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## An Analysis of the Effect of Government Effectiveness on the Aggregate Level of Entrepreneurial Activities

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*Abstract:* A level of entrepreneurial activities is widely considered as one of the key characteristics of economy in the context of economic development. However, empirical evidence and theoretical models failed to achieve a consensus with regard to the mechanism underlying existence of a certain level of entrepreneurial activities. This thesis, based on the extensive matching theory literature, considers a level of entrepreneurial activities through the labour market theory. To be more precise, a choice between seeking an employment as a worker or creating a number of vacancies, depending on the individual characteristics, thus becoming an entrepreneur, is considered. Therefore, this 'mechanism' is expected to account for a certain level of entrepreneurial activities which exists in the economy. Based on obtained theoretical results, an empirical analysis is conducted in order to empirically support the results.

*Key words:* Entrepreneurial activities, entrepreneurship, institutions, government quality, matching model, labour market.

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## 1. INTRODUCTION

The issue of entrepreneurship is widely discussed in the literature because it is usually closely related to a number of urgent issues including economic growth. In particular, several endogenous growth models were presented where a level of entrepreneurial activities was defined as a key component of economic growth (King & Levine, 1993). Wennekers and Thurik (1999) emphasised not only the role of entrepreneurship in the economic growth but also highlighted it as an important factor in the context of social policies such as a measure for reducing unemployment. However, an effect of entrepreneurship on economic growth remains ambiguous and no consensus has been achieved. In particular, Acs and Szerb (2007) argue that an importance of entrepreneurship for the country is highly dependent on the public policy conditions. Carree and Thurik (2003) emphasised also that consideration of entrepreneurship without fundamental understanding of underlying incentives to open a business might be a misleading link to the issue of economic growth. Wong, Ho and Autio (2005) considered entrepreneurship through an innovation process in line with the theory of Schumpeter. It is argued that a connection between economic growth and entrepreneurship remains ambiguous as it is dependent on whether the entrepreneurs actually support the innovation process or just balance demand and supply in the case of market disequilibrium. As it can be seen from the literature discussed here, there is no clear consensus whether entrepreneurship should be considered as a prerequisite for economic growth. However, it can be argued that it is an important factor that cannot be neglected. Furthermore, the issue of entrepreneurship is important not only from the perspectives of economic growth but also from the perspectives of social policy.

This thesis will be focused on aggregate entrepreneurial activities which are considered as a process of creating vacancies. However, the main theme of the paper is not linked to the consequences but rather to the determinants of its existence. In particular, a literature review presented in the next section identifies an existing gap which relates to an absence of a systematic theoretical framework that can match the empirical evidence. In particular, it is hypothesised that this is quality of government which plays an important role. To be more precise, an ambiguous effect of such factors as liquidity constraints and taxation is believed to be explained by the varying government effectiveness which, in turn, affects collection of taxes and provision of public goods, thus altering expected profitability of the entrepreneurs and the workers on the labour market. It seems also important to mention that this thesis will treat such

terms as government effectiveness, institutional quality and quality of government as ‘full’ synonyms.

According to the purpose of the research and in line with the works that are chosen as a benchmark for obtaining theoretical results, the entrepreneurship is considered as an indispensable part of the labour market. To be more precise, it is believed that an individual chooses to be an entrepreneur only if expected profitability with respect to personal initial conditions (entrepreneurial ability and initial wealth) is higher than expected profit that would have been earned if employment as a worker was chosen. It seems important to note, however, that theoretical and empirical analysis conducted within this paper is connected based on the assumption that a number of entrepreneurs changes with the same tendency as a number of vacancies created. In other words, it is assumed that a number of entrepreneurs is not the same as a number of vacancies created in the model but these parameters moves together since more individuals choose entrepreneurial path, the more vacancies are created in the economy. Therefore, it can be said that a number of created vacancies plays a role of a proxy for a level of entrepreneurial activities within the scopes of further theoretical analysis in this paper. Such an assumption provides a connection between theoretical and empirical parts of the research. In particular, the theoretical part considers creation of vacancies in the economy which is dependent on how many individuals find it profitable to become an entrepreneur compared to being a worker, based on their entrepreneurial ability, initial wealth and economic conditions to be discussed further, whereas the empirical part focuses on a number of entrepreneurs in the economy based on data from the Global Entrepreneurship Monitor surveys. Therefore, theoretical and empirical parts complement each other according to the purpose of the research.

To sum up, this paper is expected to enrich understanding of factors and mechanisms underlying a particular level of aggregate entrepreneurial activities within the economy. In particular, the urgency of the research is justified by the absence of a theoretical model which is supported by empirical evidence, and can capture systematic features of the labour market while taking into consideration the government as an indivisible agent, which affects the economic environment through tax collection and public expenditures. As a result of the thesis completion, the following research question will be answered: does government effectiveness play an important role in the economic environment in which a level of aggregate entrepreneurial activities is endogenously determined. In addition, empirical analysis using an econometric model will be conducted in order to assess the extent to which the theoretical model captures the reality.

According to the purpose of the research, the structure of the paper will be as follows: the second chapter provides a brief literature review that helps to identify the research gap; the third section

describes theoretical results of the extended model which was based on the model by Kolakez and Legmann (2010). The chapter four attempts to provide empirical analysis based on the results of the theoretical model in order to assess whether empirical evidence actually matches the theoretical conclusions. The fifth chapter discusses a contribution to the existing literature that stems from the results obtained in this paper and emphasises weaknesses of the research, which also leave the scopes for the future research in this field. The final section concludes.

## 2. LITERATURE REVIEW

As the introduction to this thesis suggests, entrepreneurship was widely discussed as a complex phenomenon. Nevertheless, it is believed that further contribution to the literature is required, based on the identified gap in the literature. Therefore, before proceeding to the analysis and the discussion of the literature particularly related to the issue aimed to be addressed within this research, it seems worth to start off with a definition of entrepreneurship. Many research fields such as economics, psychology, business studies, sociology, etc., considered entrepreneurship as a social phenomenon. However, there is no consensus in the literature with regard to the questions of how entrepreneurship should be defined, which resulted in existence of a number of proposed definitions. Therefore, some of them will be considered in this section below.

The literature which considers different aspects of existence of entrepreneurship might be stratified as economic and organisational approaches (Storey & Greene, 2010). Within the former approach a number of key components are emphasised. Most of the works within this branch of literature agree on importance of arbitrage<sup>1</sup> in terms of imperfect information on the market. Knight (1921) considered willingness to decision making under uncertainty as a main attribute of entrepreneurs. Kihlstrom and Laffont (1979) emphasised a risk-loving nature of entrepreneurs which is a source of profit in terms of risk-premium. It is also an opinion that due to particular personal qualities required to run a business, only a fixed share of population can profitably play this role (Blanchflower & Oswald, 1998). A widely discussed theory of Schumpeter (1934) and Schumpeter (1942) emphasised an innovative nature of entrepreneurs who push the system out of the market equilibrium. In contrast, Kirzner (1973) supports a view that this is disequilibrium on the market which provides the scopes for entrepreneurial activities. Finally, operation of scarce resources in order to create value is widely considered as the main feature of entrepreneurship.

The organisational approach has resulted in existence of several definitions of entrepreneurship. Entrepreneurship is a process of innovation and creation of new ventures and ideas, hence increasing value of existing products and services was defined by Drucker (1985) and, Low and MacMillan (1988). Timmons (1997) paid attention to leadership qualities and a specific set of mind which distinguish entrepreneurs. Therefore, as it can be seen, the organisational approach focuses, mainly, not on the behavioural microeconomic foundation but rather on evolution of

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<sup>1</sup> There are spatial and temporal types of arbitrage defined in the literature.

organisational entities that stems from establishing a business. Hence, it defines a firm as not a realisation of an intention to profitably exploit own entrepreneurial ability, but rather as an organisational decision to extract rents from cooperation. In conclusion, although both approaches consider the same phenomenon, they not only define it differently but also emphasise different causes of emergence of entrepreneurship. Therefore, this thesis is more closely linked to the former economic approach as it focuses on economic conditions underlying a certain level of entrepreneurial activities rather than patterns of organisational behaviour.

Before proceeding further to the analysis of the literature which is relevant to the purpose of the dissertation, it seems worth to note that further discussion of the literature review will be focused on the so-called equilibrium level of entrepreneurial activities thus will neglect issues related to emergence of new businesses, growth and closures.

The model considered further will provide a fairly broad picture of entrepreneurship and underlying factors, therefore it seems expedient to consider the literature which pays attention to some of the factors which are worth to consider as determinants of the level of entrepreneurship. The first factor to be considered in the literature is macroeconomic conditions which certainly affect an environment which may be positive or negative for entrepreneurial activities. This group of factors includes interest rate (Storey & Greene, 2010), macroeconomic stability (Stiglitz, 2000), etc.

Another important factor, which is widely discussed, is taxation. An effect of taxation on the level of entrepreneurial activities remains ambiguous in the literature. On the one hand, it is argued that low tax rates imply more incentive to run a business. For example, Folster (2002) showed that a tax decrease would be accompanied by an increase in entrepreneurial activities for the case of Sweden. Moreover, the author argues that a fairly low growth rate of Swedish economy can be explained by high taxes which discourage entrepreneurship. In addition, it is emphasised that profit is the main source of investment, thus, excess tax burden implies reducing availability of financial resources which has negative consequences especially in the long-run (Michaelas et al., 1999). On the other hand, there is an opinion that higher taxes might have positive effect on entrepreneurship. As it is claimed by Schuetze and Bruce (2004), it provides scopes for tax avoidance and tax evasion. In addition, the question of the effect of taxation becomes even more ambiguous when taking into account tax progressiveness. Peter (2009) concluded that entrepreneurship and a level of the shadow economy are not only influenced by an average level of tax rates but also on the level of progressiveness. The author explains this by saying that various levels of complications in tax systems increase costs of compliance. In my view, another possible explanation is that progressive tax system usually discriminate richer

share of population which usually have more power and opportunity to evade taxes without punishment due to bribes. Therefore, as noted by the author, there is a process of transition from complexity to simplicity of tax systems among countries. However, at the same time, Peter (2009) claims that flattening of taxes plays a big role only in the short run while in the long run the effect dies out.

Another important factor is regulations which account for whether regulatory environment is favourable for business growth. This issue also remains controversial in the literature. On the one hand, it is claimed by Djankov (2002) that strict regulations discourage entrepreneurial entry. Nicoletti and Scarpetta (2003) concluded that higher regulations in EU usually are accompanied with worse business performance. On the other hand, Storey and Greene (2010) also emphasise that regulations are required for creating an environment for business growth and ensuring compliance with 'rules of the game'.

The effect of education on entrepreneurship was also widely considered in the literature. A significant positive effect of education is emphasised in several works. Based on the summary by Storey and Greene (2010), a number of possible channels of such an effect might be considered: enhance knowledge and skills required to run a business; selection mechanism among able and less able individuals; more educated individuals usually have better access to the source of finance; etc. Nevertheless, as it is also said by Storey and Greene (2010), a number of empirical works such as Davidsson (2006) and Van der Sluis, Van Praag, and Vijverberg (2008) concluded that such effects are insignificant to be considered.

A number of empirical works attempted to define another factors which accounted for a decision to become an entrepreneur, thus affecting the level of entrepreneurial activities in economy. Amit, Muller and Cockburn (1995) considered opportunity costs of being employed as a worker rather than entrepreneur as the main factor in the decision making process. In particular, an empirical analysis of the labour survey data suggests that those who become entrepreneurs experienced 10,5% lower average wage than those who stay within the 'employee status'. Possible critique which arises with regard to such results is that it does not necessarily show any causality channel. In addition, it is unlikely that only wage difference accounts for the choice of being entrepreneur while missing issues related to entrepreneurial environment and other non-wage factors such as burdensome procedures which hinder an establishment of the business.

An importance of understanding the roots of entrepreneurship was emphasised by Blanchflower and Oswald (1990). The paper focused on understanding an effect of capital constraints and inherent wealth as the main determinants for the youth population within the National Child Development Study dataset. To be more precise, the results suggest a significant effect of the

capital constraints which is in line with the theoretical discussion by Evans and Jovanovic (1989). In addition, the empirical results show that those who received 5000 pounds initial wealth endowment are 50% more likely to be involved in entrepreneurial activities.

Such factors as entrepreneurial ability and risk aversion were considered by Van Praag and Cramer (2001) as those which play important role in distinguishing entrepreneurs from the employees on the labour market. Such results are explained within a general equilibrium model followed by the empirical consideration. In particular, empirical evidence for the case of Netherlands suggests that risk aversion is the main obstacle for being an entrepreneur since entrepreneurial activities usually involve higher extent to uncertainty compared to being a worker, which is in line with the ideas of Marshall and Schumpeter. In addition, it is also found that an appropriate level of entrepreneurial ability is required to profitably run a business. The main critique that is pertained to the consideration of entrepreneurial ability is that it is unclear what entrepreneurial ability actually is, since a number of authors considered general intelligence as an equivalent to such as ability, whereas others emphasised specific nature of the entrepreneurial skills, which cannot be learnt but rather are inherited. Therefore, a consideration of the entrepreneurship purely within the scopes of entrepreneurial ability seems to pertain more to the philosophical discussion rather than rational economic decision making theory.

One of the issues apart from motives for being an entrepreneur that attracted much attention is whether entrepreneurship is actually more profitable than regular employment. With this in mind, Hamilton (2000) investigated distribution of entrepreneurial earnings. The results clearly display the fact that nascent entrepreneurs have on average 25% lower wage compared to an entry position as a worker. In addition, this evidence seems even more striking while accounting for the fact that nascent entrepreneurs are prone to higher wage shocks as they do not usually have adequate risk insurance (health insurance, for instance). A number of limitations with regard to this paper relate to the fact that it does not shed light on why the entrepreneurs actually choose this career path if it involves a higher level of risks and lower expected wage on the earlier stages. Therefore, it is suggested that a number of factors such as entrepreneurial ability, risk aversion and various value of initial wealth endowment might be considered.

As it seems clear from the research goal and methods advertised to be employed, it seems expedient to dedicate time to take a look at the literature which applies matching model theory to the field of labour market. Nowadays unemployment theory mainly exploits the grounds laid by Mortensen and Pissarides (1999) and Pissarides (2000) who proposed matching models as a powerful tool for analysis. The theory assumes that labour market behaviour and, hence entrepreneurship, is dependent on a number of individuals who decide to create vacancies

(become an entrepreneur) and, a number of individuals who are willing to fill the vacancy. However, a number of matches between created vacancies and perspective workers are dependent on the matching function<sup>2</sup> which describes the rate of filling the vacancies. This rate is dependent on the ratio of vacancies to a number of people who look for a job. Imposing the equilibrium conditions allows obtaining an equilibrium level of unemployment, employment and a level of entrepreneurial activities. Nevertheless, as it can be noted, such a theory does not account for factors which were mentioned earlier in the literature review. Therefore, a number of works such as Lisi and Pugno (2010), and Boeri and Garibaldi (2005) augmented a baseline approach where entrepreneurs not only restricted in terms of ability to propose innovations and manage people, which is called ‘entrepreneurial ability’, but also taking into account heterogeneity in the distribution of such abilities. As it was mentioned above, Evans and Jovanovic (1989) emphasised an importance of the liquidity constraints with the theoretical model and empirical analysis. In particular, the results suggest that imperfect credit markets bind financial opportunities of people to being only approximately one and a half times higher than their initial wealth.

Fairlie and Krashinsky (2012) attempted to challenge the widely mentioned hypothesis of an crucial role of liquidity constraints. In particular, it was assumed a positive relationship between assets and self-employment as a support for the existence of the liquidity constraints. However, empirical results rejected this hypothesis.

Influential paper by Ghatak and Jiang (2002) considered an effect of inequality on the occupational choice within the theoretical model. In particular, it is shown that absence of the credit market makes income inequality more severe in terms of occupational opportunities even if an individual has high ability for entrepreneurship. It is also shown that a higher extent to inequality in initial wealth has significant negative consequences for economic growth because due to very limited number of those who can actually be an entrepreneur and absence of selection by ability, the economy is trapped in a ‘bad equilibrium’.

Blancháower and Oswald (1998), and Kolakez and Legmann (2010) also included financial restrictions into consideration which possibly affect a decision to enter labour market as an entrepreneur or employee and, stem from imperfect access to a financial market within the matching model approach. In particular, Kolakez and Legmann (2010), using all these augmentations to the baseline matching model, discuss the cases of socially non-optimal outcomes when credit constraints make it more profitable for low-ability but high-capital endowed individuals to become entrepreneur, whereas it is rational for high-ability but low

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<sup>2</sup> Cobb-Douglas function form is widely accepted to be used as it more closely matches the empirical evidence

capital-endowed individuals to enter a labour market as employees whereas social optimality implies to be vice versa. Such a model will provide the basis for the theoretical consideration further in this paper, therefore will be discussed in more details in the section 3.

To sum up, this chapter discussed the existent literature which considers a definition of the entrepreneurship and factors underlying a certain level of entrepreneurial activities within the economy. As a result, a number of factors such as financial constraints, ability, wealth distribution, taxation, labour market condition, etc. are considered. However, hardly any work considered a systematic effect both empirically and theoretically. In addition, a number of works found controversial evidence of the effect of certain factors on the level of entrepreneurial activities. As it was mentioned in the previous chapter, it is government effectiveness which, presumably, determines appropriateness of the environment for development of entrepreneurial activities. Therefore, the following chapters will proceed with systematic theoretical and empirical analysis of the issue of interest.

