from each other's. An obvious question for political scientists is to what extent they differ depending on various parameters of the model. Once again, the analysis shows[22] that the distance between the optimal points of capitalists and rentiers in the policy space ($\tau$, $\gamma$) heavily depends on $A$. This fact is illustrated on Figures 3, 4 and 5 that are obtained under the assumption that $\sigma = \psi$.

In Figures 3–5, the cross denotes the optimal combination of $\tau$ and $\gamma$ for the maximum growth of the economy, the triangle stands for the optimal point for capitalists and the square represents the optimal point for rentiers. The grey zone comprises all points which allow for long run growth under the given conditions.

As Figures 3–5 show, the increase in $A$ is linked with three effects: 1) the convergence of the optimal points for capitalists and rentiers; 2) the broadening of the space of successful policies; 3) the decreasing distance between the optimal points for group interests and maximum growth.

These effects of TFP can be amplified or weakened depending on the value of the discount factor: the closer it is to 1, the more pronounced are these effects.

TFP seems to make the economy more robust to suboptimal decisions, and facilitates the choice of policies which are acceptable for both interest groups.

*Figure 3. Optimal combinations of $\tau$ and $\gamma$ for capitalists, rentiers and maximum growth, $A$ = 0,5*[23]

[21] Ibid.
[22] Ахременко А.С., Локшин И.М., Юрескул Е.А. Op. cit.
[23] Source: Ibid., с. 62.

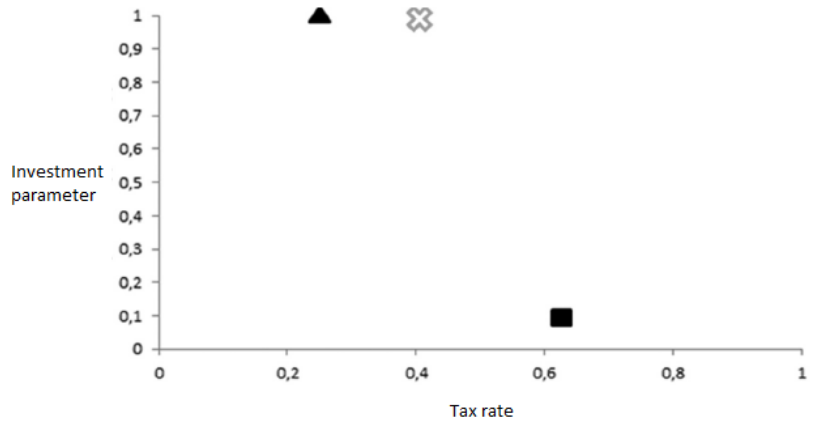



*Figure 4. Optimal combinations of $\tau$ and $\gamma$ for capitalists, rentiers and maximum growth, $A = 0.65$*[24]

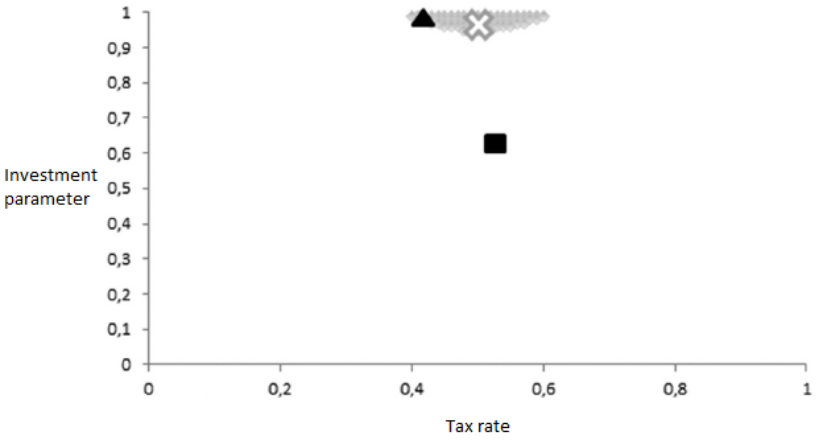
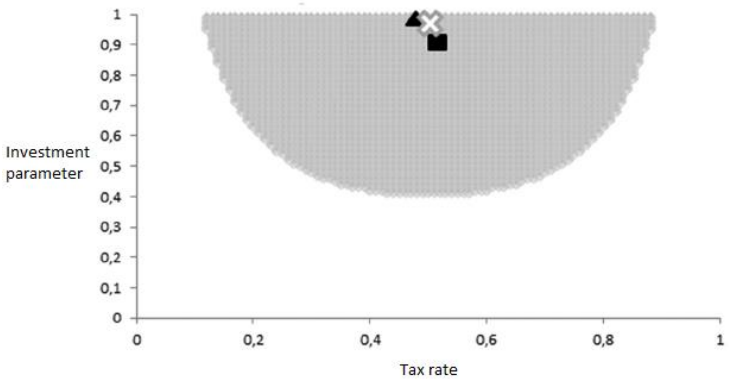



