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JOB QUALITY AND ECONOMIC DEVELOPMENT

Qualité de l'emploi et développement économique

Adrien FRONTENAUD[1]

Abstract:
The paper focuses on the impact of job quality on long-term per-capita income in the world. In order to do that, it is necessary to build a synthetic indicator of job quality by taking account of the multidimensional nature of this concept, as defined by the European Commission, the ILO with the concept of "decent work" or by the OECD. We propose an estimation of the steady-state per-capita income for a panel of one hundred and fifty countries. The Two-Stage Least Square Method is used to correct potential problems of endogeneity.
In order to implement a significant variable, we propose, in a first time, an estimation of the steady-state per-capita income in the world (150 countries). After that, we restrict our study on developing countries (105 countries), and finally, we restrict our analysis on emerging countries (29 countries).
The findings show that developing and emerging countries with higher job quality have a higher steady-state level, and also, our findings show that job quality influence positively the conditional convergence.

Résumé :
L'article se concentre sur l'impact de la qualité de l'emploi sur le revenu par habitant à long terme. Afin de faire cela, il est nécessaire de construire un indice de qualité de l'emploi fondé sur les définitions internationales (*decent work* de l'OIT ou OCDE), composées de 9 indicateurs répartis en quatre dimensions bien distinctes en utilisant l'Analyse en Composantes Principales (ACP) pour mesurer le poids de chaque dimension dans la construction de l'indice. Nous proposons une évaluation du revenu par habitant dans 29 pays émergents (voir figure 1), mais avant, pour rendre notre indicateur significatif, nous le construisons dans le monde entier avant de le restreindre aux pays en développement et aux pays émergents.
Dans un premier temps, nous cherchons à déterminer l'impact de la qualité de l'emploi sur le revenu par habitant de long terme dans les pays émergents en utilisant un modèle de type Mankiw, Romer, et Weil (1992) que nous modifierons afin d'intégrer l'impact potentiel de la qualité de l'emploi. L'objectif recherché est d'évaluer les effets de long terme d'une mise en application de politiques favorables à l'amélioration de la qualité des emplois. La méthode des doubles moindres carrés (DMC) est utilisée pour corriger des éventuels problèmes d'endogénéité.

[1] Doctorant en sciences économiques, Université Paris-Est Marne-la-Vallée et Université Paris-Est Créteil: ERUDITE et EA437, TEPP CNRS : FR3435 ; adrien.frontenaud@u-pem.fr

Introduction

For a long time the apprehension of the emerging trajectories was rather restrictive, considering only the possibilities of foreign investments, of capital attraction, growth progression and international opening. The political orientation and the ideological direction of these criteria do not result from chance insofar as the latter were defined like evaluation's elements at the time of the neo-liberal changes, in the middle of 80's (Sgard, 2008). However, from a conceptual point of view this characterization of "emerging" presents a problem, gathering very heterogeneous institutional models which would have in common only certain potentialities for growth around success-stories of the internationalization of exchanges. By widening this categorization analyses are focused on the structural conditions and socio-policies of production, essential in the construction of an emerging economics models (Piveteau and al., 2013). The subcategory of BRICS, known as the leaders of emergence, agglomerates on itself all these evoked weaknesses. Regarded since the beginning of the 21st century as champions of the international exchanges, the latter however look very often to a unicorn, following the Lautier's metaphor (2004): easy to recognize, difficult to describe. These territories appear marked by heterogeneous social structures, whose shapes of labor market are their fundamental expressions. Obviously these markets recover multidimensional aspects resulting from the institutional forms impacting States dynamics, it is thus essential to take them into account in order to translate these trajectories which are theirs. The successive social conflicts within these countries point out the importance of this development problematic characterized by employment and the ensemble of protections which are attached. A very detailed attention must then be given to the factors that contribute to the regulation of labor markets, *a fortiori* by knowing that these countries train the largest providers of employment, recording a growth of creations in spite of global deceleration. However, at the root of this evocation there is a regular confusion between growth and development, so that jobs created in quantity never inform about the intrinsic quality of them. However, it is necessary to note that this employments provide mainly low-incomes and result in a very limited access to the social rights and social security benefits whose legal existence is however not contestable in these countries. Product of the different and successive deregulations on the labor markets since the 1980's, low job quality seems to have been the price to be paid to refocus priorities on growth, at the expense of the expanding social benefits related to the exercise of the activity (Davoine and Erhel, 2007).