### 3. THEORETICAL ANALYSIS

#### 3.1. Description of the Benchmark Model

As it was mentioned in the literature review, such phenomenon as entrepreneurship has been a subject to research within the framework of various models. Some of the models included a number of the factors that bring about a certain level of entrepreneurship or entrepreneurial activities<sup>3</sup> within the country. Furthermore, a wide range of theoretical approaches were employed to address the issue. However, as it was mentioned earlier, this thesis suggests that a matching model approach seems to be the most appropriate way to proceed along in this research because it allows considering the labour, unemployment and entrepreneurs (vacancies created by entrepreneurs) as a complex and interdependent system which, in turn, is dependent on economic conditions which determine profitability and expediency of being self-employed. Before proceeding to a further discussion, it is important to note that the benchmark model used in the analysis is focused not on the aggregate entrepreneurial activities within the economy but rather the mechanism underlying the decision to become entrepreneur. However, in order to explain the level of entrepreneurial activities, it seems important to understand the underlying decision making process for which purpose the theoretical framework suggested by Kolakez and Lehman (2010) seems to be ideal. As it was mentioned earlier, this thesis argues that, in the case of 'perfect' economic conditions, only those who have a required level of entrepreneurial abilities will enter the self-employment sector. However, existence of imperfect institutions, inefficient government, financial constraints and a significant level of income inequality are the main reasons for the 'distorted' incentives to become an entrepreneur. Therefore, this section will augment the theoretical foundation in order to theoretically support the logic presented here and provide systematic explanation of the mechanism underlying the incentives to become an entrepreneur under various levels of government effectiveness, financial constraints and wealth inequality, thus affecting aggregate entrepreneurial activities which are assumed to be displayed by a number of created vacancies. In particular, this subsection will present the benchmark theoretical model which seems to be the most promising to proceed further with the theoretical analysis. As it was mentioned before, such a model exploits the foundation of the matching

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<sup>3</sup> As it was mentioned before, this thesis treats the definition of entrepreneurship and entrepreneurial activities as closely related. In addition, being entrepreneur and creating a vacancy is assumed to be synonyms here also, which is in line with arguments of Lisi and Pugno (2010).

model proposed by Mortensen and Pissarides (1999), and Pissarides (2000). Therefore, it seems expedient to start off with a brief discussion of the matching theory.

The matching theory assumes that  $S$  is a share of individuals whose rational decision is to enter a labour market as a worker whereas  $1 - S$  is a share of individuals who decide to be entrepreneurs and create  $V$  vacancies. Therefore, matching functions denote a number of matches between vacancies and workers in the form constant return to scale function  $Q(S, V)$  which is continuously differentiable, increasing and concave in  $S$  and  $V$  (usually Cobb-Douglas form function is used). Therefore, labour market is characterised by ‘tightness’  $\theta = \frac{V}{S}$  which is the ratio of a number of vacancies to a number of individuals who look for a job, thus are willing to fill vacancies created by entrepreneurs. Therefore, a probability that a vacancy is filled by the workers can be described as  $\frac{Q(S, V)}{V} = q(\theta)$ . On the other hand, a probability that worker fills a vacancy is  $\frac{Q(S, V)}{S} = \theta \cdot q(\theta) = \alpha(\theta_i)$ , where the function  $\alpha(\theta_i)$  is positive, decreasing and convex. Such functions should satisfy Inada conditions<sup>4</sup> as it is widely accepted in the literature (Petrongolo & Pissarides, 2001; Lisi & Pugno, 2010; Stevens, 2007; Boeri & Garibaldi, 2006). Hence, it is possible to obtain value functions for both entrepreneurs and workers, which are expected profitability values for the corresponding type of employment.

It seems worth now to turn attention to the specific framework suggested by Kolakez, Legmann (2010). According to the model, a choice of the sector of employment (worker or entrepreneur) is based on the expected profitability of the corresponding sector which, as it was mentioned above, is described by the value functions:

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<sup>4</sup>  $\lim_{\theta_i \rightarrow 0} q(\theta_i) = \lim_{\theta_i \rightarrow \infty} \alpha(\theta_i) = 0$ ;  $\lim_{\theta_i \rightarrow \infty} q(\theta_i) = \lim_{\theta_i \rightarrow 0} \alpha(\theta_i) = \infty$ .

$$J^V = q(\theta) \cdot (y - w) - k \cdot (1 + r)$$

$$W_z^S = \theta \cdot q(\theta) \cdot w + z \cdot (1 + r)$$

where  $J^V$  – value of the filled vacancy (expected profitability);

$W_z^S$  – value of a vacancy for a worker;

$y$  – revenue generated by a filled vacancy;

$w$  – wage paid to a worker;

$k$  – capital required to create a vacancy;

$r$  – lending interest rate<sup>5</sup>;

$z$  – initial wealth.

Therefore, the formulas presented above suggest that a decision with regard to an occupational choice is dependent on tightness of the labour market, capital requirements, wage rate and capital costs (lending interest rate). An important parameter to be discussed separately is a wage rate which plays an important role in attractiveness of being a worker. In particular, in line with a common matching theory, wage setting is assumed to follow the Nash bargaining rule, which implies that wage is dependent on a bargaining power of workers in the form of  $\beta \in (0; 1)$ . Based on the Nash bargaining rule, the following equation is maximised with respect to  $w$ :

$$\max_w w^\beta \cdot (y - w)^{1-\beta}$$

The maximization problem thus yields to  $w = \beta \cdot y$ . Based on this transformation, the expressions for the value functions can be expressed as follows:

$$J^V = q(\theta) \cdot (1 - \beta) \cdot y - k \cdot (1 + r)$$

$$W_z^S = \theta \cdot q(\theta) \cdot \beta \cdot y + z \cdot (1 + r)$$

Apart from the factors discussed so far, each individual is characterised by the corresponding entrepreneurial ability  $\alpha$  and, as it was mentioned above, initial wealth  $z$ . Therefore, there are two main constraints that are faced by entrepreneurs. Firstly, this is entrepreneurial ability which is a maximum number of vacancies which can be created. Secondly, this is initial wealth which is related to credit constraints, since the real world credit market is imperfect. In particular, it is

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<sup>5</sup> Here lending interest rate is used because it generally represents actual costs of capital for those who borrow for the purpose of consumption or private investment, such as creating a business.

assumed that entrepreneurs can borrow up to  $\lambda \in (1; \infty)$  where  $\lambda=1$  corresponds to the case of absence of credit market or, in other words, the case when individuals can rely only on their own initial wealth. The case when  $\lambda=\infty$  corresponds a perfect credit market conditions, thus no financial constraints are faced by the individuals.

Therefore, an entrepreneur with corresponding parameters  $\alpha$  and  $z$  solves the following problem:

$$E_{\alpha,z} = \max_v v \cdot J^V + z \cdot (1 + r)$$

$$\text{s.t: } v \leq \alpha;$$

$$v \cdot k \leq \lambda \cdot z$$

Since it is suggested that  $J^V$  is always positive<sup>6</sup>, potential entrepreneurs will open as many vacancies as possible depending on their entrepreneurial ability and initial wealth constraints. To be more precise, as it was partially discussed above, initial wealth affects borrowing capacity of the particular person since one of the issues which is of interest here is capital constraints. Therefore, the following equation defines borrowing ability of the person in the economy:

$$\mu = \frac{\lambda}{k}$$

Hence, it is straightforward to show based on the discussion so far that an optimal number of created vacancies takes the following form:

$$v_{\alpha,z} = \min [\alpha, \mu \cdot z]$$

Substituting the equation for a number of vacancies yields to the following equation of the optimisation problem:

$$E_{\alpha,z} = \min [\alpha, \mu \cdot z] \cdot J^V + z \cdot (1 + r)$$

In order to proceed with further analysis, it is required to denote the ratio of expected gain of being a worker to the expected profitability of being an entrepreneur with one created vacancy:

$$\phi = \frac{W_z^S - (1 + r) \cdot z}{J^V}$$

As it is proved by Kolakez and Legmann (2010), the following requirements should be satisfied for the individual who choose to be an entrepreneur:  $\min [\alpha, \mu \cdot z] \geq \phi$ .<sup>7</sup> As it can be noted from the discussion so far, this ratio is dependent on tightness of the market, bargaining power of the workers, lending interest rate and capital requirements. Therefore, partial equilibrium can be

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<sup>6</sup> See Kolakez and Legmann (2010) for the proof and explanation.

<sup>7</sup> For the proof see Kolakez and Legmann (2010) p. 5-6.

obtained by extending the formula with the parameters of interest, which yields to the following equation:

$$\phi = \frac{\beta \cdot \theta \cdot q(\theta) \cdot y}{q(\theta) \cdot (1 - \beta) \cdot y - k \cdot (1 + r)}$$

The formulas obtained by Kolakez and Legmann (2010) and presented above suggest a number of observations. Firstly, tightness of the market negatively affects an incentive to become an entrepreneur ( $\phi$  increases). In addition, such parameters as bargaining power of workers, capital requirements and lending interest rate also negatively affect expected profitability of entrepreneurs compared to being a worker. In line with the discussion so far, it is possible to derive an equation for a number of workers in the economy:

$$S(\phi, \mu) = \int_{\alpha=0}^{\phi} \int_{z=0}^{\infty} f(\alpha, z) dz da + \int_{\alpha=\phi}^{\infty} \int_{z=0}^{\frac{\phi}{\mu}} f(\alpha, z) dz da$$

Applying the same logic, a number of vacancies created in the economy is determined by the following equation:

$$V(\phi, \mu) = \int_{\alpha=\phi}^{\infty} \left\{ \int_{z=\frac{\phi}{\mu}}^{z=\frac{\alpha}{\mu}} \mu \cdot z \cdot f(\alpha, z) dz + \int_{z=\frac{\alpha}{\mu}}^{\infty} \alpha \cdot f(\alpha, z) dz \right\} d \alpha$$

Therefore, based on the propositions and discussion so far, such formulas suggest that a number of workers in the economy is positively dependent on the ratio of profitability of being a worker to the expected vacancy profitability but depends negatively on  $\mu$ . In contrast, a number of vacancies created in the economy is negatively dependent on  $\phi$  but positively on  $\mu$ . It is explained by the fact that as worker-related profitability increases, more individuals choose to enter the labour market as workers, which, in turn, increases an aggregate level of entrepreneurial activities.

As it is clear from the discussion so far, Kolakez and Legmann (2010) provided a sound theoretical framework for understanding causes underlying a decision to become an entrepreneur, which, in turn, directly affect a level of entrepreneurial activities. In particular, the model allows investigating effects of financial constraints, labour market conditions and individual ability distribution on the entrepreneurial conditions within the economy. However, the model left institutional factor and government behaviour unaccounted which, presumably, have a significant effect on the aggregate level of entrepreneurial activities within the economy and, thus should be considered. Therefore, the next subsection will an extention in order to

provide a theoretical model which attempts to reflect the real processes underlying a certain level of entrepreneurial activities within an economy.

### 3.2. Extension of the Theoretical Model

As it was clear from the theoretical discussion so far, the model presented by Kolakez and Legmann (2010), which is, in turn, based on the matching theory of Pissarides, provides a promising theoretical foundation for understanding the nature of entrepreneurship and explains the differences in the level of entrepreneurial activities among countries with the help of imperfect credit market, which implies importance of initial wealth endowment. Therefore, it is suggested that wealth distribution in the society plays an important role to define how many vacancies can be opened taking into account available wealth and a fixed share that they can borrow. An interpretation of the results suggested by Kolakez and Legmann (2010) slightly differs from what is interpreted by this thesis. In particular, the focus of the benchmark model was mainly on the labour market outcomes in terms of employment, unemployment and created jobs in the economy. Taking into account an assumption that all the economies have roughly equal distribution of entrepreneurial ability in the society but vary in terms of wealth distribution, the results can be considered as a basis for considering entrepreneurial activities. In other words, it can be said that differences in a number of vacancies among economies is accounted by differences in a number of entrepreneurs. It means that a number of vacancies are treated as a proxy for a level of entrepreneurial activities since it is not an increase in ability of current entrepreneurs, which enable them to post more jobs, but rather changes in economic environment, which makes it more profitable to other individuals to become entrepreneurs and, thus, open vacancies.

However, as it was mentioned before, empirical evidence and various economic theories discussed in the literature review do not fully support the results of the model as it does not capture a significant part of the variation. Moreover, a number of studies suggested ambiguous results with regard to some of the variables such as wealth distribution and taxation. Therefore, this subsection is aimed at augmenting the benchmark model with a number of extensions that, presumably, will help to understand behavioural patterns underlying a certain level of entrepreneurial activities within an economy.

In particular, this thesis argues that it is governmental quality and institutions which account for environment and labour market, thus affect expected profitability and incentives to become an

entrepreneur. It is assumed in the model that a government plays a role of an agent which collects taxes from both entrepreneurs and workers, and, redistributes them via two channels: alleviating constraints and burdensome procedures by reducing capital required to establish a vacancy and, increasing profitability of a vacancy by way of investment in education, which, in turn, increases expected productivity of the worker who fills a created vacancy. However, as it was mentioned above, such expenditures are financed purely by means of taxes. Therefore, a possible ambiguous effect of taxation arises here. To be more precise, effectiveness of such investment in the form of return of paid taxes to the workers and entrepreneurs is dependent on the quality of institutions that are responsible for delivering high public policy effectiveness through collected taxes.

It seems worth now to start with expressions which are aimed to capture effects, which, as it is hypothesised, play an important role. Firstly, there are taxes on labour personal income  $\tau_w$  and on entrepreneurial profit  $\tau_j$ . In addition, there are two main directions of government expenditures considered here as those which affect entrepreneurial environment. In particular, as it was mentioned above, a government invests a certain share of collected taxes for the purpose of increasing profitability of entrepreneurs.

As can be seen from the benchmark model, there is an exogenous level of labour productivity  $y$  which is assumed to be the only production factor in the model since capital is required only to open a vacancy. Let us assume that labour productivity can be enhanced by way of educational attainment. However, education is costly; hence, productivity  $y$  is dependent on capital  $k_y$ , which is invested in education. This function can be expressed as follows:

$$y = \frac{q}{e^{k_y}}$$

An implication of this formula is that higher costs of education within a country imply that fewer people can afford it. An exponential form of this function was chosen as an alternative to, for example, a linear function as it does not presuppose a negative values of  $y$  in the case of a very high  $k_y$ . The variable  $q$  is mainly used for the purposes of constant and can be interpreted as quality or effectiveness of education.

The role of the government is that it affects initial costs of education by way of subsidising it through government expenditure which comes from collected taxes. Therefore, an educational system is characterised by some initial costs of education  $y_0$  which corresponds to the case of the

government is zero spending on the educational sphere. However, it is assumed, that it should spend some exogenous share  $\gamma_y$ <sup>8</sup> of the total tax income  $\tau$  to reduce such costs:

$$k_y = \frac{y_0}{1 + \gamma_k \cdot \tau \cdot m}$$

A parameter  $m$  is one of the key exogenous parameters in the model which denotes the quality of institutions or government effectiveness. This parameter is treated as exogenous; therefore, any behaviour of agents cannot affect it as it is inherited historically.

A combination of the formulas yields:

$$y = \frac{q_e}{e^{\frac{\gamma_0}{1 + \gamma_y \cdot (\tau_w + \tau_j) \cdot m}}}$$

The formula suggests that productivity is dependent positively on initial quality of education  $q_e$ , a share of the collected taxes spent on alleviating education costs  $\gamma_y$ , a sum of collected taxes and quality of institutions  $m$ . In addition, the level of productivity is negatively related to capital costs of education in the absence of government intervention.

In addition, it was widely discussed before that each vacancy requires  $k$  amount of capital. It includes not only formal capital but also burdensome procedures that are required to overcome in order to open a business. It can be expressed with the following formula:

$$k = \frac{k_0}{1 + \gamma_k \cdot (\tau_w + \tau_j) \cdot m}$$

Effectiveness of the government intervention is also dependent on the quality of institutions which denotes effectiveness of such investment.

The graphical and analytical analysis of the variables will be presented in the next subsection but it seems worth to note now that, as it can be seen from the figure 3.1, capital required to open a vacancy is decreasing in the sum of taxes collected, whereas productivity, by means of an increase in the affordability of education, increases.

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<sup>8</sup> Within the dissertation shares of taxes spent on particular purpose are constant and exogenous.

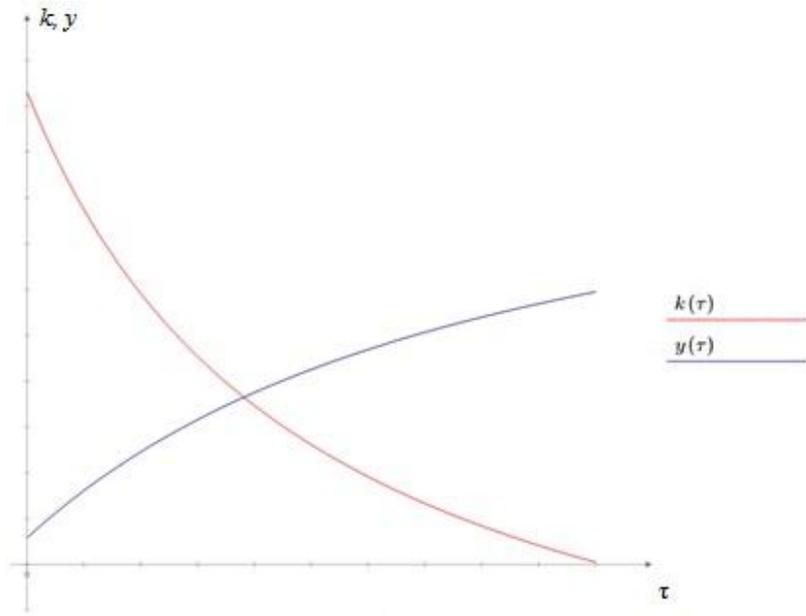


Figure 3.1. Relationships between productivity ( $y$ ), capital required to establish a vacancy ( $k$ ) and a sum of collected taxes ( $\tau$ )

In line with the discussion so far, the benchmark value functions can be modified such that they yield to the following expression for the profitability of a worker related to profitability of entrepreneur:

$$\phi = \frac{q_e \cdot \beta \cdot \theta \cdot q(\theta) \cdot e^{-\frac{y_0}{m \cdot (\tau_w + \tau_j) \cdot \gamma_y + 1}} \cdot (\tau_w - 1)}{\frac{k_0 \cdot (r + 1)}{m \cdot \gamma_k \cdot (\tau_w + \tau_j) + 1} - q_e \cdot q(\theta) \cdot e^{-\frac{y_0}{m \cdot \tau \cdot \gamma_y + 1}} \cdot (\beta - 1)}$$

The formula suggests that expected profitability of being an entrepreneur is also dependent now on the quality of institutions, both kinds of taxes included in the model and a share of taxes spent on each of the policy directions. In particular, it seems worth to note that it is not only total tax rate but also a particular difference (ratio) between personal labour income tax and corporate profit tax that play an important role in the model.