*Figure 5. Optimal combinations of $\tau$ and $\gamma$ for capitalists, rentiers and maximum growth, $A = 1$*[25]




## III. The linkages between IPF and TFP

[24] Source: Ibid., c. 64.
[25] Source: Ibid., c. 65.

The models described above have quite deep connections and similarities. In the framework proposed by Djankov et al. the space above the IPF constitutes the space of institutional choices which are achievable; the IPF which is close to the origin allows for more relatively successful institutional choices. In the second model there is an analogue of the space of successful institutional choices, namely, the space of successful policies. That space is determined, among other factors, by TFP. A comparison of the models suggests that, if it could be shown that two said spaces are closely connected to each other, TFP may be regarded as a factor influencing the closeness of the IPF to the origin.

One way of revealing such a connection is to associate the trade-off between dictatorship and disorder with interest groups which have been designated in the discussion of the second model. It is reasonable to assume that public officials who control the redistribution of the budget represent the pole of dictatorship: if they are not restrained in the pursuit of their interests, the scope of regulation and "state abuse" would be so high that the term dictatorship would seem suitable. On the other hand, capitalists can be considered as an interest group which aspires to restrict state regulation (though not necessarily its complete abandonment) and, thus, to disorder. More than that, some subgroups of capitalists may be willing to maintain (quasi)anarchical disorder due to their comparative advantages following from the weak enforcement of property rights[26]. Such an interpretation urges a discussion of the social losses which are associated with the closeness to the poles of disorder and dictatorship. Indeed, social losses can be formalized with the help of the second model.

As far as rentiers represent the pole of dictatorship, there must be something in their interests that can be regarded as social losses due to dictatorship. An obvious candidate is the investment parameter $\gamma$ : the smaller it is, the smaller the share of the budget used in a way conducive to overall growth. On the other hand, social losses due to disorder should be linked to the interests of capitalists. To do that, we have to loosen the original and rather unrealistic assumption that capitalists maximize private capital and cannot cheat in any way; in fact, they may do that by not paying taxes and by trying to capture the state. In order to formalize the idea, we introduce the parameter $\theta$ which, if $\tau \geq \theta$, may be interpreted as the amount of unpaid taxes, if $\tau < \theta$ as the degree (more precisely, such a degree is expressed as $\theta - \tau$) to which capitalists manage to accomplish the state capture (i.e., in this case capitalists not only do not pay taxes but also privatize the part of the total output which should have been used for investment in public capital).

Another change in the initial model is concerned with the refinement of the utility functions.

While capitalists want to preserve more private capital under the assumption that they can hide the part of their taxes, they also have to take into account the effect that the underpayment may have on growth and, hence, on private capital in the current and/or subsequent period(s). The similar logic applies to rentiers: they have to pay attention to the effects of their actions on the current and/or next period(s).

[26] Sonin K. (2003). Why the Rich May Favor Poor Protection of Property Rights. *Journal of Comparative Economics, 31*, p. 715-731.