Job quality (or quality of employment) thus appears as an important concern of the social partners within the International Labour Organization (ILO), and settles like a major issue in the international public debate. For over a decade, an international debate takes shape on the issues of job quality, carried by the ILO through the concept of decent work, but also through a solid scientific literature materializing it without really summarizing it completely (Burchell and al., 2014).

Job quality seems to be associated with the multidimensional operationalization with the objective of decent work, which is rather naturally comprehensible on the level of the characteristics of each employment. In this way, a well-paid employment, providing a stable status and good work conditions, that leaves the possibility of having a life filled outside work, and in which the relationships in the working environment are good, is an employment of quality. This concept is then by definition multidimensional, but also carries symmetrically on a wide range of criteria and fundamentally interdisciplinary sense there by weakening the strength of the concept. However, without disavowing its weaknesses, job quality is nevertheless discussed as if it were a well-established idea, appearing as a concept of "performance" within the international organizations. These reserves rather seem an important challenge in the current debates, justifying the reconsideration of the place of the labor markets in the emerging trajectories. The tools used must necessarily be adapted to this

multidimensional exploration of the characteristics of employment within the emerging countries and their leaders, by taking into account the multiple institutional realities by nature. This requirement seems all the more essential for the construction of a typology of emerging states through the quality of employment, by the identification of similarities and contrasts on their respective labour markets. These relative regroupings around qualitative identities of employment are essential in order to question their common category and the place of their leaders.

After having studied theoretical links between economic growth and job quality (Frontenaud, 2015) and after questioning the category formed by these countries by studying their variety of job quality regimes (Deghilhem, Frontenaud, 2016), we want to explore empirically the impact of job quality on long-term income. In order to do that, it is necessary to build a synthetic indicator of job quality by taking account of the multidimensional nature of this concept, as defined by the European Commission, the ILO with the concept of "decent work" or by the OECD. Section 2 give a presentation of the concept of job quality. In addition, section 2 detail the content of job quality index by spelling the methodology employed to construct the job quality index. It is then possible to endogenously determine the weight of each dimensions in the aggregate index of job quality by using Principal Components Analysis. Section 3 presents the standard growth models used to estimate the long-term effects of a better job quality of workers on long term-income. As our aggregate indicator of job quality is added in the specification, we obtain a "Mankiw, Romer and Weil model augmented by job quality". The model is estimated at first for a large panel of countries (150) and then for developing countries (105 countries), and finally, we restrict our analysis on emerging countries (29 countries).

2. Job Quality: presentation and definition of the concept

The definition of decent work was the object of a special issue of the International Review of Work in 2003. Ghai (2003) proposes many indicators of decent work. Theoretical and empirical studies highlighted the link between economic growth and quality of employment. Bazillier (2007) already highlighted the positive bond between Core Labor Standards and growth of the income per capita of long run.

Reconcile "quantity" and "quality" of employment appeared necessary and legitimate in a context of world economic growth (Guergoat-Larivière, Merchant, 2013: 24). Although the economic situation is less favourable today, this interest remains present in current work of the ILO, OECD, or the European institutions. The International Labour Organisation (ILO) approaches the concept of job quality by decent work since 1999. By integrating this concept in its conventions, ILO has set for objective to allow each woman and each man "to reach a decent and productive work under conditions of freedom, equity, security and dignity" (ILO, 1999). The action of the ILO is articulated around four major axes: 1) create jobs, 2) ensure the rights to work, 3) extend social protection and finally 4) reinforce the social dialogue. As Ghai (2003) underlines: "the decent work term embraces in its totality the most various aspects of what is work today and synthesizes it in an expression that everyone can apprehend". Force of proposal at the same time in the developed countries, but also in the emerging countries and in the process of development, the objective of decent work is articulated initially around job creation for the greatest number and by the installation of active public policies. The ILO supports that "the economy must generate the possibilities of investing, to undertake, develop competences, to create jobs and durable means of subsistence" in order to reach the full employment. The second axis aims at promoting the universal respect of the principles and basic rights to work by reinforcing the social norms. It is a major axis of strategy of job quality in the emerging countries and under development where the socio-economic conditions of the