It seems also important to remind that the final formulas from the previous subsection which determines particular number of entrepreneurs and workers in the economy:

$$S(\phi, \mu) = \int_{\alpha=0}^{\phi} \int_{z=0}^{\infty} f(\alpha, z) dz da + \int_{\alpha=\phi}^{\infty} \int_{z=0}^{\mu} f(\alpha, z) dz da \quad (1)$$

$$V(\phi, \mu) = \int_{\alpha=\phi}^{\infty} \left\{ \int_{z=\frac{\phi}{\mu}}^{\frac{\alpha}{\mu}} \mu \cdot z \cdot f(\alpha, z) dz + \int_{z=\frac{\alpha}{\mu}}^{\infty} \alpha \cdot f(\alpha, z) dz \right\} da \quad (2)$$

Analysis of Kolakez and Legmann (2010) to some extent lacked an insight into the model solution. In particular, it did not provide clear analysis of the effect of income distribution in the society and distribution of entrepreneurial abilities which are incorporated in the function  $f(\alpha, z)$ . To be more precise, it is believed in this thesis that entrepreneurial ability is distributed in the society homogeneously among the countries. In other words, it is, approximately, an equal share of highly-skilled entrepreneurs in the society. Hence, it is not the factor which accounts for the differences among countries. However, it is wealth distribution which varies significantly among countries and, presumably, play an important role for the aggregate level of entrepreneurship.

To sum up, this subsection was dedicated to augmentation of the benchmark model by Kolakez and Legmann (2010) in order to understand the effect of taxation, quality of institutions and government expenditures on the aggregate level of entrepreneurship in the country, which, presumably, are important factors which were missing before. Therefore, the next subsection will be devoted to analysis of the theoretical results, which are expected to result in broader understanding of the issue under consideration.

### 3.3. Theoretical Results and Analysis

Augmentations to the benchmark model of Kolakez and Legmann (2010) that were presented in the previous subsection concerned mainly incorporation of an institutional factor into the model in order to explain ambiguous results that can be witnessed with regard to an effect of the quality of institutions on effects of taxation, interest rate, capital constraints and wealth distribution on the level of entrepreneurial activities within the country.

It seems worth to remind that the main theoretical results obtained so far were related mainly to the effect on the ratio of expected profitability to be a worker to the expected profitability to be an entrepreneur who creates one vacancy. Therefore, theoretical analysis will be dedicated mostly to the analysis of the function  $\phi$  described in the previous sections. However, it seems important to remind, in order to avoid confusion, that despite the fact that parameter  $\phi$  is linked to the question of decision to become entrepreneur based on the expected profitability compared to profitability of being a worker, it is expected to be an indirect measure of a share of entrepreneurs in the society in the form of created vacancies. It is exactly what is shown by the formulas 1 and 2 in the previous subsections. It means that in case of an increase in  $\phi$ , some

individuals, who were previously employed as a worker, now find it more profitable to post a number of vacancies (again dependent on personal wealth and entrepreneurial ability).

Before proceeding further, the results presented in this section are obtained using simulation of the model presented in the previous section, thus numerical model solution was achieved using selected parameters and constant values. The numerical results will not be presented here as they do not provide convenient and meaningful insight but can be provided on request. The model parameters in the simulation were based on the works of Lisi and Pugno (2010), Boeri and Garibaldi (2006) and adjusted such that parameters satisfy the condition of yielding to positive value functions and main outcomes of interest. The parameters that were chosen for the simulation are presented in a table in the appendix. The final note which is related to the graphical analysis below is that it is an inverted function  $\phi$ , which is of interest because we are not interested in the relative attractiveness of being the worker but rather in the relative attractiveness of being an entrepreneur. As it was discussed above, such relationship is treated here as a direct proxy of entrepreneurial activities in the economy. Therefore, it seems worth to look at the effect that an institutional factor has on entrepreneurial incentives, and thus, according to the model and assumption within the thesis, on entrepreneurial activities, which is presented on the figure 3.2:

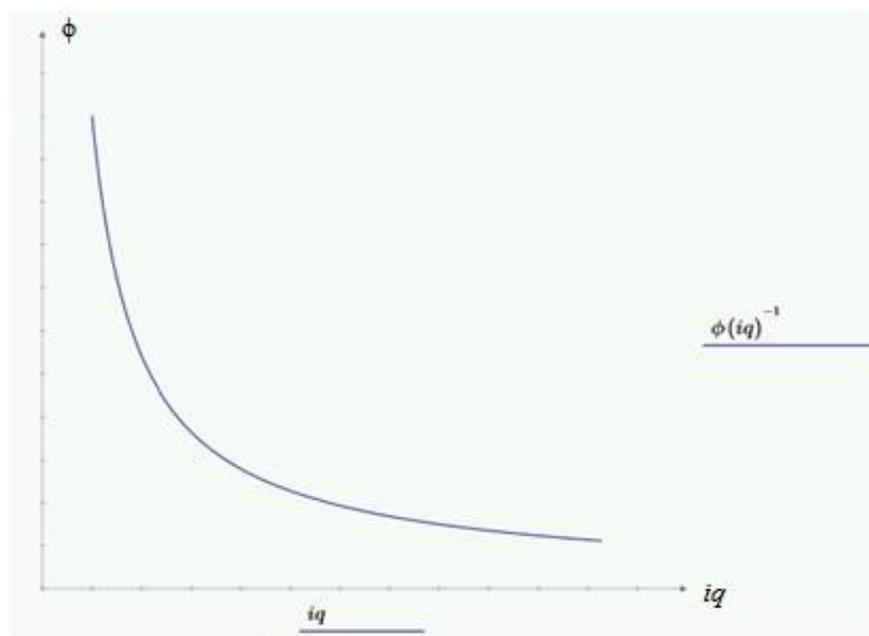


Figure 3.2. Effect of the institutional or governmental quality ( $iq$ ) on the level of entrepreneurial activities ( $\phi$ )

As it is clear from the graph above, the model suggests that there exists a negative relationship between quality of institutions and a level of entrepreneurial activities. Such theoretical results are in line with the main hypothesis of this thesis, which says that incentives to become an entrepreneur stem from inadequate institutions which, in turn, cannot ensure an existence of labour market that can adequately match skills and provide adequate income for workers. Therefore, poor institutions can be considered as a prerequisite for the ‘forced entrepreneurship’ when individuals are simply forced to become entrepreneurs because of inability to find an adequate match of their skills on the labour market. The noteworthy point is that the function  $\phi^{-1}$  is convex and decreasing in the quality of institution.

Another important factor which is of interest here is taxation. As it was mentioned in the previous section, taxes are spitted in the model as labour income tax and corporate tax which act as additional costs for workers and entrepreneurs, correspondingly. Therefore, it is not only a total sum of taxes but also the ratio<sup>9</sup> of corporate to labour tax is important to consider. As it was mentioned earlier, analysis of all other variables considered in this subsection will provided for two opposite cases: the case of bad institution with the effectiveness close to zero (0.01 is used for the simulation) and for the case of perfect institutions with 100% effectiveness (the value 1 is used). Therefore, it seems worth to start with the effect of the total taxes collected with the corresponding case of institutional quality presented on the figure 3.3:

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<sup>9</sup> The ratio rather than the difference is considered here for the reasons of model solution. Using the ratio but not the difference seems not crucial for the obtained results

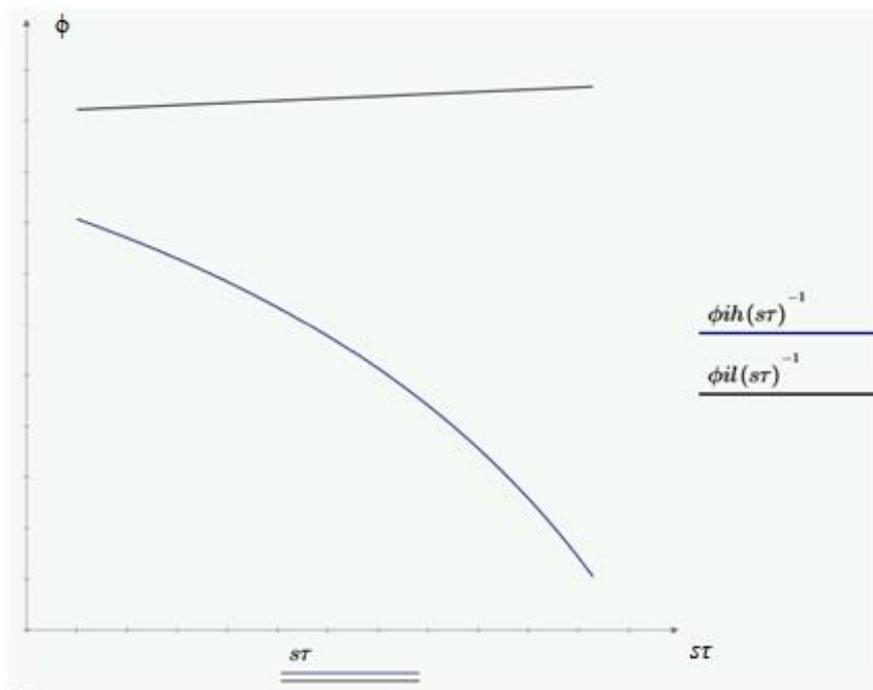


Figure 3.3. Effect of the sum of collected taxes ( $s\tau$ ) on the level of entrepreneurial activities ( $\phi$ ) in the case of perfect and imperfect institutions

The results presented below confirm an ambiguous effect that taxation might have on the entrepreneurial activities depending on the quality of institutions. The results presented above correspond to the case when labour and corporate taxes are not differentiated. To be more precise, the graph shows a negative effect of higher taxation on the incentives to become entrepreneur, whereas the effect is fairly flat but positive for the case of poor institutions. In addition, the curve which corresponds to the case of high quality institutions is placed higher compared to the low quality institutions curve. A possible explanation for such results is that higher taxation, in the case of effective institutions, implies that taxes are effectively invested for the various purposes such as education, alleviating tax burden, etc., which are not considered in the model. In contrast, in the case of poor institutions, an additional unit of collected taxes does not provide any additional value for entrepreneurs or workers but because of the functional forms used in the model, a positive effect is even less for the workers since usually their bargaining power is less than 50%, thus higher taxes imply more incentives to become entrepreneur.

Nonetheless, more important factor in the case under consideration is the difference between the sources of taxation. In particular, as it was mentioned before, the ratio of corporate tax to the labour tax is considered. The relationship between the ratio ( $n$ ) and the level of entrepreneurial activities are presented on the figure 3.4:

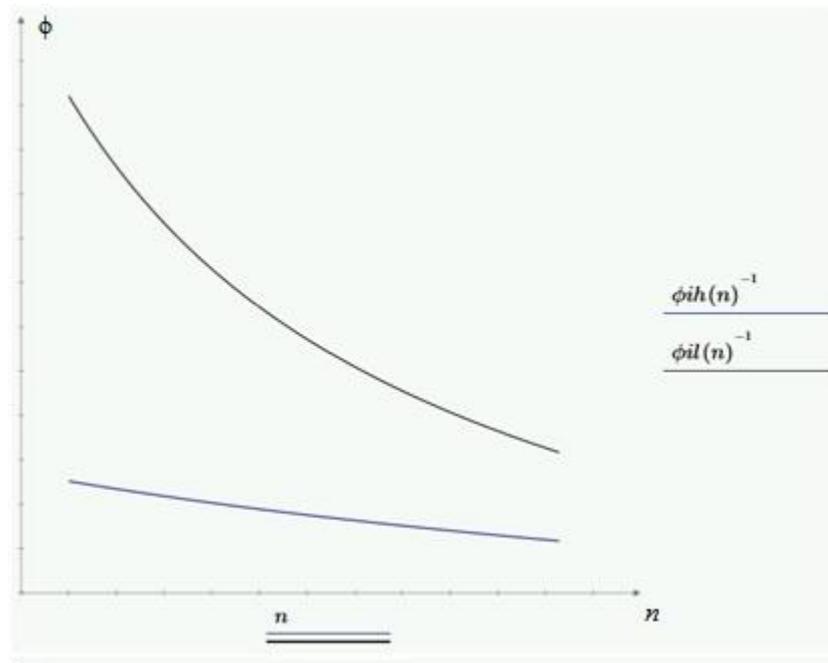


Figure 3.4. Effect of the ratio of corporate tax to labour tax ratio ( $n$ ) on the entrepreneurial activities ( $\phi$ ) in the case of perfect and imperfect institutions

The figure 3.4 above shows that higher ratio implies a lower level of incentives to become an entrepreneur compared to being a worker for both cases independently on the quality of institutions. However, the case of more effective institutions is characterised by more flat negative relationship where an increase in the ratio implies a relatively small decrease in the level entrepreneurial activities compared to the case of low quality institutions when a slight increase in the corporate tax compared to the labour tax implies a considerable drop in the expected relative profitability of opening the vacancy. The intuition behind the results is that, as it was mentioned above, better institutions implies better environment for workers, thus they are better off being a worker without involving themselves in ‘risky employment’. Therefore, the curve which corresponds to case of high quality institutions is placed far below the line corresponding to the high quality institutions line. Relatively higher extent to steepness of the poor institutions curve can be explained by the fact that high quality institutions imply existing of proper labour market which decreases an incentive to become an owner of the business hence, a relative corporate tax increase has smaller effect compared to the case of poor institution where elasticity of the entrepreneurship to the ratio is much higher. The final figure demonstrates an effect of lending interest rate on the level of entrepreneurial activities. The results are presented below on the figure 3.5:

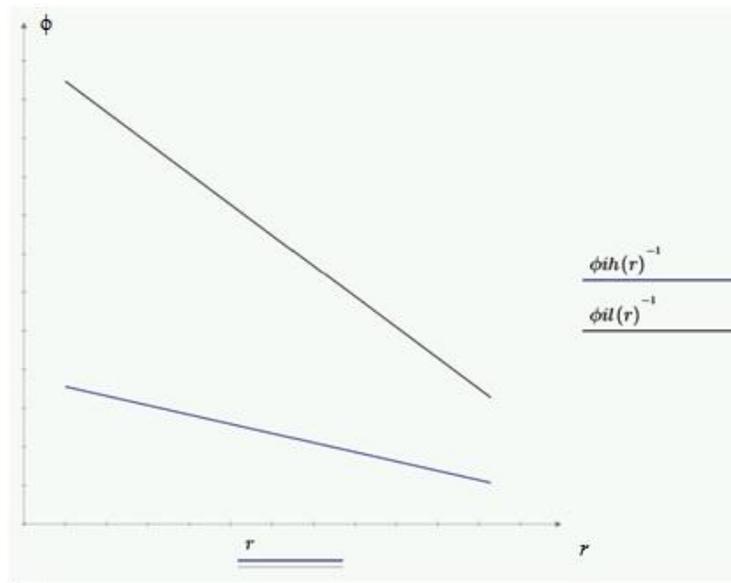


Figure 3.5. Effect of lending interest rate ( $r$ ) on a level of entrepreneurial activities ( $\phi$ ) in the case of perfect and imperfect institutions

Compared to the case of the ratio of corporate tax rate to the labour tax, the results presented on the figure 3.5 suggest a similar effect. In particular, the curve for the poor institutions is shifted upwards and is much steeper while both curves remain decreasing. The logic applied to explaining such results is also similar to those stated above. To be more precise, better institutions, because of more suitable environment to seek employment as a worker, reduce a marginal effect of changes in interest rate which explains the differences in the steepness of the curves. In contrast, initially better quality of institutions places the low quality institutions curve higher compared to the ‘comparison’ curve.

Therefore, theoretical results achieved so far allow explaining the role of the institutions on the level of entrepreneurial activities through varying the effect of taxation and interest rate, and assuming a close connection between a number of vacancies created in the economy with a number of entrepreneurs, which, in turn, seems reasonable based on the model assumption related to the distribution of entrepreneurial abilities and wealth. Therefore, the final factor of interest is wealth distribution. It seems worth to remind that the theoretical results provided by the Kolakez and Legmann (2010) are summarised in the formulas 1 and 2 mentioned in the subsection 3.1, which defined a number of vacancies and workers in the economy. The analysis provided by Kolakez and Legmann (2010) clearly lacked the implications that arise as a result of the theoretical augmentation achieved so far. In particular, the results presented in the subsection which implies an increase or a decrease in the value of the function  $\phi$ , implies also a decrease or an increase in the number of entrepreneurs, correspondingly, which stems from the consideration

above and formulas presented by Kolakez and Legmann (2010). To be more precise, the factors considered above together with the effect of institutional factor, affect expected relative profitability of being a worker. This, in turn, based on the formulas 1 and 2, implies a corresponding change in a level of entrepreneurial activities (a number of entrepreneurs in the economy), which, however, is dependent on the functional form of the distribution of entrepreneurial abilities and wealth<sup>10</sup>.

To sum up, this section discussed the theoretical foundation by Kolakez and Legmann (2010), described augmentations and conducted analysis of the achieved results. It allowed concluding a number of theoretical implications that will be tested in the next section. In particular, it is explained how taxation, income inequality and costs of capital (lending interest rate) might have ambiguous effect on a level of entrepreneurial activities in the economy. Moreover, it is suggested that this is quality of government which account for the effect that these variables have on the aggregate level of entrepreneurship. Before proceeding to the empirical analysis, it seems important to note that a number of points related to connection between further empirical analysis and theoretical results achieved so far. Firstly, the analysis here was focused on a number of vacancies created in the economy while the variable of interest in the next section will be a particular percentage of entrepreneurial activities in the economy in terms of business management or ownership. Despite the fact that these outcomes are unlikely to be the same, it is believed that they move together, as a result of an effect of the factors discussed above. This assumption seems reasonable considering the following logic based on the theoretical assumptions by Kolakez and Legmann (2010): each person can open a fixed number of vacancies depending on individual ability and personal wealth only if it is expected to be more profitable than being a worker. Therefore, changes in economic environment considered in the thesis imply that more vacancies are created if more individuals find it more profitable. Hence, it would be supported by the corresponding sign of the coefficient in the empirical model in the next section.