Prior to formalizing these assertions, it is reasonable to make some simplifying assumptions which hold both for capitalists and rentiers. First, assume that representative individuals from these interest groups have the opportunity to determine the values of parameters $\theta$ and $\gamma$ in each period separately. Second, assume that those parameters depend on each other (they both affect total output) and, hence, it is possible to think about their decisions in terms of strategic behaviour and game theory. Third, assume that the game is sequential and its timing is established as follows: $\theta_0$ and $\gamma_0$ are set exogenously (by "nature"), then rentiers fix $\gamma_1$ depending on $\theta_0$, then capitalists set $\theta_1$ depending on $\gamma_1$ and so forth; generally, $\theta_{t-1}$ influences $\gamma_t$ which, in turn, influences $\theta_t$. Third, assume that representative individuals determine $\theta_t$ and $\gamma_t$ *during* the period $t$, so that they do not know the exact total amount of output in that period and make decisions on the basis of the *expected* total output. Fourth, let representative individuals estimate the influence of their decisions in period $t$ for the total output in the same period only and not further. Fifth, and this assumption seems to be most restrictive, assume that the expected total output in the period $t$ is not considered by rentiers and capitalists as a function of either $\theta_t$ or $\gamma_t$; however, the severity of this assumption is mitigated in two ways: 1) in the utility functions that follow, we presume the quasi-dependence of the expected total output on $\theta_t$ and $\gamma_t$ because they interact with each other via multiplication, so that a change in those parameters influences the benefits (losses) of the change in the expected total output; 2) total output depends on factors such as TFP and the tax rate much more than on $\theta_t$ and $\gamma_t$.

Let the utility function of capitalists in the period $t$ be

$$U_t^c = (1-\tau+\theta_t)Y_{t-1} - \frac{\psi E_{Y_t}\theta_t^2}{\gamma_t^l}, \tag{5}$$

where $(1-\tau+\theta_t)Y_{t-1}$ is the amount of private capital in the period $t$, $\psi$ is the discount factor, $E_{Y_t}$ is the expected total output in period $t$, $l$ is the elasticity parameter which determines the extent to which capitalist utility is affected by $\gamma$, $l \in [0,1]$ and $\frac{\psi E_{Y_t}\theta_t^2}{\gamma_t^l}$ are the discounted losses[27] due to the underpayment of taxes in the current period.

The optimal value of $\theta_t$ which maximizes[28] $U_t^c$ is:

$$\theta_t^* = \frac{\gamma_t^l Y_{t-1}}{2\psi E_{Y_t}} \tag{6}$$

Thus, $\theta_t^*$ may be regarded as a proxy for social losses due to disorder in period $t$.

[27] The actual formula for social losses based on formulas (1-4) can be obtained quite easily, however, it is much more cumbersome. The simplified version proposed in the main text is in compliance with the general consequences that would follow from the use of the "real" formula for social losses but it is significantly more comfortable for the analysis.

[28] Obviously, the second derivative is negative, hence, we have the conditions for maximum.

A proxy for the social losses due to dictatorship in the same period can be obtained in a similar way. The utility function of rentiers may be approximated[29] by:

$$U_t^r = (1-\gamma_t)(\tau-\theta_{t-1})Y_{t-1} - \frac{\sigma(1-\gamma_t)^2 E_{Y_t}}{(1-\theta_{t-1})^m}, \quad (7)$$

where $m \in [0,1]$ is the elasticity parameter and $\frac{\sigma(1-\gamma_t)^2 E_{Y_t}}{(1-\theta_{t-1})^m}$ is the discounted losses for rentiers in the next period due to opportunistic behaviour.

The optimal[30] value for $1-\gamma_t$ is:

$$1-\gamma_1^* = \frac{Y_{t-1}(\tau-\theta_{t-1})(1-\theta_{t-1})^m}{2\sigma E_{Y_t}}. \quad (8)$$

As formulas (6) and (8) suggest, the social losses due to disorder and dictatorship depend on the ratio $\frac{Y_{t-1}}{E_{Y_t}}$; but notice that, in expanded form, this ratio equals $\frac{A_{t-1}\sqrt{K_{t-1}G_{t-1}}}{E_{A_t\sqrt{K_tG_t}}}$ (provided that $\alpha = 0,5$), so that the expected changes in TFP matter: the expected increase in TFP diminishes social losses at both poles of the disorder-dictatorship continuum.