workers are weak in majority. The third axis seeks to improve the socio-economic security of all workers by guaranteeing an effective and inclusive social protection system. Within this framework, ILO wishes to support the insertion of all, by guaranteeing sure work conditions. It promotes the exercise of free time and rest, the work-life balance and finally the access to compensation in the event of accident. The fourth and last axis affirm the right for all the workers and in particular most vulnerable to actively take part in the democratic life of their company by taking part in the economic and social guidelines of this one. So in the developed countries, the right to the trade-union membership is ensured by the law, it is not systematically the case in the emerging countries and in the process of development. It is however a precondition to the democracy and the improvement of the wages. The concept of decent work thus implies to take into account the interactions between the four beforehand definite objectives (Bazillier, 2008).

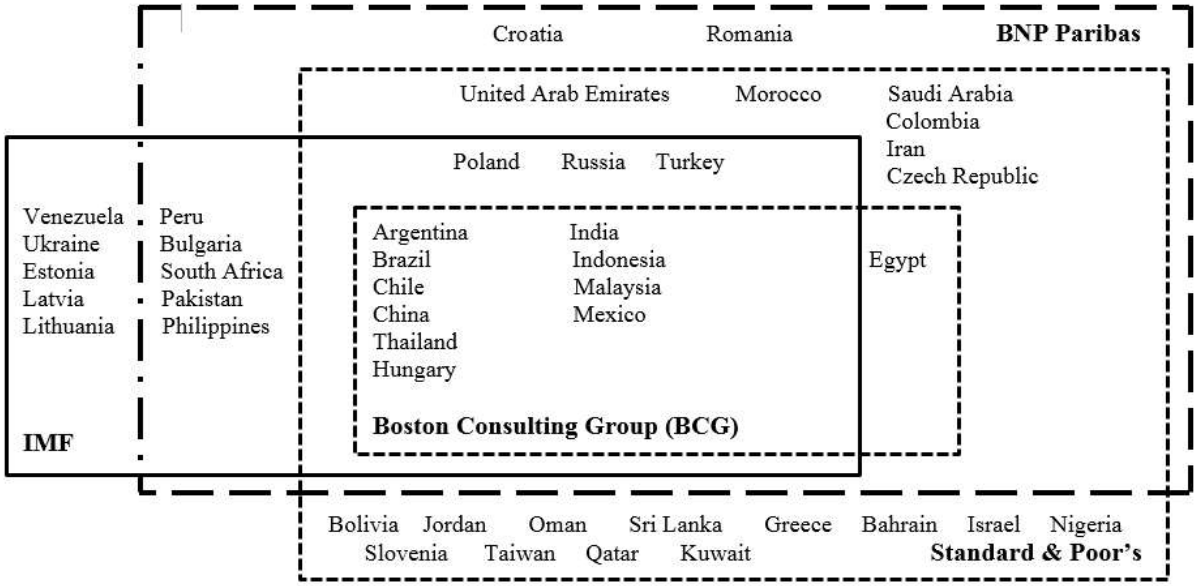
After having studied theoretical links between economic growth and job quality (Frontenaud, 2015), the aim of this paper is to explore empirically the impact of job quality on long-term income. Theoretically, the strong economic growth noted in the emerging countries for at least two decades tended to increase the labour demand, initially making it possible to increase the wages (Fields, 2003). Firms, by redeploying workers lately available in the intensive sectors such as the secondary sector (manufacturing industries, construction) improve the total productivity and thus the production. Moreover, with the economic growth, firms reach new markets, which means that they need even more labour to produce. The volume of employment increases and the companies are supposed to propose higher wages to attract the best workers, which develops the production and consumption. Moreover, the economic growth creates new public incomes making it possible to invest in goods and public services useful to all the community, such as health and education.