Another important point to be discussed is the fact that theoretical model does not consider quality of government as a factor which directly affects a level of entrepreneurial activities but rather as a factor which affects the outcome with regard to changes in other explanatory variables. Therefore, an empirical model discussed in the next section will incorporate this effect by means of using an interaction term, which, literally, will denote changes in the effect that a certain factor will have depending on the government effectiveness.

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<sup>10</sup> It is meant here that change in  $\phi$  implies change in the limit of the integral in the formulas 1 and 2. Therefore, calculating this integral yields to a number of entrepreneurs depending on the chosen functional forms.

## 4. EMPIRICAL ANALYSIS

### 4.1. Description of Data and Its Relationship with Theoretical Results.

The literature review presented in the previous section displays a lack of systematic analysis of the factors that influence a level of entrepreneurship on the aggregate level. In addition, it results in the failure to achieve the consensus between empirical and theoretical understanding of such a phenomenon. An explanation that was suggested in this thesis is that most of the works known on the time of writing this paper lacked an attention to the quality of institution or government effectiveness, which, presumably, has a significant effect on the economic environment affecting incentives to become an entrepreneur. In other words, the theoretical model considers a level of entrepreneurial activities through an aggregate decision, which also plays a role of a link between the results of theoretical and empirical analysis conducted in this section. Therefore, this chapter will shed light on empirical evidence in order to see what factors play a significant role in determination of the size of the entrepreneurship within the country. In turn, this subsection will present variables and corresponding data which are used in the empirical analysis further in this section.

Before proceeding to the description of the variables and corresponding sources, it seems worth to mention that this is a panel framework, which uses observations for different countries within the certain timeframe.

The first variable of interest here is a level of entrepreneurial activities within the country for a certain period of time. In particular, the Global Entrepreneurship Monitor dataset is used. The variable which represents entrepreneurial activities is “Established Businesses: number of adults [18-64 years old] per 100 involved in established firm as owner and manager for which salaries or wages have been paid for more than 42 months”. Because the dataset is available mostly for the years from 2002 to 2012, it results in a use of the dataset 2002-2012 for all the variables. In addition, it is fairly limited to a number of countries where the survey took place. Nevertheless, the dataset contains various countries from various continents and with various level of government effectiveness which corresponds to the purpose of the research.<sup>11</sup> Therefore, it is suggested that the chosen parameter is an appropriate indicator because it captures ‘equilibrium’ entrepreneurship while sorting out businesses that were closed down in a short period of time after establishing.

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<sup>11</sup> For more details see the Appendix which contains the dataset used in the analysis.

It seems worth to turn attention to explanatory variables used in the analysis. According to the theoretical model presented in the previous chapter it is required to obtain baseline variables that can be further transformed to obtain the variables which represent government effectiveness, lending interest rate, tax ratio and income distribution.

As an indicator which, presumably, can adequately describe government effectiveness, an average of Government Effectiveness and Regulatory Quality with equal weights is chosen. Both indicators are estimated by the World Bank. A motivation for using a combination of indicators consists in importance to capture a wider sense of government effectiveness since these indexes account for different 'areas' of government quality. In particular, according to the definition provided by the World Bank, Government Effectiveness indicator includes survey responses with regard to such issues as quality of public goods and services, a level of bureaucracy, public labour competency, a level of political pressure of services provided, government credibility and control over bank operations. The Regulatory Quality indicator includes such factors as market-friendliness of the policies and a level of excessive burden with respect to business development. As it can be seen, the former indicator considers the quality of government as a provider of the public services and a policy institution while the latter concerns more with ability of a government to create adequate conditions for business growth. It is also noteworthy that such parameters usually go 'hand-in-hand' among countries. Therefore, an average of these parameters is expected to account for the variance of a broader sense of governmental quality, which, presumably, plays a crucial role according to the discussion in the previous chapter.

Another important factor to consider in the model is taxation. Again, in order to capture the broader sense of the taxation as it is suggested by the theoretical discussion, corporate tax rate, which affects profitability of the business, and personal income tax, which affects the final income of the worker, are included into consideration. Both of the variables are obtained using the World Bank dataset. However, as it was widely discussed in the previous chapter, it is not the sum of collected taxes but rather a difference between the corporate tax rate and labour income tax which have a significant effect on expected profitability of opening a business compared to being a worker. Therefore, it is suggested using a ratio of these taxes to capture such an effect. The reason for choosing the ratio rather than a difference roots in the fact that the higher both taxes are, consequently, the less important effect the deference between them has.

The next variable under consideration is a lending interest rate which implies how costly the capital is to borrow to open the business. In conjunction with the income distribution variable discussed below, this parameter is assumed to capture the liquidity constraints that are faced by the entrepreneurs. In addition, the analysis, then, implies that basic capital costs, apart from

burdensome procedures, are homogeneous among the countries. The data on lending interest rate is taken from the World Bank database.

The final variable of interest is income distribution. As it was clear from the previous chapter, it affects the initial wealth that plays an important role in defining liquidity constraints. In particular, it is believed but not tested here is that income equality is correlated with the average wealth in a society as these are more advanced economies that can ‘afford’ relatively equal income distribution. Therefore, as it was mentioned above, income distribution and lending interest rate variables are assumed to adequately capture liquidity constraints. Similarly to most of the variables discussed so far, the data for income inequality is obtained using the World Bank database on the GINI coefficient. This coefficient captures statistical distribution of income within the country. To be more precise, the higher is coefficient, the more unequal the income is distributed within the country.<sup>12</sup> For example, the value of 0 suggests perfectly equal distribution, whereas value of 100 suggests perfectly unequal wealth distribution.

The table 4.1 below presents a statistical summary of the data used in the analysis:

**Table 4.1.** Statistical Summary of the Data

Variable	N of observations	Mean	Std. Deviation	Minimum Value	Maximum Value
Government Effectiveness	546	.7082314	.9449319	-1.371542	2.407654
Regulatory Quality	546	.63714	.8949051	-1.725779	1.939
<i>Government Quality</i>	546	.6726857	.9036332	-1.37062	2.158572
Level of Entrepreneurial Activities	416	6.984255	3.977052	1.08	30.1
Corporate Tax Rate	605	27.04466	7.263765	6.424695	55
Personal Income Tax Rate	597	34.9732	13.27812	0	62.3
<i>Tax Ratio</i>	581	.8984831	.669426	.1590271	6
Income Distribution	384	37.97906	9.539824	24.2	67.4

<sup>12</sup> For more details on GINI coefficient see <http://data.worldbank.org/indicator/SI.POV.GINI>

As it can be seen from the data, each of the variables included in the analysis captures a wide range of values for the cases of high and low government quality, tax ratio, level of entrepreneurship and income distribution, thus the obtained dataset seems to be valid for the purpose of analysis. In addition, as it will be also discussed in more details in the next section, an empirical analysis will contain also interaction variables which are the product of two variables. However, such variables are not included in the summary here since they are fully derived from the ‘basic’ variables. It is important to note that as it was mentioned before, some observations are missing for a number of countries. The effect of missing observations on the validity of analysis will be discussed in the next subsection.

The final point which is important to mention is a connection between the variables described in this subsection and theoretical model obtained in the section 3, which constitutes a ‘bridge’ between theoretical results and an empirical part of the paper. The main outcome of interest in the theoretical model was a number of vacancies created in the economy by entrepreneurs. Hence, it is assumed that such parameters as a number of vacancies and a number of entrepreneurs closely related since an increase in a number of entrepreneurs inevitably leads to an increase in a number of vacancies created in the economy. Therefore, it is suggested that a number of vacancies considered in the theoretical model is directly and closely linked to a measure of a number of entrepreneurs. In other words, if some factor causes an increase in a number of individuals who choose to open a business, it leads to an increase in a number of created vacancies. Therefore, an empirical discussion in this section is based on the theoretical model and will allow evaluating whether it reflects real behavioural patterns. Consequently, other variables described in this subsection, represent parameters, namely wealth distribution, interest rate on borrowing capital, government effectiveness, tax ratio, correspondingly.

The last point relates to a connection of theoretical results and specific features of a use of government effectiveness term. To be more precise, quality of government is not a factor which influences the outcome of interest directly, but, according to the model, it influences an extent to which other independent variables would affect the level of entrepreneurial activities. In other words, a change in the variable, which denotes quality of government, results in a change in steepness of the curve, which means existence of an interaction effect. Therefore, the model discussed in this section will include an institutional factor as an interaction term only. These issues together with general methodology used in the analysis will be discussed in the next subsection in more details.

## 4.2. Discussion of the Methods

As it was widely discussed in the previous chapter, fairly rich data obtained from the World Bank and the Global Entrepreneurship Monitor databases allowed achieving the purpose of the empirical part of the research. The nature of data is such that it combines annual observations for a number of countries with various levels of development for a time frame from 2002 to 2012. As it was mentioned before, there is a number of missing observations. However, it is believed that this is not due to any kind of selection that might bias the estimation but it is rather random. In addition, according to the Stata, the panel is strongly balanced, which is concluded upon exporting the data and can be proven by running the Do-file presented in the appendix. Therefore, any particular methods that are aimed to deal with such an issue are not required. Before proceeding further, it seems important to note that this subsection will discuss a number of theoretical issues with regards to econometric model to be used, thus, will widely refer to such sources as Green (2003), Cameron and Trivedi (2005), and Verbeek (2008). Therefore, all the discussion within this subsection will be theoretically based on the mentioned sources.

In line with the discussion so far, a panel data framework will be used in the model. The next subsection will consider a particular form of the estimated model more closely, while this subsection pays more attention to main theoretical standpoints underlying model estimation. Therefore, the model to be estimated takes the following general form:

$$y_{it} = x'_{it} \cdot \beta + \alpha_i + \varepsilon_{it}$$

where,  $y_{it}$  – dependent variable;

$x'_{it}$  – vector of independent variables;

$\alpha_i$  – unobserved heterogeneity term;

$\varepsilon_{it}$  – error term.

It seems necessary to discuss a number of issues related to a use of panel models. A number of issues with regard to exploiting a panel data framework arise when dealing with incomplete (missing observations), unbalanced and rotating panels. Nonetheless, the first two issues usually do not imply significant problems if we can ensure that unbalancing and missing observations are not a result of any kind of selection bias, attritions or optimising behaviour, whereas rotating panels do not generally imply any problems. Therefore, these issues will not be raised further in

the discussion as it is believed that this is not the case with data used in the analysis due to a nature of the data.

Another kind of issues is related to so-called exogeneity problems. In particular, there are several kinds of exogeneity that are considered. It is a strict exogeneity which assumes that a vector  $X$  is fully uncorrelated with any current, past, future values of error term and a vector of unobserved heterogeneity. Weak exogeneity implies the assumption described above but with regard to only current and past observations of  $X$ . Finally, contemporaneous exogeneity considers only assumption with regards to current values of  $X$ . A consideration as to what estimator should be chosen with respect to the features and nature of the assumptions is important and involves a range of issues that seem not expedient to discuss in more details here because of the time and space constraints. However, such a brief discussion seems to provide an adequate foundation for choosing the appropriate empirical strategy which will be discussed in more details in the next section. In particular, the main choice with regards to the empirical strategy that is expected to be made is whether fixed or random effect model must be chosen. In line with the discussion so far and arguments by Cameron and Trivedi (2005), on the one hand, the fixed effect model is often preferred because of weaker assumptions compared to pooled or random effects model, and possibility to establish causality relationships for an outcome of interest. On the other hand, a fixed effect model is also associated with a number of weaknesses that should be taken into account. To be more precise, the fixed effects model usually suffers from ‘absorbing’ time invariant factors, thus do not allow estimating them. In addition, such problems as imprecision of time-invariant estimates and impossibility of conditional mean prediction should be also noted. Finally, although it looks like a ‘rule-of-thumb’, it can be said that random effects model is usually preferred when a number of cross-section observations is large. Therefore, because an empirical consideration does not focus on causality issues and a number of observations are believed to be sufficiently large, it seems reasonable to apply the random effects model. However, in order to ensure that RE model can be adequately applied to the case, the Wu-Hausman test will be used in the next subsection.

The final methodological issue that seems to be worth to discuss is a use of an interaction term. The interaction term is a multiplication of the explanatory variables which is expected to capture a change in the variable’s effect on the outcome variable, depending on the particular variable that is used as a multiplier. To be more precise, as it was mentioned earlier, in order to test the results presented in the theoretical part, interaction term is required to see how the effect of the chosen variables varies with respect to the government effectiveness. Therefore, the product of the certain variable with the government effectiveness variable will describe this effect of

interest. However, Bedeian and Mossholder (1994) argue that interpretation of the interaction term might not be straightforward as it is claimed. In addition, a number of complications arise because of the nature of the empirical goal which will be discussed more in the next subsection but it can be said now that government effectiveness is not expected to be a factor affecting the level of entrepreneurship directly. Instead, it enters the model as a multiplier for a number of variables which, according to the model, are dependent on the government effectiveness. It is also believed that model is adequately formulated in order to achieve the purpose of the research, which will be also addressed using several tests in the next subsection.

To sum up, this subsection briefly discussed the main issues with regards to methods that will be used and discussed in the next subsection.

### 4.3. Empirical Results and Analysis

The previous section was dedicated to an extension and augmentation of the theoretical framework which attempts to understand the factors and mechanisms underlying an existence of the certain level of entrepreneurial activities within the economy. In particular, the model by Kolakez and Legmann (2010) was employed and augmented by means of including into consideration institutional factor, taxation, endogenously defined productivity level, capital requirements and burdensome costs, which are required to be paid by perspective entrepreneurs in order to set up a vacancy.

The results achieved in the previous section suggest that an ambiguous effect of taxation and macroeconomic conditions (interest rate) can be explained by a various quality of institutions, which account for an effect that these variables have on the level of entrepreneurial conditions. Because the results achieved so far imply only theoretical importance, it seems worth to look at empirical validity of these results. In particular, as it was widely discussed in the previous subsections of this chapter, it is a panel data approach which is applied in order to obtain the results. The data was discussed in more details in the first subsection but it seems worth to remind that the following variables presented by the corresponding indicator are used: income distribution within the country (Gini coefficient provided by the World Bank database), lending interest rate (lending interest rate data provided by the World Bank), corporate tax rate (data provided by the World Bank database), personal income tax (data provided by the World Bank

database), level of entrepreneurial activities within the country (percentage of adults who own or manage business provided by the Global Entrepreneurship Monitor) and, finally, government effectiveness index which is the average with equal weights of such indexes as estimated coefficients on Government Effectiveness and Regulatory Quality provided by the World Bank.

Therefore, a use of the data and methodology allowed achieving empirical results presented below.

The model to be estimated takes the following form:

$$\begin{aligned}
 \text{enterpr}_{it} = & \beta_0 + \beta_1 \cdot \text{tax\_dif}_{it} + \beta_2 \cdot \text{lend\_i}_{it} + \beta_3 \cdot \text{income\_distr}_{it} + \beta_4 \cdot \text{tax\_dif}_{it} \cdot \\
 & \cdot \text{qual\_inst}_{it} + \beta_5 \cdot \text{lend\_i}_{it} \cdot \text{qual\_inst}_{it} + \varepsilon_{it}
 \end{aligned}$$

where  $\text{enterpr}_{it}$  - a level of entrepreneurial activities;

$\text{tax\_dif}_{it}$  - a ratio of the corporate tax to the personal income tax;

$\text{lend\_i}_{it}$  - lending interest rate;

$\text{income\_distr}_{it}$  - income distribution presented by the GINI coefficient;

$\text{qual\_inst}_{it}$  – indicator of quality of institutions and governmental effectiveness

$\varepsilon_{it}$  - error term

As it is clear from the model presented above, it does not include a government effectiveness factor as a separate variable because it is not considered as a factor which has a direct effect on the dependent variable but, presumably, plays a crucial role in the effect that other variables, except for income distribution, have on the level of entrepreneurial activities within the country. In addition, another concern which is related to the quality of government variable is that it might be strongly correlated with income distribution because of the historical inheritance. This is also the reason why the multiplication of the quality of institutions with income distribution variable is not used. In addition, according to the theoretical model, there is no a particular mechanism that suggests how the quality of government influences the effect of income inequality. In line with an interaction model theory discussed in more details in the previous subsection, the main coefficient of interest here is the variables that are multiplications of the government effectiveness factors with lending interest rate and tax ratio, and income inequality variable. Therefore, coefficients of these variables might confirm the theoretical finding presented before.

Before conducting the analysis, it seems worth to note that time series properties of the panel data are neglected here because it is believed that a time period is fairly short, thus skipping such a consideration seems not being crucial for analysis and, moreover, does not seem to be expedient due to time and space constraints. Another decision to be made before proceeding to the results is a use of fixed/random effects models. In line with the consideration presented in the previous subsection which suggests using random effect model, it is required to justify the choice using the Wu-Hausman test. All the results for this section are obtained using Stata 12. Therefore, the Do-file together with the data is presented in the appendix at the end of the thesis.

The results of the Wu-Hausman test suggest that we cannot reject a hypothesis that the model can be adequately estimated as a random effect model, thus estimator is consistent and more efficient compared to a fixed effect estimator, which is consistent only.

Therefore, the results for the estimated model are presented in the table 4.2 below:

**Table 4.2.** Effect of the variables under consideration and institutional quality on a level of entrepreneurial activities

<u>Entrepreneurial Activities, %</u>	
Corporate to Personal Income Tax Ratio	-0,110 (1,057)
Lending Interest Rate	-0,024 (0,022)
Income Distribution	-0,008 (0,052)
<u>Interaction Terms</u>	
Corporate to Personal Income Tax Ratio * Government Effectiveness	-2,571*** (0,768)
Lending Interest Rate * Government Effectiveness	-0,064* (0,038)
Constant	9,225*** (2,148)
N	197

\*p<0,1 \*\* p<0.05 \*\*\*p<0.01. Standard errors within parentheses.

The results presented in the table 4.2 can be considered such that support the results obtained with the theoretical model in the previous subsection. The shortcomings and possible improvements of such results will not be considered within this section. Instead, the focus here will remain on the results while the following chapters will pay more attention to the possible issues with regards to the conducted analysis. As it was expected, such variables as tax ratio and lending interest rate are not significant. The results for the income distribution show that a coefficient is insignificant which does not support importance of liquidity constraints which was widely concluded and emphasised in the papers discussed in the literature review. However, it is predicted by the theoretical model and supported with the results of this subsection that interaction variables are significant. Furthermore, the results suggest that higher quality of institutions implies a significantly lower effect of the considered tax ratio. Similarly, the results show that higher government effectiveness also implies a lower extent to an effect that lending interest rate has on the aggregate level of entrepreneurial activities.