Thus, there is a twofold linkage between TFP and the IPF. Firstly, TFP can be regarded as a factor determining the closeness of the IPF to the origin. Secondly, TFP influences the scope of social losses, hence, the fit of the IPF to the total loss minimization line (see Figure 1) depends on TFP.

Is it reasonable to discuss the social losses from institutional choices in terms of a specific economic parameter such as TFP? This question is concerned with the very foundation for comparisons between two theoretical frameworks. It may seem, the answer should be negative because often TFP is interpreted as a "technical" parameter which does not have much to do with the broad social infrastructure and the workings of social institutions. However, this assertion can be challenged both on theoretical and empirical grounds. The analysis presented above should be built into the literature on the nature of TFP and the fundamental prerequisites of long run economic growth and development. In the next section, I will attempt to draw some conclusions about the boundaries between different interpretations of the nature of TFP.

## IV. Discussion

The parallels drawn above between two theoretical frameworks may be useful in two respects. First, they may be conducive for building a bridge between hitherto distinct research fields, one concerned with the attempts to "decipher" TFP and the other regarding the fundamental differences in the quality of institutions in societies. Moreover, the sketch of

[29] As in the previous case, the precise formula can be deduced with no difficulty but it has too bad properties to be used in the following analysis.
[30] The second derivative is evidently negative, so that the conditions for the maximum hold.

formalization presented above may be helpful to translate "qualitative" argumentation about social losses and the disorder-dictatorship space into more rigorous language, though with necessarily simplifying assumptions. Finally, the effect of TFP, concerned with the broadening of the space of successful policies, has parallels not only in the framework of Djankov and et al. but also in the assertion of North et al. about long run growth, arguing that the dynamic of economic growth in developed countries is characterized not by relatively fast growth but with growth which is relatively stable[31]. This is precisely the effect of sustainability which is associated with high TFP. So, through the notion of TFP, the agenda of New Comparative Economics presented in Djankov et al. may be linked to the agenda of institutional economics developed in North et al.

Second, the considerations from the previous section shed light on the nature of TFP. Due to the "residual" character of TFP, it is not clear how it can be interpreted in substantial terms. The obscurity of the essence of TFP is in conflict with its importance for growth: there are serious reasons to consider TFP a major determinant of economic development and a factor which influences the main differences between economic performance across countries[32]. Not surprisingly, economists acknowledge the need for the consistent theory of TFP[33].

What implications for TFP can be drawn from the preceding analysis? First, recall that the social losses due to both disorder and dictatorship are dependent on the ratio of $A_{t-1}$ and the expected $A_t$. Taking into account the utility functions of capitalists and rentiers given as (5) and (7), one can conclude that $A_{t-1}$ is associated with the gains from "opportunistic behaviour", i.e., increasing $\theta_t$ and $1-\gamma_t$ respectively, while the expected $A_t$ partially determines the losses from "opportunistic behaviour" due to the reduction in the size of total output as public good *sui generis*. Hence, the ratio $\frac{A_{t-1}}{E_{A_t}}$ affects the relative attractiveness of "opportunistic behaviour". The expected increase in TFP makes it more reasonable for individuals to contribute to the "public good" of total output rather than to their own enterprise which is in conflict with the overall growth.

Consequently, in the framework presented above the increase in TFP mitigates the severity of the prisoners' dilemma: it stimulates actions which are beneficial for society as a whole. However, such an effect is traditionally associated with the notion of social capital[34]. The analogy between the effects of social capital and TFP paves the way for linking these concepts with each other. Although such a conclusion is clearly built upon a weak analogy, it is strengthened by another similarity between the theories covered in sections II.1 and II.2.

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[31] North D., Wallis J., Weingast B. (2009). *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge: Cambridge University Press, p. 6.

[32] Easterly W., Levine R. (2001). It's Not Factor Accumulation Stylized Facts and Growth Models. *The World Bank Economic Review, 15*(2), p. 177-219.

[33] Prescott E. (1997). *Needed: A Theory of Total Factor Productivity*. Retrieved June 29 2015 from Federal Reserve Back of Minneapolis, https://www.minneapolisfed.org/research/sr/sr242.pdf.