The Shapiro–Wilk test for normality of residuals suggests that residuals are normally distributed and do not display excessive skewness or kurtosis. It is also can be concluded from a histogram of residuals presented on the figure 4.1:

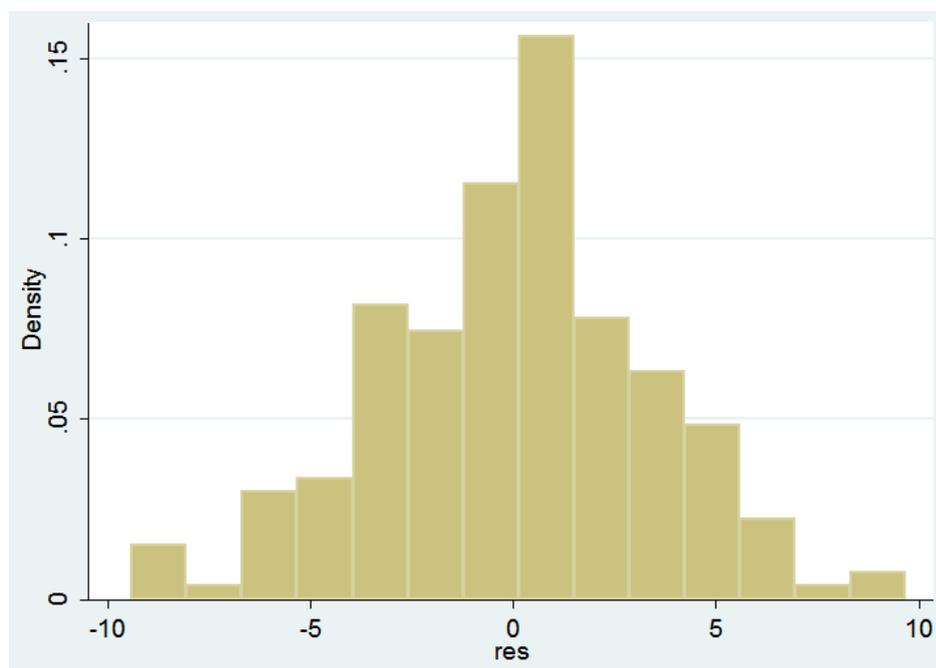


Figure 4.1. Distribution of residuals

In line with the discussion so far, the model estimated in this section seems to be valid and adequately formulated. In addition, it allowed achieving the empirical purpose of the thesis. In

particular, it supports a conclusion which stems from the theoretical model presented in the previous section. To be more precise, it suggests that entrepreneurship is a complex phenomenon and analysis of the level of entrepreneurship on the aggregate level cannot be restricted to considering only liquidity constraints or any other factor as a main factor behind a certain level of entrepreneurial activities within the economies. In other words, it is also an economic environment, which is characterised by government effectiveness, which account for what effect is witnessed as a results of changes in any other factors under consideration. Therefore, the next chapter will provide a discussion of the contribution that the results obtained so far imply to the existing literature which attempts to understand economic factors behind of a particular level of entrepreneurial activities within the economy.

## 5. RESEARCH CONTRIBUTION AND DISCUSSION

A discussion so far was focused on extending theoretical understanding of entrepreneurial activities on the aggregate level as a rational choice which is fully dependent on the labour market conditions. In addition, the purpose also consisted in empirical justification for theoretical findings in order to ensure that such a consideration can capture the real-world picture.

In order to achieve the purpose of the research, a wide range of literature has been reviewed and referred to within the thesis. Nonetheless, although most of the findings are to some extent based on methodology and conclusions published before, the results of the paper also imply a number of contributions to the existing literature and, as it is believed, fill the literature gap advertised in the introduction. Therefore, this section will focus on the discussion of the contribution of this paper to existing literature and possible extensions which are a subject to future research.

As it was discussed mostly in the literature review, a multitude of works paid attention to the entrepreneurship and, in particular, to the factors that influence the level of entrepreneurial activities in the society. Therefore, as it was mentioned in the literature review, there is a wide range of economic, sociological or psychological factors which to a various extent influence expected profitability of entrepreneurial activities. Most of the works in the field of economics mostly considered an effect of single factors on the aggregate decision to be a entrepreneur, thus affecting entrepreneurial activities. To be more precise, most of the well-known theoretical works considered liquidity constraints as a decisive factor. Therefore, such an incomplete theoretical picture is considered as a root of inconsistency between the theoretical results and empirical evidence. A theoretical model that was presented in the thesis, and, in turn, was based on the theoretical attempts by Kolakez and Legmann (2010) to explain importance of the liquidity constraints as a main factor which determines the attractiveness of being self-employed. The results of this and a number of similar works, which were discussed in the literature review, argue that this is an important factor affecting a level of entrepreneurial activities. However, they neglect a vast range of other factors and economic features. In addition, a number of works clearly emphasised existence of a gap in the literature with regard to the systematic theoretical understanding of the entrepreneurship, which is also supported by empirical ambiguity of the results. Therefore, this literature gap justifies importance of this research, which, literally, attempts to augment a theoretical framework of entrepreneurship as a labour market choice by means of including systematic economic features into consideration rather than focusing on

particular factor which, as it is hypothesised in this thesis, might have various effects on the entrepreneurial incentives depending on the systematic economic features. It is a governmental effectiveness which is considered as 'systematic economic features' in this research. In particular, a government, which may be effective or not, affects expected profitability of entrepreneurs and workers, who strive to fill the vacancy created by the entrepreneurs, mainly, by way of tax collection and government expenditures. As a result, such an extension, with regard to the known models on the time of writing this thesis, allows achieving satisfactory results in the theoretical and empirical context. In particular, upon solving the model, empirical analysis employing panel data framework and including the factors under consideration supported the theoretical conclusions. Therefore, it enables considering this as a contribution to existing literature in this field in a number of ways.

Firstly, a consensus between theoretical and empirical views that was achieved in this thesis implies that government effectiveness, apart from other factors, is an important factor which determines economic environment. In particular, entrepreneurship is sensitive to taxes, burdensome procedures and productivity of the vacancies created. However, this sensitivity is to a large extent dependent on the government effectiveness. This, in turn, leads to a number of subsequent conclusions. In particular, an effective government has larger scopes to rise or reduce taxes as long as they are properly invested for the purpose of providing better environment for flourishing of entrepreneurial activities such as increasing labour productivity through reducing costs of education or decreasing capital required to post a vacancy. In reality, there is a multitude of other channels that government can use to increase expected profitability of entrepreneurs but they are not included in the model for the purpose of simplification of the analysis.

Secondly, an effect of taxes is concluded to be ambiguous as it is directly connected to the government effectiveness which, as it was mentioned, defines what effect the difference of taxes will have on the aggregate decision to become an entrepreneur.

Finally, leaving the government effectiveness aside, this thesis does not support a theoretically grounded hypothesis of the liquidity constraints as a deterministic factor. In particular, empirical results did not allow concluding a significant role of income equality and costs of capital (lending interest rate) as factors which, to some extent, are considered here as proxies for capital constraints that might be faced by the entrepreneurs. Again the effect of lending interest rate is also concluded to be dependent on the government effectiveness.

Despite the contribution of this paper, there are a number of weaknesses and limitations with regard to both theoretical and empirical parts of the research, which should be taken into account and can be addressed in the further research. Firstly, the theoretical model lacked a number of

directions for the government expenditures that might be worth to consider as those which affect a level of entrepreneurial activities. In addition, the functional form chosen to achieve theoretical results might also affects obtained results. Nevertheless, it is believed that results would not change dramatically if another appropriate functional form is chosen<sup>13</sup>. Another issue to consider is that the results of the model are, to a limited extent, dependent on the constant values chosen for the simulation. Therefore, a unique solution can be achieved only when value functions yield to positive values for all the considered range of values. In addition, the relative profitability function considered in the model should be also strongly greater than zero. It is also might be worth to consider a number of complications such as allowing a tax rate to be progressive with respect to the income. However, such issues were not addressed in this thesis due to a different purpose and focus of the research. The final point that is worth to note with regard to the theoretical model discussed here is related to government effectiveness which is the key variable in the analysis. This indicator is assumed to be historically inherited thus is exogenous and not interdependent with any other variable in the model. Such an assumption can be criticised as being not realistic because, in fact, government effectiveness might be dependent on economic conditions. Nonetheless, it is believed that the scopes of the research identified at the beginning of the thesis enable suggesting that this assumption does not distort the real picture and the obtained results remain valid.

Another kind of issues, which are important to mention, relates to the empirical analysis conducted within the thesis. In particular, one of the obvious weaknesses of the data used is a number of missing observations that certainly reduced the power of the results. Nevertheless, such missing observations are considered as random and amount to insignificant share of total observations, thus do not seem to be a point for a serious concern. Another possible worry mentioned earlier relates to a use of an interaction term as it is claimed to be difficult to interpret. However, as it was also mentioned earlier, such specification of the model seems to be reasonable to achieve the results and interpretation based on the previous theoretical discussion. Furthermore, these concerns do not imply inadequacy of the analysis especially taken into account that no problems were found with regard to the error term distribution.

To sum up, the results obtained in this thesis are expected to bear theoretical importance for understanding behavioural patterns underlying existence of a certain level of entrepreneurial activities in economy. The results of the empirical analysis support the results obtained in the theoretical part of the research. In particular, insignificant coefficients for the tax ratio, lending

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<sup>13</sup> The functional form should satisfy the requirements with respect to being increasing/decreasing and convex/concave correspondingly to the factor under consideration.

interest rate and GINI coefficient of income inequality support that these variables are unlikely to have unambiguous effect on the aggregate level of entrepreneurial activities. Furthermore, as it was suggested in the theoretical section, it is quality of government that account for such ambiguity. In other words, changes which are witnessed as a result of changes mentioned variables are dependent on the quality of government or regulations. Therefore, it can be considered as a contribution to the defined gap in the existing literature. The results are considered to be valid after the critical assessment of the conducted research.

## 6. CONCLUSIONS

An ambiguous nature of entrepreneurship in terms of the consequences that it implies to the social and economic development is even less ambiguous than factors which account for the entrepreneurship on the aggregate level. Therefore, a number of works discussed the entrepreneurship and a level of entrepreneurial activities in the context of public economics, macroeconomics, development economics, psychology, sociology, etc. However, as this research argues, this is a systematic approach that was lacking in the analysis conducted within the previous works. A clear example was cited by the Storey and Greene (2008) who argue that most of the works in the field of entrepreneurship studies, which focused on a particular aspect of the entrepreneurial incentives or obstacles, are unlikely to get us much closer to the reality. In line with this gap in the literature, it is believed in this thesis that inconsistency among various theoretical approaches and empirical considerations might be a result of inability to include governmental or institutional effectiveness into analysis, which are considered as 'full synonyms' here. In other words, this is the factor which, to a large extent, is responsible for the effect that a particular policy measure would have on the aggregate level incentives to manage the business, thus to create work places and to hire those who, because of the personal conditions, are better off being employed as workers. As a result, it brings about existence of a certain level of entrepreneurial activities within the economy.

In line with the initial hypothesis that this is the government effectiveness which should be considered as a crucially important factor, it seemed expedient to structure the analyse such that provides a theoretical model which can explain a mechanism underlying the aggregate level of entrepreneurial activities as an alternative to an aggregate level of employment. On the other hand, a widely mentioned mismatch between the theory and empirical conclusion poses a requirement to conduct the theoretical analysis along with empirical, which would support or reject the initial hypothesis of the research.

Therefore, in order to achieve the purpose of the analysis, it was required to choose the theoretical framework that would enable achieving the theoretical results. The fact that this thesis considers the entrepreneurship as an alternative occupation to being a worker, it is a matching model approach that seems to be promising enough to proceed further in the analysis, since it considers not only monetary incentives but also accounts for labour market conditions which are hypothesised to play an important role. The history of the matching model approach started from Pissarides saw a multitude of different works, partially discussed in the literature review, which

based the research on this foundation. However, the literature review, which previously contributed to the identification of the gap in the literature expected to be filled as a result of the thesis, suggested the model by Kolakez, Legmann (2010) as an ideal foundation to achieve the results. The original model was mainly used to understand how liquidity constraints affect the decision to become an entrepreneur. Although the model was not originally suitable for the analysis aimed to be conducted, it was possible to extend the model by means of a number of augmentations. As results, it was shown that it is a governmental or institutional factor that can account for the mentioned absence of the consensus. In particular, depending on the government effectiveness, different forms of taxation and capital constraints may have dramatically different outcomes.

As it was mentioned before, such results do not seem to have any importance as a contribution to the existing literature if they do not help to understand the underlying real world processes. Therefore, the empirical analysis using panel data and including various countries with various quality of the government for a period of time from 2002 to 2012 was to be required. The results supported the conclusion formulated upon solving the theoretical model. To be more precise, such factors as taxation (labour and corporate), wealth inequality and costs of capital lending might have radically different effects on the level of entrepreneurial activities within the economy as the outcome of interest. Furthermore, this effect, to a large extent, is dependent on the quality of government that exists in the country and, which defines the 'rules of the game'. Such results stem, mainly, from insignificant coefficients for all the variables and significant coefficients of the interaction terms which denote the effect of government effectiveness on the effect that a particular variable have on the aggregate level of entrepreneurship.

It is clear that the relationships discussed in this thesis are much more complex mainly due to endogeneity issue that roots in the fact that government effectiveness is also affected by a number of factors. Nonetheless, the results are concluded to be valid despite such exogeneity simplifications and, therefore, it can be considered that the purpose of the thesis was achieved since the initially formulated hypothesis was not rejected within the theoretical and empirical contexts.

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## Appendix 1. Do-file

```
xtset c_code Year
```

```
gen tax_dif = corp_tax/lab_tax
```

```
gen tax_s = corp_tax + lab_tax
```

```
gen tax_dif_qual_inst = tax_dif * qual_inst
```

```
gen lend_i_qual_inst = lend_i * qual_inst
```

```
gen incom_distr_qual_inst = incom_distr * qual_inst
```

```
gen tax_s_qual_inst = incom_distr * tax_s
```

```
summarize gov_eff reg_qual qual_inst enterp corp_tax lab_tax incom_distr tax_dif
```

```
xtreg enterp tax_dif lend_i incom_distr incom_distr_qual_inst tax_dif_qual_inst lend_i_qual_inst, fe  
estimate store fixed
```

```
xtreg enterp tax_dif lend_i incom_distr incom_distr_qual_inst tax_dif_qual_inst lend_i_qual_inst, re  
estimate store random
```

```
hausman fixed random
```

```
xtreg enterp tax_dif lend_i incom_distr tax_dif_qual_inst lend_i_qual_inst, re
```

```
outreg using reg_module1, replace se title("Effect of the variables under consideration and institutional quality on level of entrepreneurship")
```

```
predict ent_hat
```

```
gen res = enterp - ent_hat
```

```
swilk res
```

```
sktest res
```

## Appendix 2. Data

N	Country	Year	Government Effectiveness	Regulatory Quality	Quality of Institutions	Level of Entrepreneurship	Corporate Tax	Labour tax	Lending Interest Rate	GINI coefficient
1	Algeria	2012				3,3	40	35	8	
1	Algeria	2011	-0,65544	-1,15811	-0,90677	3,1	40	35	8	
1	Algeria	2010	-0,56203	-1,13643	-0,84923		40	35	8	
1	Algeria	2009	-0,65712	-1,04144	-0,84928	4,7	40	35	8	
1	Algeria	2008	-0,65093	-0,79631	-0,72362		40	35	8	
1	Algeria	2007	-0,64134	-0,62047	-0,63091		40	35	8	
1	Algeria	2006	-0,56376	-0,57565	-0,56971		40	35	8	
1	Algeria	2005	-0,43737	-0,43402	-0,43569		40	35	8	
1	Algeria	2004	-0,52093	-0,54495	-0,53294		40	35	8	
1	Algeria	2003	-0,61475	-0,55109	-0,58292		40	35	8,125	
1	Algeria	2002	-0,61492	-0,5939	-0,60441		40	35	8,5833	
2	Angola	2012				9,1	35	17	16,7	
2	Angola	2011	-1,14517	-1,1026	-1,12389		35	17	18,8	
2	Angola	2010	-1,12292	-1,03701	-1,07996	8,6	35	17	22,5	
2	Angola	2009	-0,97656	-1,03762	-1,00709		35	15	15,7	42,7
2	Angola	2008	-1,07131	-1,06091	-1,06611	4,1	35	15	12,5336	
2	Angola	2007	-1,23727	-1,04876	-1,14302		35	15	17,6988	
2	Angola	2006	-1,37154	-1,13631	-1,25393		35	15	19,5108	
2	Angola	2005	-1,16884	-1,28809	-1,22847		35	15	67,7181	
2	Angola	2004	-1,2846	-1,24638	-1,26549		35	15	82,3342	
2	Angola	2003	-1,13841	-1,23314	-1,18578		35	15	96,115	
2	Angola	2002	-1,25417	-1,48707	-1,37062		35	15	97,3358	58,64
3	Argentina	2012				9,6	35	35	14,1	
3	Argentina	2011	-0,15906	-0,73555	-0,44731	11,8	35	35	14,1	
3	Argentina	2010	-0,21131	-0,75503	-0,48317	12,4	35	35	10,6	44,5

3	Argentina	2009	-0,34551	-0,84365	-0,59458	13,5	35	35	15,7	46,1
3	Argentina	2008	-0,12283	-0,72772	-0,42527	13,5	35	35	19,4682	46,3
3	Argentina	2007	-0,02786	-0,68579	-0,35682	10	35	35	11,052	47,4
3	Argentina	2006	-0,03285	-0,64936	-0,3411	7	35	35	8,6269	47,7
3	Argentina	2005	-0,08829	-0,56762	-0,32795	5	35	35	6,1632	49,3
3	Argentina	2004	-0,02051	-0,69181	-0,35616	8,06	35	35	82,3342	50,2
3	Argentina	2003	-0,00951	-0,71932	-0,36442	7,84	35	35	19,1462	54,7
3	Argentina	2002	-0,26004	-0,93764	-0,59884	10,78	35	35	51,6788	53,8
4	Australia	2012					30	45	7	35,2
4	Australia	2011	1,739433	1,789629	1,764531	9,1	30	45	7,7	35,2
4	Australia	2010	1,814114	1,638126	1,72612	8,5	30	45	7,3	35,2
4	Australia	2009	1,750799	1,770497	1,760648		30	45	6	35,2
4	Australia	2008	1,780872	1,756162	1,768517		30	45	8,9083	35,2
4	Australia	2007	1,823371	1,673533	1,748452		30	45	8,1958	35,2
4	Australia	2006	1,758561	1,617078	1,687819	9,1	30	47	9,4125	35,2
4	Australia	2005	1,765651	1,597923	1,681787	10,4	30	47	9,0583	35,2
4	Australia	2004	2,038821	1,734342	1,886582	9,64	30	47	8,85	35,2
4	Australia	2003	1,814809	1,584026	1,699417	9,12	30	47	8,4125	35,2
4	Australia	2002	1,697198	1,444242	1,57072	7,71	30	47	8,1625	35,2
5	Austria	2012				7,6	25	50		29,2
5	Austria	2011	1,660707	1,414109	1,537408		25	50		29,2
5	Austria	2010	1,884996	1,528125	1,706561		25	50		29,2
5	Austria	2009	1,722385	1,516825	1,619605		25	50		29,2
5	Austria	2008	1,7677	1,60623	1,686965		25	50		29,2
5	Austria	2007	1,863715	1,706422	1,785069	6	25	50		29,2
5	Austria	2006	1,81783	1,65482	1,736325		25	50		29,2
5	Austria	2005	1,720302	1,618364	1,669333	3,8	25	50		29,2
5	Austria	2004	1,909839	1,544744	1,727291		34	50		29,2
5	Austria	2003	2,018822	1,543268	1,781045		34	50		29,2
5	Austria	2002	1,965897	1,564841	1,765369		34	50		29,2

6	Belgium	2012				5,1	34	50		33
6	Belgium	2011	1,66664	1,252731	1,459685	6,8	34	50		33
6	Belgium	2010	1,589819	1,275477	1,432648	2,7	34	50		33
6	Belgium	2009	1,589543	1,309744	1,449644	2,5	34	50	9,5	33
6	Belgium	2008	1,3843	1,391906	1,388103	2,6	34	50	9,2083	33
6	Belgium	2007	1,605324	1,414243	1,509784	1,4	34	50	8,5708	33
6	Belgium	2006	1,710647	1,317784	1,514216	2,1	34	50	7,4917	33
6	Belgium	2005	1,736865	1,247851	1,492358	5,6	34	50	6,7208	33
6	Belgium	2004	1,920938	1,366921	1,64393	4,03	34	50	6,7	33
6	Belgium	2003	1,95968	1,288451	1,624065	2,21	34	50	6,8875	33
6	Belgium	2002	1,986018	1,278929	1,632474	2,24	40,2	50	7,7083	33
7	Bolivia	2012					25	13	11,1	
7	Bolivia	2011	-0,41484	-0,74583	-0,58034		25	13	10,9	
7	Bolivia	2010	-0,45126	-0,77567	-0,61346	18,2	25	13	9,9	
7	Bolivia	2009	-0,53026	-0,83076	-0,68051		25	13	12,4	
7	Bolivia	2008	-0,65608	-0,87251	-0,76429	19,1	25	13	13,8733	56,3
7	Bolivia	2007	-0,59573	-0,98106	-0,7884		25	13	12,8608	57,4
7	Bolivia	2006	-0,67196	-0,86707	-0,76952		25	13	11,8913	56,4
7	Bolivia	2005	-0,68016	-0,62872	-0,65444		25	13	16,615	57,8
7	Bolivia	2004	-0,54566	-0,17772	-0,36169		25	13	14,4699	
7	Bolivia	2003	-0,27666	-0,05778	-0,16722		25	13	17,6633	
7	Bolivia	2002	-0,29114	-0,05025	-0,17069		25	13	20,6325	59,9
8	Bosnia and Herzegovina	2012				6	10	10	6,9	
8	Bosnia and Herzegovina	2011	-0,76009	-0,04159	-0,40084	5	10	10	7,4	
8	Bosnia and Herzegovina	2010	-0,7265	-0,10145	-0,41398	6,6	10	10	7,9	
8	Bosnia and Herzegovina	2009	-0,68943	-0,10183	-0,39563	3,9	10	5	7,9	
8	Bosnia and Herzegovina	2008	-0,57476	-0,16637	-0,37056	8,7	10	5	6,9783	
8	Bosnia and Herzegovina	2007	-0,80033	-0,26305	-0,53169		30	5	7,1725	36,2
8	Bosnia and Herzegovina	2006	-0,59784	-0,42844	-0,51314		30	5	8,0142	
8	Bosnia and Herzegovina	2005	-0,71727	-0,4911	-0,60418		30	5	9,6125	

8	Bosnia and Herzegovina	2004	-0,5666	-0,19077	-0,37869		30	5	10,2817	35,8
8	Bosnia and Herzegovina	2003	-0,77409	-0,47866	-0,62637		30	5	10,87	
8	Bosnia and Herzegovina	2002	-0,97077	-0,55947	-0,76512		30	5	12,6985	28
9	Brazil	2012				15,2	34	27,5	36,6	
9	Brazil	2011	-0,00852	0,166335	0,078906	12,2	34	27,5	43,9	
9	Brazil	2010	0,070938	0,169004	0,119971	15,3	34	27,5	40	
9	Brazil	2009	0,022423	0,135499	0,078961	11,8	34	27,5	44,7	54,7
9	Brazil	2008	-0,0193	0,044074	0,012386	14,6	34	27,5	47,25	55,1
9	Brazil	2007	-0,12799	-0,04564	-0,08682	9,9	34	27,5	43,7167	55,9
9	Brazil	2006	-0,16368	-0,05768	-0,11068	12,1	34	27,5	50,8083	56,8
9	Brazil	2005	-0,09933	0,041074	-0,02913	10,1	34	27,5	55,3833	57,4
9	Brazil	2004	0,066151	0,054642	0,060397	10,11	34	27,5	54,925	57,7
9	Brazil	2003	0,179733	0,313235	0,246484	7,62	34	27,5	67,0833	58,8
9	Brazil	2002	0,033569	0,286739	0,160154	7,76	34	27,5	62,875	59,4
10	Chile	2012				7,8	20	40	10,1	
10	Chile	2011	1,172877	1,538325	1,355601	7	20	40	9	
10	Chile	2010	1,177217	1,472577	1,324897	6	17	40	4,8	
10	Chile	2009	1,146691	1,495347	1,321019	6,7	17	40	7,3	52,1
10	Chile	2008	1,180647	1,535102	1,357875	6,8	17	40	13,2618	
10	Chile	2007	1,266378	1,480556	1,373467	8,7	17	40	8,6713	
10	Chile	2006	1,126649	1,457582	1,292116	6,8	17	40	7,9995	51,8
10	Chile	2005	1,21647	1,425055	1,320763	3,8	17	40	6,6779	
10	Chile	2004	1,200185	1,427898	1,314042		17	40	5,127	
10	Chile	2003	1,235814	1,469457	1,352636	6,46	16,5	40	6,1788	54,6
10	Chile	2002	1,136118	1,442992	1,289555	6,79	16	40	7,7581	55,3
11	China	2012				12,5	25	45	6	
11	China	2011	0,119377	-0,20318	-0,0419	12,7	25	45	6,6	
11	China	2010	0,122686	-0,2071	-0,04221	13,8	25	45	5,8	
11	China	2009	0,13475	-0,19286	-0,02905	17,2	25	45	5,3	42,1
11	China	2008	0,191362	-0,14123	0,025065		25	45	5,31	42,6

11	China	2007	0,224692	-0,16023	0,032231	8,4	33	45	7,47	
11	China	2006	0,11791	-0,19339	-0,03774	12,9	33	45	6,12	
11	China	2005	-0,09212	-0,13197	-0,11204	13,2	33	45	5,58	42,5
11	China	2004	0,00011	-0,27516	-0,13753		33	45	5,58	
11	China	2003	-0,03823	-0,33689	-0,18756	16,38	33	45	5,31	
11	China	2002	-0,0514	-0,53062	-0,29101	10,07	33	45	5,31	42,6
12	Colombia	2012				6,7	33	33	12,6	
12	Colombia	2011	0,244031	0,353496	0,298764	7,5	33	33	11,2	
12	Colombia	2010	0,142876	0,241222	0,192049	12,2	33	33	9,4	55,9
12	Colombia	2009	-0,02408	0,127358	0,05164	12,6	33	33	13	56,7
12	Colombia	2008	-0,00549	0,257444	0,125975	14,1	33	33	17,1756	57,2
12	Colombia	2007	-0,02622	0,23839	0,106087	11,6	34	34	15,3819	58,9
12	Colombia	2006	-0,09746	0,128626	0,01558	10,4	35	38,5	12,8939	58,9
12	Colombia	2005	-0,16276	0,061898	-0,05043		35	38,5	14,5608	56,1
12	Colombia	2004	-0,13768	-0,01721	-0,07744		35	35	15,0831	58,3
12	Colombia	2003	-0,13694	-0,07836	-0,10765		35	35	15,1871	57,9
12	Colombia	2002	-0,40794	0,0231	-0,19242		35	35	16,3268	60,7
13	Croatia	2012				3,1	20	40	9,5	
13	Croatia	2011	0,554	0,557054	0,555527	4,2	20	40	9,7	
13	Croatia	2010	0,619324	0,552206	0,585765	2,9	20	45	10,4	
13	Croatia	2009	0,60599	0,546994	0,576492	4,8	20	45	11,6	
13	Croatia	2008	0,579382	0,492044	0,535713	4,8	20	45	10,0692	33,7
13	Croatia	2007	0,476651	0,45415	0,4654	4,2	20	45	9,3308	
13	Croatia	2006	0,565131	0,379386	0,472259	4,1	20	45	9,333	
13	Croatia	2005	0,479289	0,488581	0,483935	3,7	20	45	11,1911	
13	Croatia	2004	0,473094	0,540879	0,506986	2,1	20	45	11,7452	29
13	Croatia	2003	0,37844	0,480888	0,429664	2,5	20	45	11,5767	
13	Croatia	2002	0,336924	0,29761	0,317267	2,2	20	45	12,84	31,1
14	Czech Republic	2012					19	15	5,4	
14	Czech Republic	2011	1,018404	1,251802	1,135103	5,2	19	15	5,7	25,8

14	Czech Republic	2010	1,002204	1,269477	1,135841		19	15	5,9	25,8
14	Czech Republic	2009	0,978374	1,293875	1,136124		20	15	6	25,8
14	Czech Republic	2008	1,001254	1,160746	1,081		21	15	6,2517	25,8
14	Czech Republic	2007	0,897602	1,032821	0,965211		24	32	5,7884	25,8
14	Czech Republic	2006	1,056379	1,111003	1,083691	5,4	24	32	5,5973	25,8
14	Czech Republic	2005	0,966202	1,117075	1,041639		26	32	5,7767	25,8
14	Czech Republic	2004	0,905102	1,083027	0,994064		28	32	6,0275	25,8
14	Czech Republic	2003	0,89116	1,184438	1,037799		31	32	5,9492	25,8
14	Czech Republic	2002	0,965963	1,185665	1,075814		31	32	6,7242	25,8
15	Denmark	2012				3,4	25	55,4		
15	Denmark	2011	2,170198	1,931577	2,050887	4,9	25	55,4		24,7
15	Denmark	2010	2,163527	1,900514	2,03202	5,6	25	55,4		24,7
15	Denmark	2009	2,292006	1,909966	2,100986	4,7	25	62,3		24,7
15	Denmark	2008	2,227589	1,888232	2,057911	4,4	25	62,3		24,7
15	Denmark	2007	2,34432	1,92328	2,1338	6	25	59		24,7
15	Denmark	2006	2,251133	1,810402	2,030768	5,3	28	59		24,7
15	Denmark	2005	2,140622	1,673747	1,907185	4,4	28	59		24,7
15	Denmark	2004	2,344899	1,780683	2,062791	5,06	30	59		24,7
15	Denmark	2003	2,16178	1,763772	1,962776	5,66	30	59		24,7
15	Denmark	2002	2,096022	1,752214	1,924118	5,52	30	59	7,1	24,7
16	Dominica	2012					29	25	15,5	
16	Dominica	2011	0,611447	0,243159	0,427303		25	25	15,6	
16	Dominica	2010	0,65533	0,429628	0,542479		25	25	12,1	47,2
16	Dominica	2009	0,616379	0,517578	0,566979	11,4	25	25	18,1	48,9
16	Dominica	2008	0,541477	0,553423	0,54745	8,2	25	25	19,945	49
16	Dominica	2007	0,517159	0,797495	0,657327	7,6	25	29	15,8267	48,7
16	Dominica	2006	0,482642	0,928691	0,705666		30	30	19,475	51,9
16	Dominica	2005	0,429245	0,731488	0,580366		25	25	24,1092	51,1
16	Dominica	2004	0,120757	0,58579	0,353274		25	25	32,6342	52
16	Dominica	2003	0,221354	0,786568	0,503961		25	25	31,3917	52,1

16	Dominica	2002	0,424501	0,679928	0,552215		25	25	26,055	50,1
17	Ecuador	2012				18,9	23	35		
17	Ecuador	2011	-0,54845	-1,01751	-0,78298		24	35		
17	Ecuador	2010	-0,67435	-1,1557	-0,91503	14,7	25	35		49,3
17	Ecuador	2009	-0,72827	-1,27669	-1,00248	16,1	25	35		49,4
17	Ecuador	2008	-0,84409	-1,12735	-0,98572	11,9	25	35		50,6
17	Ecuador	2007	-0,84334	-1,11082	-0,97708		25	25	14,93	54,3
17	Ecuador	2006	-0,97192	-1,06899	-1,02046		25	25	9,8064	52,3
17	Ecuador	2005	-0,91683	-0,81028	-0,86355		25	25	9,6195	54,1
17	Ecuador	2004	-0,85061	-0,7023	-0,77645	10,1	25	25	9,9501	
17	Ecuador	2003	-0,83396	-0,66935	-0,75165		25	25	13,64	55,1
17	Ecuador	2002	-0,85752	-0,67472	-0,76612		25	25	15,813	
18	Finland	2012				8	24,5	49		
18	Finland	2011	2,246964	1,77298	2,009972	8,8	26	49,2		26,9
18	Finland	2010	2,237616	1,82912	2,033368	9,4	26	49,6		26,9
18	Finland	2009	2,228277	1,782306	2,005291	8,5	26	49,8		26,9
18	Finland	2008	2,035639	1,621701	1,82867	9,2	26	50,7		26,9
18	Finland	2007	1,964855	1,554608	1,759732	7,6	26	51		26,9
18	Finland	2006	2,124252	1,627803	1,876027	8,2	26	51,4		26,9
18	Finland	2005	2,157755	1,690633	1,924194	8,6	26	53,5		26,9
18	Finland	2004	2,21022	1,812196	2,011208	7,5	29	53,5	3,6889	26,9
18	Finland	2003	2,264352	1,86238	2,063366	7,5	29	53,5	4,13	26,9
18	Finland	2002	2,169184	1,853848	2,011516	8,5	29	53,5	4,821	26,9
19	France	2012				3,2	34,4	45		
19	France	2011	1,364101	1,109965	1,237033	2,4	34,4	41		32,7
19	France	2010	1,438733	1,312423	1,375578	2,4	34,4	41		32,7
19	France	2009	1,475326	1,217626	1,346476	3,2	34,4	40		32,7
19	France	2008	1,582725	1,274666	1,428696	2,8	34,4	40		32,7
19	France	2007	1,480006	1,276224	1,378115	1,7	34,4	40		32,7
19	France	2006	1,582872	1,222522	1,402697	1,3	34,4	40		32,7

19	France	2005	1,706714	1,220794	1,463754	2,3	35	48,1		32,7
19	France	2004	1,81469	1,231117	1,522904	1,45	35,4	48,1	6,6	32,7
19	France	2003	1,723194	1,216454	1,469824	1,51	35,4	48,1	6,6	32,7
19	France	2002	1,601053	0,986699	1,293876	1,27	35,4	48,1	6	32,7
20	Germany	2012				5	15,825	45	3,9	
20	Germany	2011	1,533604	1,51162	1,522612	5,6	15,825	45	4	28,3
20	Germany	2010	1,552398	1,576689	1,564543	5,7	15,825	45	3,3	28,3
20	Germany	2009	1,571719	1,525017	1,548368	5,1	15,825	45	6,4	28,3
20	Germany	2008	1,554853	1,470221	1,512537	4	15,825	45	6,5	28,3
20	Germany	2007	1,662619	1,597332	1,629976		21,9	45	5,7	28,3
20	Germany	2006	1,646714	1,54635	1,596532	3	21,9	42	4,5	28,3
20	Germany	2005	1,543406	1,493509	1,518458	4,2	21,9	42	4,5	28,3
20	Germany	2004	1,534746	1,490477	1,512611	4,31	21,9	45	4,5	28,3
20	Germany	2003	1,401347	1,510705	1,456026	4,64	23,2	45	5,5	28,3
20	Germany	2002	1,720683	1,544483	1,632583	4,83	21,9	45	9,02	28,3
21	Greece	2012				12,3	20	45		
21	Greece	2011	0,478029	0,509778	0,493903	15,8	20	45		
21	Greece	2010	0,520179	0,651411	0,585795	14,8	24	45		
21	Greece	2009	0,582086	0,822434	0,70226	15,1	25	40		
21	Greece	2008	0,644187	0,857823	0,751005	12,6	25	40		
21	Greece	2007	0,621718	0,876112	0,748915	13,3	25	40		
21	Greece	2006	0,724193	0,824184	0,774189	8,2	29	40		
21	Greece	2005	0,71894	0,926647	0,822794	10,5	32	40		
21	Greece	2004	0,83441	0,85545	0,84493	6,54	35	40		
21	Greece	2003	0,749383	0,997967	0,873675	19,61	35	40	6,7858	
21	Greece	2002	0,771846	0,972952	0,872399		35	40	7,4133	34,3
22	Guatemala	2012				5,1	31	31	13,4867	
22	Guatemala	2011	-0,70062	-0,12914	-0,41488	2,5	31	31	13,43	
22	Guatemala	2010	-0,70471	-0,15395	-0,42933	6,6	31	31	13,3417	
22	Guatemala	2009	-0,68694	-0,14283	-0,41489	3,3	31	31	13,8492	