[34] Putnam R. Op. cit.; Fukuyama F. (1995). *Trust*. New York: The Free Press. Luigi Guiso and coauthors refine the notion of social capital by introducing the concept of civil capital which has basically the effect mentioned in the main text above; as they state, civic capital may be defined as *"those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities"* (Guiso L., Sapienza P., Zingales L. (2010). *Civic Capital as the Missing Link*. Retrieved September 18 2015 from NBER Working Papers, http://www.nber.org/papers/w15845.pdf.

Recall that there is a connection between the space of successful institutional choices in the framework proposed by Djankov et al. on the one hand and the space of successful policies in the theory centred around TFP on the other. The size of the space of successful institutional choices is said to be dependent upon civic capital[35]; the size of the space of successful policies in the second model is dependent upon TFP, as is shown in Figure 2. Thus, it is possible to presume a close link between TFP and civic capital, with the latter a refined version of the notion of social capital[36]. Once again, the interpretation of TFP suggests the importance of positive social bonds and social embeddedness which, in turn, may comprise an important part of "social infrastructure" which is conducive to long run growth[37]. Some evidence substantiates the hypothesis that aspects of social capital and social embeddedness, such as trust, are an important source of economic growth[38].

However, this is not the only interpretation of TFP which is concerned with aspects of social infrastructure and deep cultural characteristics. Other perspectives consider "the effectiveness of resistance to the use of better technologies"[39] as an essential feature of TFP and thereby stress "the innovative spirit" as the driving force behind the growth of TFP. At the same time, "the innovative spirit" operates at the heart of the capitalist system: as Schumpeter pointed out in the passage about "creative destruction", "the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates"[40]. One can single out at least two conditions which form "the innovative spirit": economic and political institutions (such as the protection of property rights and the set of laws that create conditions for economic competition) which preserve and foster stimuli for innovative behaviour; and the cultural environment, which creates and encourages such stimuli.

The latter assertion is problematic because the fundamental stimuli for economically innovative behaviour can be attributed to nature rather than to culture, in a way similar to Adam Smith's conclusions about the universal and natural "propensity to truck, barter, and exchange one thing for another"[41]. However, there are strong grounds to believe that it is the cultural environment, not nature, which plays the main role in creating basic stimuli for economic innovation. For instance, personal gain and economic interest, though they may be regarded as embedded in human nature, had to obtain cultural approval or even be invented as distinct psychological forces to become the major driving force behind the aspiration to innovate[42]. The

[35] Djankov S., Glaeser E., La Porta R. et al. Op. cit.
[36] Guiso L., Sapienza P., Zingales L. Op. cit.
[37] Hall R., Jones C. (1999). Why Do Some Countries Produce So Much More Output Per Worker Than Others? *The Quarterly Journal of Economics, 114*(1), p. 84.
[38] Bjørnskow C., Méon P.-G. (2013). Is Trust the Missing Root of Institutions, Education, and Development? *Public Choice, 157*: 641-669; Knack S., Keefer P. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics, 112*(4), p. 1251-1288; Tabellini G. Op. cit.; Tabellini G. (2010). Culture and Institutions: Economic Development in the Regions of Europe. *Journal of the European Economic Association, 8*(4), p. 677-716.
[39] Prescott E. Op. cit.
[40] Schumpeter J. (2003). *Capitalism, Socialism and Democracy*. New York: Routledge, p. 82-83.
[41] Smith A. (2008). An Inquiry into the Nature and Causes of the Wealth of Nations. Oxford: Oxford University Press, p. 21.
[42] As Robert Heilbroner put it, "it may strike as odd that the idea of gain is a relatively modern one; we are schooled to believe that man is essentially an acquisitive creature and that left to himself he will behave as any self-respecting businessman would. The profit motive, we are constantly being told, is as old as man himself. But it is not. The profit motive as we know it is only as old as "modern man" (Heilbroner R. (1999). *The Worldly Philosophers: The Lives, Times, and Ideas of the Great Economic Thinkers*. New York: Simon and Schuster, p. 24). The "invention" of the notion of economic interest is traced in Hirschman A.