22	Guatemala	2008	-0,53474	-0,1669	-0,35082		31	31	13,3917	
22	Guatemala	2007	-0,52244	-0,20756	-0,365		31	31	12,8367	
22	Guatemala	2006	-0,57712	-0,21412	-0,39562		31	31	12,7625	55,9
22	Guatemala	2005	-0,69747	-0,39353	-0,5455		31	31	13,0333	
22	Guatemala	2004	-0,64077	-0,18568	-0,41323		31	31	13,8108	54,5
22	Guatemala	2003	-0,4475	-0,34075	-0,39412		31	31	14,9783	56,1
22	Guatemala	2002	-0,49322	-0,16104	-0,32713		31	31	16,8642	59,2
23	Hungary	2012				8,1	19	16	9,0093	
23	Hungary	2011	0,705322	1,046198	0,87576	2	19	16	8,3204	
23	Hungary	2010	0,696964	1,031902	0,864433	5,4	19	32	7,5869	
23	Hungary	2009	0,701452	1,091916	0,896684	6,7	20	36	11,0369	
23	Hungary	2008	0,760565	1,187227	0,973896	5,3	20	36	10,1817	
23	Hungary	2007	0,760218	1,185349	0,972784	4,8	20	36	9,0859	31,2
23	Hungary	2006	0,904314	1,205287	1,054801	6,7	17,3	36	8,0794	
23	Hungary	2005	0,79512	1,112534	0,953827	2	16	38	8,5409	
23	Hungary	2004	0,898782	1,176149	1,037465	2,18	16	38	12,8245	30
23	Hungary	2003	0,961751	1,118526	1,040139		18	38	9,6034	
23	Hungary	2002	1,020237	1,310162	1,165199	5,48	18	38	10,1689	26,8
24	Iceland	2012					20,0	46,2	8,3243	
24	Iceland	2011	1,566826	1,011414	1,28912		20,0	46,2	7,6981	39,2
24	Iceland	2010	1,578167	0,890104	1,234136	7,4	18,0	46,1	10,257	39,2
24	Iceland	2009	1,646038	1,012473	1,329256	8,9	15,0	37,2	18,9877	39,2
24	Iceland	2008	1,816057	1,334546	1,575301	7,1	15,0	35,7	20,1433	39,2
24	Iceland	2007	1,789401	1,516783	1,653092	8,8	18,0	35,7	19,2908	39,2
24	Iceland	2006	1,864736	1,555534	1,710135	6,7	18,0	36,7	17,909	39,2
24	Iceland	2005	1,994875	1,60901	1,801942	7,3	18,0	24,8	14,7775	39,2
24	Iceland	2004	2,124655	1,641451	1,883053	7,3	18,0	25,8	12,0167	39,2
24	Iceland	2003	2,120046	1,644171	1,882108	7,3	18,0		11,95	39,2
24	Iceland	2002	2,010376	1,514409	1,762393	10,4	18,0		15,3667	39,2
25	India	2012					32,45	30	10,6042	

25	India	2011	-0,02877	-0,34012	-0,18445		33,22	30	10,1667	
25	India	2010	-0,00767	-0,3891	-0,19839		33,99	30	8,3333	33,9
25	India	2009	-0,01951	-0,32197	-0,17074		33,99	30	12,1875	
25	India	2008	-0,02698	-0,35824	-0,19261	16,5	33,99	30	13,3125	
25	India	2007	0,109447	-0,26465	-0,0776	5,5	33,99	30	13,0208	
25	India	2006	-0,04141	-0,23093	-0,13617	5,6	33,66	30	11,1875	
25	India	2005	-0,08404	-0,24292	-0,16348		36,59	30	10,75	33,4
25	India	2004	-0,10433	-0,39915	-0,25174		36,59	30	10,9167	
25	India	2003	-0,07079	-0,36484	-0,21782		36,75	30	11,4583	
25	India	2002	-0,13083	-0,37928	-0,25506	12,1	36,75	30	11,9167	
26	Iran	2012				9,5	25	35		
26	Iran	2011	-0,46234	-1,6822	-1,07227	11,2	25	35	11	
26	Iran	2010	-0,50221	-1,68685	-1,09453	12,2	25	35	12	
26	Iran	2009	-0,60617	-1,72578	-1,16598	6,5	25	35	12	
26	Iran	2008	-0,60135	-1,60922	-1,10528	6,8	25	35	12	
26	Iran	2007	-0,58974	-1,56208	-1,07591		25	35	12	
26	Iran	2006	-0,57088	-1,45999	-1,01544		25	35	14	
26	Iran	2005	-0,62103	-1,28455	-0,95279		25	35	16	38,3
26	Iran	2004	-0,4455	-1,26225	-0,85387		25	35	16,65	
26	Iran	2003	-0,45506	-1,22744	-0,84125		25	35		
26	Iran	2002	-0,51901	-1,31932	-0,91917		25	35		
27	Ireland	2012				8,3	12,5	48		
27	Ireland	2011	1,421047	1,64725	1,534148	8	12,5	48		34,3
27	Ireland	2010	1,311354	1,660784	1,486069	8,6	12,5	47		34,3
27	Ireland	2009	1,31796	1,739373	1,528667		12,5	46		34,3
27	Ireland	2008	1,526266	1,924115	1,725191	9	12,5	41		34,3
27	Ireland	2007	1,596159	1,852915	1,724537	9	12,5	41		34,3
27	Ireland	2006	1,615117	1,854016	1,734567	7,8	12,5	42		34,3
27	Ireland	2005	1,733453	1,535677	1,634565	8,1	12,5	42	2,6475	34,3
27	Ireland	2004	1,563842	1,602234	1,583038	6,5	12,5	42	2,5658	34,3

27	Ireland	2003	1,575973	1,618549	1,597261	6,7	12,5	42	2,8458	34,3
27	Ireland	2002	1,631082	1,762335	1,696708	8	16,0	42	3,8333	34,3
28	Israel	2012				3,8	25,0	48	5,5515	
28	Israel	2011	1,203067	1,347615	1,275341		24,0	45	5,9691	39,2
28	Israel	2010	1,239915	1,245229	1,242572	3,1	25,0	45	4,9648	39,2
28	Israel	2009	1,13747	1,125448	1,131459	4,3	26,0	46	4,201	39,2
28	Israel	2008	1,34634	1,168754	1,257547	4,5	27,0	47	6,5842	39,2
28	Israel	2007	1,265703	1,10423	1,184966	2,4	29,0	48	6,8564	39,2
28	Israel	2006	1,265471	1,017855	1,141663		31,0	49	8,0892	39,2
28	Israel	2005	1,083086	0,879104	0,981095		34,0	49	6,7673	39,2
28	Israel	2004	1,310428	0,846136	1,078282	3,9	35,0	49	7,4505	39,2
28	Israel	2003	1,245831	0,934805	1,090318		36,0	49	10,6356	39,2
28	Israel	2002	1,12275	0,954046	1,038398	5,7	36,0	49	9,8729	39,2
29	Italy	2012				3,3	27,5	43	5,2225	
29	Italy	2011	0,446745	0,753817	0,600281		27,5	43	4,5992	36
29	Italy	2010	0,514931	0,868838	0,691884	3,7	27,5	43	4,0317	36
29	Italy	2009	0,491015	0,925792	0,708404	5,8	27,5	43	4,7567	36
29	Italy	2008	0,369692	0,912253	0,640973	6,5	27,5	43	6,8373	36
29	Italy	2007	0,284695	0,884152	0,584424	5,6	33,0	43	6,3347	36
29	Italy	2006	0,439975	0,909293	0,674634	3	33,0	43	5,6218	36
29	Italy	2005	0,577066	0,960256	0,768661	6,4	33,0	43	5,3139	36
29	Italy	2004	0,674691	1,085598	0,880144	4,72	33,0	45	5,5062	36
29	Italy	2003	0,796111	1,051407	0,923759	2,26	34,0	45	5,8304	36
29	Italy	2002	0,800663	0,929045	0,864854	3,63	36,0	45	6,5365	36
30	Jamaica	2012					33,33	25	17,6283	
30	Jamaica	2011	0,19767	0,328047	0,262858	5,1	33,33	25	19,5093	
30	Jamaica	2010	0,181567	0,278729	0,230148	6,9	33,33	35	20,4545	
30	Jamaica	2009	0,188638	0,273583	0,23111	16,3	33,33	25	16,432	
30	Jamaica	2008	0,281785	0,334895	0,30834	9,1	33,33	25	16,8258	
30	Jamaica	2007	0,290641	0,313616	0,302128		33,33	25	17,1975	

30	Jamaica	2006	0,275263	0,262055	0,268659	10,3	33,33	25	17,6425	
30	Jamaica	2005	-0,08427	0,231206	0,073468	9,5	33,33	25	17,3608	
30	Jamaica	2004	0,207289	0,21454	0,210915		33,33	25	18,1375	44,5
30	Jamaica	2003	0,06081	0,247924	0,154367		33,33	25	18,8867	
30	Jamaica	2002	-0,02206	0,227819	0,102881		33,33	25	18,5017	48,3
31	Japan	2012				6,1	28,0	50	1,4075	
31	Japan	2011	1,345518	0,897772	1,121645	8,3	28,0	50	1,5009	
31	Japan	2010	1,395024	0,983561	1,189292	7,4	28,0	50	1,5983	
31	Japan	2009	1,334356	1,053328	1,193842	7,8	28,0	50	1,7233	
31	Japan	2008	1,433992	1,116661	1,275327	7,9	28,0	50	1,9095	
31	Japan	2007	1,435564	1,114061	1,274812	8,6	28,0	50	1,8833	
31	Japan	2006	1,536734	1,234423	1,385579	4,8	28,0	50	1,6648	
31	Japan	2005	1,34534	1,232287	1,288813	5,4	28,0	50	1,6769	
31	Japan	2004	1,42466	1,141043	1,282851	4,75	28,0	50	1,7666	
31	Japan	2003	1,224642	1,064259	1,144451	6	27,4	50	1,8221	
31	Japan	2002	1,070835	0,484142	0,777489	6,81	27,4	50	1,8649	
32	Korea, South	2012				9,6	24,2	38	5,3958	
32	Korea, South	2011	1,232367	0,952724	1,092545	10,9	24,2	35	5,7575	31,6
32	Korea, South	2010	1,188718	0,920402	1,05456	11,2	24,2	35	5,5117	31,6
32	Korea, South	2009	1,078275	0,824502	0,951389	11,8	24,2	35	5,6492	31,6
32	Korea, South	2008	1,090204	0,706586	0,898395	12,8	27,5	35	7,1683	31,6
32	Korea, South	2007	1,254036	0,909611	1,081823		27,5	35	6,5517	31,6
32	Korea, South	2006	1,080087	0,732046	0,906067		27,5	35	5,9875	31,6
32	Korea, South	2005	1,019477	0,820714	0,920096		27,5	35	5,5933	31,6
32	Korea, South	2004	0,943602	0,805812	0,874707		29,7	36	5,9042	31,6
32	Korea, South	2003	0,925874	0,749134	0,837504		29,7	36	6,2367	31,6
32	Korea, South	2002	0,886253	0,802902	0,844577	10,2	29,7	36	6,7692	31,6
33	Latvia	2012				7,9	15,0	25	5,5175	
33	Latvia	2011	0,68445	0,954622	0,819536	5,7	15,0	25	6,3883	
33	Latvia	2010	0,697024	0,976619	0,836821	7,6	15,0	26	9,5583	

33	Latvia	2009	0,606033	0,979364	0,792698	9	15,0	23	16,23	34,8
33	Latvia	2008	0,562932	1,024651	0,793792	3	15,0	25	11,8525	36,6
33	Latvia	2007	0,490082	1,005378	0,74773	3,4	15,0	25	10,9092	36,3
33	Latvia	2006	0,68502	0,99697	0,840995	5,7	15,0	25	7,2925	
33	Latvia	2005	0,589372	0,940038	0,764705	5	15,0	25	6,1067	
33	Latvia	2004	0,647434	0,986913	0,817173		15,0	25	7,4483	35,7
33	Latvia	2003	0,656768	0,95556	0,806164		19,0	25	5,3808	37,7
33	Latvia	2002	0,543234	0,882993	0,713114		19,0	25	7,9683	35,9
34	Malaysia	2012				7	25,0	26	4,7858	
34	Malaysia	2011	0,999484	0,658212	0,828848	5,2	25,0	26	4,915	
34	Malaysia	2010	1,095226	0,616507	0,855867	7,9	25,0	26	5	
34	Malaysia	2009	0,959159	0,328502	0,64383	4,3	25,0	27	5,0842	46,2
34	Malaysia	2008	1,150996	0,371482	0,761239		26,0	28	6,08	
34	Malaysia	2007	1,239542	0,549869	0,894705		27,0	28	6,4092	46
34	Malaysia	2006	1,186536	0,566709	0,876622	7,3	28,0	28	6,4858	
34	Malaysia	2005	1,134693	0,611302	0,872998		28,0	28	5,9525	
34	Malaysia	2004	1,128076	0,494295	0,811186		28,0	28	6,0458	37,9
34	Malaysia	2003	1,173958	0,60385	0,888904		25,0	28	6,3008	
34	Malaysia	2002	0,992513	0,527368	0,759941		25,0	28	6,5283	
35	Mexico	2012				4,7	30,0	30	4,7308	
35	Mexico	2011	0,323868	0,348096	0,335982	3	30,0	30	4,9158	
35	Mexico	2010	0,165828	0,298509	0,232168		30,0	30	5,2867	47,2
35	Mexico	2009	0,189373	0,269784	0,229578		28,0	28	7,0742	
35	Mexico	2008	0,170364	0,34215	0,256257	4,9	28,0	28	8,7058	48,3
35	Mexico	2007	0,164756	0,381391	0,273073		28,0	28	7,5608	
35	Mexico	2006	0,160355	0,406434	0,283394	2,3	29,0	29	7,5118	48,1
35	Mexico	2005	0,078956	0,277279	0,178118	1,9	30,0	30	9,695	51,2
35	Mexico	2004	0,168122	0,44184	0,304981		33,0	33	7,4383	46,1
35	Mexico	2003	0,225593	0,384508	0,30505		34,0		7,0225	
35	Mexico	2002	0,250356	0,457741	0,354048	1,5	35,0		8,2108	49,7

36	Netherlands	2012				9,5	25,0	52	1,625	
36	Netherlands	2011	1,790193	1,84492	1,817557	8,7	25,0	52	2	30,9
36	Netherlands	2010	1,731042	1,794825	1,762933	9	25,5	52	1,75	30,9
36	Netherlands	2009	1,748422	1,761384	1,754903	8,1	25,5	52	1,9833	30,9
36	Netherlands	2008	1,686671	1,772919	1,729795	7,2	25,5	52	4,6042	30,9
36	Netherlands	2007	1,726785	1,799795	1,76329	6,4	25,5	52	4,6042	30,9
36	Netherlands	2006	1,776527	1,682278	1,729402	6,6	29,6	52	3,5417	30,9
36	Netherlands	2005	1,949091	1,673423	1,811257	5,7	31,5	52	2,7708	30,9
36	Netherlands	2004	2,119223	1,79175	1,955486	6,1	34,5	52	2,75	30,9
36	Netherlands	2003	2,034048	1,743537	1,888792	3,77	34,5	52	3	30,9
36	Netherlands	2002	2,004474	1,861534	1,933004	4,56	34,5	52	3,9583	30,9
37	Norway	2012				5,8	28,0	47,8		
37	Norway	2011	1,762931	1,413244	1,588087	6,6	28,0	47,8		25,8
37	Norway	2010	1,790514	1,456217	1,623366	6,7	28,0	47,8		25,8
37	Norway	2009	1,74619	1,419706	1,582948	8,3	28,0	47,8	4,28	25,8
37	Norway	2008	1,842794	1,414221	1,628508	7,7	28,0	47,8	7,279	25,8
37	Norway	2007	2,031287	1,361257	1,696272	4,8	28,0	47,8	6,6473	25,8
37	Norway	2006	1,952566	1,256462	1,604514	6	28,0	47,8	4,7	25,8
37	Norway	2005	1,854974	1,44638	1,650677	7,3	23,8	51,3	4,04	25,8
37	Norway	2004	2,101782	1,453559	1,777671	6,29	28,0	55,3	4,04	25,8
37	Norway	2003	1,915612	1,292904	1,604258	6,14	28,0		4,73	25,8
37	Norway	2002	1,903631	1,230194	1,566912	6,27	28,0		8,71	25,8
38	Peru	2012				5,1	30,0	30	19,2369	
38	Peru	2011	-0,15086	0,501425	0,175282	5,7	30,0	30	18,6779	
38	Peru	2010	-0,20748	0,471199	0,131858	7,2	30,0	30	18,9769	48,1
38	Peru	2009	-0,4098	0,410583	0,000391	7,5	30,0	30	21,0419	49,1
38	Peru	2008	-0,33251	0,336371	0,001928	8,3	35,0	30	23,6734	49
38	Peru	2007	-0,47871	0,262218	-0,10825	15,2	35,0	30	22,8556	51,7
38	Peru	2006	-0,55226	0,141726	-0,20527	12,4	35,0	30	23,9333	50,9
38	Peru	2005	-0,60044	0,081359	-0,25954		32,0	30	25,5338	51,1

38	Peru	2004	-0,46855	0,232334	-0,11811	14,46	32,0	30	24,6746	50,3
38	Peru	2003	-0,42215	0,176319	-0,12291		32,0	30	21,0157	55,2
38	Peru	2002	-0,35153	0,026887	-0,16232	14,9	32,0	30	20,7654	55,6
39	Portugal	2012				6,2	30,0	46,5		
39	Portugal	2011	0,97448	0,656311	0,815396	5,7	27,0	46,5		38,5
39	Portugal	2010	1,0365	0,759264	0,897882	5,4	25,0	45,9		38,5
39	Portugal	2009	1,176544	1,002421	1,089483		25,0	42		38,5
39	Portugal	2008	1,00956	1,082776	1,046168		25,0	42		38,5
39	Portugal	2007	0,855501	1,06942	0,962461	7,1	25,0	42		38,5
39	Portugal	2006	0,83984	1,054102	0,946971		25,0	42		38,5
39	Portugal	2005	1,063595	1,26638	1,164987		25,0	40		38,5
39	Portugal	2004	1,09558	1,207917	1,151749	7,3	25,0	40		38,5
39	Portugal	2003	1,152524	1,225991	1,189257		30,0	40		38,5
39	Portugal	2002	1,197596	1,271101	1,234349		30,0	40		38,5
40	Romania	2012				3,9	16,0	16	11,3292	
40	Romania	2011	-0,21902	0,722387	0,251683	4,6	16,0	16	12,1275	24,72
40	Romania	2010	-0,15447	0,663038	0,254286	2,1	16,0	16	14,0725	24,2
40	Romania	2009	-0,25444	0,616921	0,181239	3,4	20,0	16	17,275	30
40	Romania	2008	-0,26932	0,585751	0,158216	2,1	24,0	16	14,9883	31,2
40	Romania	2007	-0,27664	0,532167	0,127763	2,5	24,0	16	13,3483	32,1
40	Romania	2006	-0,18952	0,47537	0,142925		24,0	16	13,9817	32,1
40	Romania	2005	-0,27359	0,209352	-0,03212		24,0	16	19,6008	31,6
40	Romania	2004	-0,16741	0,159706	-0,00385		24,0	40	25,6125	31,7
40	Romania	2003	-0,26871	-0,0723	-0,1705		24,0	40	25,435	31,1
40	Romania	2002	-0,22909	0,020229	-0,10443		24,0	40	35,425	31,5
41	Russia	2012				2	20,0	13	9,1	
41	Russia	2011	-0,40391	-0,35408	-0,379	2,8	20,0	13	8,4583	
41	Russia	2010	-0,39994	-0,36313	-0,38154	2,8	20,0	13	10,8167	
41	Russia	2009	-0,35129	-0,35087	-0,35108	2,3	20,0	13	15,3083	40,1
41	Russia	2008	-0,39631	-0,41718	-0,40674	1,1	20,0	13	12,225	42,3

41	Russia	2007	-0,4236	-0,31001	-0,3668	1,7	20,0	13	10,0333	43,7
41	Russia	2006	-0,49401	-0,43505	-0,46453	1,2	20,0	13	10,425	42,1
41	Russia	2005	-0,45936	-0,17726	-0,31831		30,0	13	10,6833	37,5
41	Russia	2004	-0,38199	-0,11162	-0,24681		30,0	13	11,4417	37,1
41	Russia	2003	-0,39215	-0,18299	-0,28757		30,0	13	12,975	37,3
41	Russia	2002	-0,34284	-0,26123	-0,30203	1,11	30,0	13	15,7	35,7
42	Serbia	2012					10,0	15	17,4	
42	Serbia	2011	-0,14532	0,005612	-0,06985		10,0	15	17,17	
42	Serbia	2010	-0,10422	-0,04032	-0,07227		10,0	15	17,3	29,6
42	Serbia	2009	-0,09465	-0,13744	-0,11604	10,1	18,0	15	11,78	27,8
42	Serbia	2008	-0,18146	-0,29451	-0,23798	9,3	18,0	15	16,1267	28,2
42	Serbia	2007	-0,21673	-0,34362	-0,28018	5,3	20,0	15	11,13	29,4
42	Serbia	2006	-0,1998	-0,44975	-0,32477		20,0	10	16,56	29,6
42	Serbia	2005					20,0	10	16,8317	33,4
42	Serbia	2004					22,0	10	15,5269	32,9
42	Serbia	2003					22,0	10	15,4814	32,8
42	Serbia	2002					22,0	10	19,7146	32,7
43	Singapore	2012				3,1	17,0	20	5,38	
43	Singapore	2011	2,156807	1,82529	1,991048	3,3	17,0	20	5,38	42,5
43	Singapore	2010	2,244724	1,812916	2,02882		17,0	20	5,38	42,5
43	Singapore	2009	2,265554	1,811709	2,038632		19,0	20	5,38	42,5
43	Singapore	2008	2,407654	1,90949	2,158572		19,0	20	5,38	42,5
43	Singapore	2007	2,36062	1,833231	2,096925		19,0	20	5,33	42,5
43	Singapore	2006	2,176716	1,771681	1,974198	3,4	19,0	20	5,3125	42,5
43	Singapore	2005	1,996066	1,796511	1,896288	4,7	19,0	21	5,3	42,5
43	Singapore	2004	2,033281	1,804619	1,91895	3,88	19,0	22	5,3	42,5
43	Singapore	2003	1,960539	1,825609	1,893074	1,78	25,0		5,3067	42,5
43	Singapore	2002	1,851883	1,939	1,895442	3,12	25,0		5,3458	42,5
44	Slovenia	2012				5,8	20,0	41		
44	Slovenia	2011	0,985216	0,632536	0,808876	4,8	20,0	41		

44	Slovenia	2010	1,030799	0,701761	0,86628	4,9	20,0	41		
44	Slovenia	2009	1,156147	0,870037	1,013092	5,6	21,0	41	5,94	
44	Slovenia	2008	1,191467	0,824284	1,007876	5,6	22,0	41	6,6583	
44	Slovenia	2007	0,942624	0,797187	0,869905	4,6	23,0	41	5,9125	
44	Slovenia	2006	0,983769	0,775812	0,87979	4,4	25,0	50	7,4083	
44	Slovenia	2005	0,919416	0,832994	0,876205	6,3	25,0	50	7,8	
44	Slovenia	2004	0,970801	0,856788	0,913795	4,2	25,0	50	8,65	31,2
44	Slovenia	2003	1,071957	0,867417	0,969687	5,4	25,0	50	10,75	30,8
44	Slovenia	2002	0,897989	0,864955	0,881472	6,7	25,0	50	13,1708	29,2
45	South Africa	2012				2,3	34,6	40	8,75	
45	South Africa	2011	0,368881	0,436321	0,402601	2,3	34,6	40	9	
45	South Africa	2010	0,382441	0,390876	0,386659	2,1	34,6	40	9,8333	
45	South Africa	2009	0,462595	0,435232	0,448913	1,4	30,0	40	11,7083	63,1
45	South Africa	2008	0,534599	0,4874	0,511	2,3	30,0	40	15,125	
45	South Africa	2007	0,506743	0,518362	0,512552		32,5	40	13,1667	
45	South Africa	2006	0,518109	0,701543	0,609826	1,7	35,0	40	11,1667	67,4
45	South Africa	2005	0,644622	0,671809	0,658216	1,3	35,0	40	10,625	
45	South Africa	2004	0,664746	0,665314	0,66503	1,44	35,0	40	11,2917	
45	South Africa	2003	0,683104	0,778381	0,730743	1,08	35,0	40	14,9583	
45	South Africa	2002	0,637907	0,629977	0,633942	1,12	35,0	40	15,75	57,8
46	Spain	2012				8,5	30,0	52		
46	Spain	2011	1,021439	1,092676	1,057057	8,9	30,0	45		34,7
46	Spain	2010	0,981735	1,162015	1,071875	7,7	30,0	43		34,7
46	Spain	2009	0,926783	1,17888	1,052832	6,4	30,0	43		34,7
46	Spain	2008	0,885733	1,227821	1,056777	9,1	30,0	43		34,7
46	Spain	2007	0,965916	1,201784	1,08385	6,4	32,5	43		34,7
46	Spain	2006	0,871598	1,145553	1,008576	5,4	35,0	45		34,7
46	Spain	2005	1,488634	1,294576	1,391605	7,7	35,0	45		34,7
46	Spain	2004	1,373442	1,329381	1,351411	7,79	35,0	45		34,7
46	Spain	2003	1,89883	1,311911	1,60537	4,78	35,0	45		34,7

46	Spain	2002	1,855474	1,353447	1,60446	8,39	35,0	45	4,3058	34,7
47	Sweden	2012				5,2	26,3	56,6		
47	Sweden	2011	1,961028	1,835567	1,898298	7	26,3	56,6		25
47	Sweden	2010	2,000982	1,709628	1,855305	6,4	26,3	56,6		25
47	Sweden	2009	2,039521	1,707027	1,873274		26,3	56,7		25
47	Sweden	2008	1,906695	1,666722	1,786709		28,0	56,7		25
47	Sweden	2007	1,991916	1,598337	1,795126	4,7	28,0	56,8		25
47	Sweden	2006	1,830822	1,461904	1,646363	5	28,0	56,8	3,314	25
47	Sweden	2005	1,889506	1,51486	1,702183	6,3	28,0	56,8	4	25
47	Sweden	2004	2,144012	1,690708	1,91736	6,03	28,0	56,7	4,79	25
47	Sweden	2003	2,093538	1,619816	1,856677	5,36	28,0	56,7	5,64	25
47	Sweden	2002	2,033928	1,616635	1,825282	6,81	28,0	56,7	5,55	25
48	Switzerland	2012				8,4	6,7	40	2,6883	
48	Switzerland	2011	1,89115	1,637395	1,764272	10,1	6,7	40	2,7183	33,7
48	Switzerland	2010	1,909908	1,646252	1,77808	8,7	6,7	40	2,7333	33,7
48	Switzerland	2009	1,986132	1,573689	1,77991	8,4	6,7	40	2,7508	33,7
48	Switzerland	2008	2,019682	1,589183	1,804432		6,7	40	3,3425	33,7
48	Switzerland	2007	2,030659	1,6529	1,841779	6,6	6,7	40,4	3,15	33,7
48	Switzerland	2006	2,025148	1,505749	1,765448		6,7	40,4	3,0317	33,7
48	Switzerland	2005	1,887899	1,538064	1,712981	9,7	6,7	40,4	3,1192	33,7
48	Switzerland	2004	2,217569	1,666198	1,941883		6,5	40,4	3,195	33,7
48	Switzerland	2003	1,805266	1,708917	1,757092	7,3	6,5	40,4	3,2692	33,7
48	Switzerland	2002	2,023317	1,777607	1,900462	6,8	6,4	40,4	3,9317	33,7
49	Thailand	2012				29,7	23,0	37	7,0975	
49	Thailand	2011	0,102637	0,236564	0,169601	30,1	30,0	37	6,9142	
49	Thailand	2010	0,084831	0,202341	0,143586		30,0	37	5,935	39,4
49	Thailand	2009	0,170814	0,250963	0,210889		30,0	37	5,9625	40
49	Thailand	2008	0,245686	0,226236	0,235961		30,0	37	7,0417	40,5
49	Thailand	2007	0,358574	0,135772	0,247173	21,4	30,0	37	7,05	
49	Thailand	2006	0,387151	0,242991	0,315071	17,4	35,0	37	7,3542	42,4

49	Thailand	2005	0,429161	0,455116	0,442139	14,1	35,0	37	5,7917	
49	Thailand	2004	0,362202	0,251331	0,306766		33,0	37	5,5	
49	Thailand	2003	0,376206	0,370559	0,373383		30,0	37	5,9375	
49	Thailand	2002	0,29319	0,164903	0,229046	13,3	30,0	37	6,875	42
50	Turkey	2012				8,7	20,0	35		
50	Turkey	2011	0,409213	0,422114	0,415664	8	20,0	35		
50	Turkey	2010	0,353137	0,325334	0,339235	10,7	20,0	35		40
50	Turkey	2009	0,33965	0,315243	0,327447		20,0	35		38,7
50	Turkey	2008	0,255512	0,270078	0,262795	4,8	20,0	35		39
50	Turkey	2007	0,29408	0,323926	0,309003	5,5	20,0	35		39,3
50	Turkey	2006	0,155368	0,294886	0,225127	11,4	20,0	35		40,3
50	Turkey	2005	0,162724	0,272451	0,217588		30,0	35		42,6
50	Turkey	2004	0,043412	0,073972	0,058692		33,0	40		42,7
50	Turkey	2003	0,039336	0,030959	0,035147		30,0	40		43,4
50	Turkey	2002	0,044635	0,087173	0,065904		33,0	40		42,7
51	United Arab Emirates	2012					55,0	0		
51	United Arab Emirates	2011	0,951929	0,399546	0,675737	2,7	55,0	0		
51	United Arab Emirates	2010	0,78251	0,369494	0,576002		55,0	0		
51	United Arab Emirates	2009	0,89032	0,497173	0,693747	5,7	28,0	0		
51	United Arab Emirates	2008	0,885724	0,606413	0,746068		28,0	0		
51	United Arab Emirates	2007	0,92685	0,646702	0,786776	3,4	30,0	0		
51	United Arab Emirates	2006	0,914692	0,652641	0,783667	1,4	30,0	0		
51	United Arab Emirates	2005	0,754226	0,687998	0,721112		30,0	0		
51	United Arab Emirates	2004	0,755248	0,828556	0,791902		30,0	0		
51	United Arab Emirates	2003	0,562495	0,658268	0,610382		30,0	0		
51	United Arab Emirates	2002	0,821629	1,116117	0,968873		30,0	0	8,0525	
52	United Kingdom	2012				6,2	24,0	50	5	
52	United Kingdom	2011	1,547938	1,619811	1,583875	7,2	26,0	50	5	36
52	United Kingdom	2010	1,558267	1,746126	1,652197	6,4	28,0	50	5	36
52	United Kingdom	2009	1,504105	1,601857	1,552981	6,1	28,0	40	6,25	36

52	United Kingdom	2008	1,635262	1,778	1,706631	6	28,0	40	4,625	36
52	United Kingdom	2007	1,655768	1,858771	1,757269	5,1	30,0	40	5,5242	36
52	United Kingdom	2006	1,718414	1,849638	1,784026	5,4	30,0	40	4,6458	36
52	United Kingdom	2005	1,747057	1,619856	1,683456	5,1	30,0	40	4,6458	36
52	United Kingdom	2004	1,899971	1,758722	1,829347	5,11	30,0	40	4,3958	36
52	United Kingdom	2003	1,831382	1,665951	1,748667	5,78	30,0	40	3,6875	36
52	United Kingdom	2002	1,849087	1,741349	1,795218	5,5	30,0	40	4	36
53	United States	2012				8,6	32,8	35	3,25	
53	United States	2011	1,406131	1,485022	1,445576	9,1	32,7	35	3,25	40,8
53	United States	2010	1,439457	1,44881	1,444133	7,7	32,7	35	3,25	40,8
53	United States	2009	1,397449	1,40493	1,40119	5,9	32,8	35	3,25	40,8
53	United States	2008	1,535166	1,533041	1,534104	8,3	32,7	35	5,0875	40,8
53	United States	2007	1,590377	1,491702	1,54104	5	32,7	35	8,05	40,8
53	United States	2006	1,556301	1,641529	1,598915	5,4	32,7	35	7,9575	40,8
53	United States	2005	1,573012	1,613144	1,593078	4,7	32,7	35	6,1892	40,8
53	United States	2004	1,799928	1,5852	1,692564	5,45	32,7	35	4,34	40,8
53	United States	2003	1,60633	1,576541	1,591435	5,39	32,7	35	4,1225	40,8
53	United States	2002	1,696281	1,580929	1,638605	5,69	32,7	35	4,675	40,8
54	Uruguay	2012				5	25,0	25	11,1992	
54	Uruguay	2011	0,576409	0,409251	0,49283	5,9	25,0	25	9,7818	
54	Uruguay	2010	0,653863	0,365703	0,509783	7,2	25,0	25	10,3262	45,3
54	Uruguay	2009	0,608045	0,349421	0,478733	5,9	34,0	25	15,2848	46,3
54	Uruguay	2008	0,504881	0,243775	0,374328	7,9	34,0	25	12,4476	46,3
54	Uruguay	2007	0,504309	0,201208	0,352759	6,6	34,0	25	8,9397	47,6
54	Uruguay	2006	0,393929	0,292773	0,343351	6,9	34,0	0	9,25	47,2
54	Uruguay	2005	0,505115	0,344607	0,424861		34,0	0	13,6095	45,9
54	Uruguay	2004	0,347946	0,267037	0,307491		34,0	0	23,6791	47,1
54	Uruguay	2003	0,504237	0,276821	0,390529		34,0	0	58,941	46,2
54	Uruguay	2002	0,581859	0,500367	0,541113		34,0	0	118,3799	46,7
55	Venezuela	2012					34,0	34	16,38	

55	Venezuela	2011	-1,10316	-1,49232	-1,29774	1,6	34,0	34	17,15	
55	Venezuela	2010	-1,0163	-1,58939	-1,30284		34,0	34	18,3475	
55	Venezuela	2009	-0,89116	-1,56007	-1,22561	6,5	25,0	34	19,8933	
55	Venezuela	2008	-1,0551	-1,33058	-1,19284		28,0	34	22,3808	
55	Venezuela	2007	-1,01086	-1,36828	-1,18957	5,4	28,0	34	17,105	
55	Venezuela	2006	-0,99869	-1,12728	-1,06298		28,0	34	15,4767	44,8
55	Venezuela	2005	-0,89763	-1,12871	-1,01317	8,6	28,0	34	16,8092	49,5
55	Venezuela	2004	-1,01768	-1,08206	-1,04987		28,0	34	18,4967	47,5
55	Venezuela	2003	-0,95112	-1,03102	-0,99107	9,6	32,0	34	25,1933	48,1
55	Venezuela	2002	-1,00789	-0,647	-0,82744		32,0	34	36,5775	49

### Appendix 3. Constants of Simulation Experiments

$q(\theta)$ (matching function)	0,5
$\theta$ (labour market tightness)	1,5
$r$ (a discount factor)	0,2
$q$ (productivity of education)	10
$p$ (productivity advantage in the regular sector)	2
$\beta$ (a fixed share of surplus)	0,3
$\gamma_y$ (a share of taxes dedicated to the sphere of education)	0,43
$\gamma_k$ (a share of taxes dedicated to the sphere of education)	0,57
$k_0$ (initial costs of posting a vacancy)	1
$y_0$ (initial costs of education)	1