equally important observation is that such stimuli are centred around individualistic aspirations; the point is illustrated by the very concept of *homo economicus* which underlies neoclassical economic theory (though it may be too simplified to reflect real human behaviour, the basic intuition stresses the importance of self-interest as a "passion" which drives economic competition and innovation). Recent research also bolsters the significance of the cultural individualistic environment for growth: it is argued that "countries with a more individualist culture have more innovation, higher productivity and higher long run growth than countries with a more collectivist culture"[43]. To sum up, "the innovative spirit" which seems to be a fundamental feature of TFP may be associated with individualistic culture and aspirations to innovate which take their origin in economic self-interest.

Thus, there are two perspectives which associate TFP with cultural characteristics: the first associates TFP with social capital and social embeddedness, while the second posits individualistic stimuli at the heart of the cultural dimension of TFP. The problem is that these two perspectives seem to contradict each other: individualistic culture is usually interpreted as the opposite of social embeddedness[44] and the latter (even under the name of social capital) may imply serious limitations for pursuing individualistic goals due to the practice of sharing benefits with members of the same social group[45]. It may be argued, however, that the network structure of society, cooperation and a better spread of information are associated with social capital and therefore they are clearly conducive to innovation[46]. This perspective, however, simplifies the problem: first, high social capital *inside* established groups may have a reverse side and may imply weak ties *between* groups[47] thereby restricting cooperation and the spread of information in society as a whole; second, it is not at all clear why potential innovators may be ready to share their insights and resources with other individuals and groups; anecdotal evidence may be drawn from the early history of modern mathematics: many scholars were very reluctant to share their discoveries with colleagues; this reluctance underlies the dramatic history of obtaining the formula for the solution of cubic equations[48], the decline in the relationship between the Bernoulli brothers[49] and the inclination of Pierre de Fermat to hide his methods of solutions and proofs is notorious. In other words, social capital may indeed foster innovations but it is far from clear under what conditions social capital emerges in the context of interactions between innovators.

Nevertheless, it is possible that both perspectives on TFP are partially true. Perhaps, it is this difficult, somewhat paradoxical combination that conditions the economic success of Western countries on the fundamental level of cultural values and dispositions. To inscribe the problem in a broader context, consider a crude typology of societies (Table 1).

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[47] For negative effects of social capital, see Portes A. Op. cit.

[48] See the story of Girolamo Cardano: Гиндикин С.Г. (2006). *Рассказы о физиках и математиках*. М.: МЦНМО, с. 13-44.

[49] Weisberg H. (2014). *Willful Ignorance: The Mismeasure of Uncertainty*. Hoboken: Wiley, p. 76.

*Table 1. Cultural characteristics and types of societies*

| | | **Social capital and social embeddedness** | |
|---|---|---|---|
| | | *High* | *Low* |
| **Socially approved individualistic values** | *High* | Contemporary Western societies | Societies under "wild capitalism" |
| | *Low* | Traditional societies | Anomic societies |

Socially approved individualism without the balancing effect of tight social bonds may be destructive and imply high social costs, as occurred during economic transitions in a number of post-communist countries or during the era of weakly restrained capitalistic competition in the nineteenth-century West[50]. Traditional societies which comprise the major share of the Third World are less economically successful because of bad institutions[51], unfavourable natural conditions[52], or other reasons which may include fundamental features of the social infrastructure and peculiarities of the cultural environment. The strange dual nature of TFP seems to be associated both with individualistic "innovative spirit" and collectivistic mechanisms of solving social dilemmas; this paradoxical combination highlights a number of problems which appear quite marginal for research on the long run growth. Which social ties are compatible with individualistic stimuli lying behind competition and innovation on the micro-level? Under what conditions does individualistic culture bring about innovative behaviour fostered by (quasi)collectivistic social practices? Questions of this sort which go beyond the conventional discourse centred around stimuli-preserving institutions (such as secure property rights) may be quite important for a better understanding of the idiosyncratic Western experience lying at the heart of its impressive economic growth during the last 150 years. These investigations may be intimately connected with clarifying the nature of TFP.

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