Theoretically, in fact the households directly profit from the economic growth and the incomes generated by the improvement of the living conditions. It is useful up to what point to identify the improvement of the quality of employment constitutes an additional lever of growth in the emerging countries, in order to understand by which mechanism the companies, the State, and workers themselves can improve working conditions.

2.1. Justification of the choice of emerging countries

The identification of the emerging countries remains woolly. Gabas and Losch (2008) propose to enter the occurrences for each emerging countries under consideration like, thus noting the overlapping of certain lists, allowing to reveal with robustness a “core” of emerging economies (figure 1).

Figure 1. Emerging countries according to the BCG, the IMF, BNP Paribas and Standard & Poor' S



Source: Adapted to Gabas et Losch (2008).

Thanks to this method, we constitute a sample of country in spite of the fluctuation of the institutional enumerations. In order to reinforce this approach, we confront each country retained with the principal criterion advanced by Vercueil[2] (2012). The combination of these two elements bring us to keep twenty-nine emerging countries: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Egypt, Estonia, Hungary, India, Indonesia, Latvia, Lithuania, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Ukraine, Romania, Russian Federation, Thailand, Turkey, Venezuela, Croatia, Czech Republic, Uruguay, South Africa.

2.2. Justification of the choice of developing countries

According to the World Bank, developing countries are composed to low income countries (GNI per capita, calculated using the World Bank Atlas method, of $1,045 or less). Also, developing countries incorporates middle-income economies which are those with a GNI per capita of more than $1,045 but less than $12,736. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of $4,125. In this paper, we have kept 105 developing countries in total.

2.3. Presentation and construction of job quality indicators

By mobilizing multiple statistical sources, table 1 proposes a list of twelve indicators gathered in seven dimensions making it possible to measure job quality in emerging countries and around the world. These indicators come from different sources:

- ✓ The World Bank: World Development Indicators (WDI) [3];
- ✓ Eurostat [4];

[2] Vercueil's criteria: GDP per capita between 10% and 75% of GDP per capita of OECD members (PPP, 2012).
[3] See http://donnees.banquemondiale.org/
[4] See http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/

- ✓ [OECD.Stat] [5] ;
- ✓ ILO: Key Indicators of the Labour Market (KILM,8th) [6];
- ✓ ILO: Global Extension of Social Security (GESS);
- ✓ UNESCO: Institute for Statistics [7].

The choice of the indicators takes account of the availability of the data in all countries during the period 1990-2015. The complete database for the year 2010 is presented in appendix 6. Table 1 presents the four dimensions and the twelve indicators constituting our job quality index.

Table 1. List of dimensions and indicators of job quality in the world and in emerging countries

Dimensions	Indicators	Sources
I) Non-standard forms of employment (inverted)	1) Part-time employment rate (inverted)	ILO (KILM, 8th)
	2) Working poverty rate (inverted)	ILO (KILM, 8th)
	3) Vulnerable employment rate (inverted)	ILO (KILM, 8th)
	4) Informal employment rate (inverted)	ILO (KILM, 8th)
II) Working time and work-life balance	5) Share of workers working 48 hours or more per week (inverted)	ILO (KILM, 8th) and OECD
	6) Variation of the rate of employment between men and women (inverted)	ILO (KILM, 8th)
	7) Share of weeks of maternity leave	GenderStat (WDI)
III) Job security and social protection	8) Public social protection expenditure as a percent of GDP	ILO (World Social Security Report 2010/11)
IV) Social Dialogue	9) Freedom House civil rights indicator	Freedom in the World

First dimension is inverted to follow the logic of the other dimensions.
Income is an important element in the comprehension of job quality in emerging countries if we consider that incomes come exclusively from work. But the apprehension of what is a good job quality cannot be limited to the wages and our willingness here is to explore the relationship between other dimensions and income aspect.
The first dimension focuses on the non-standard forms of employment: the first indicator enunciate the part-time employment rate. The second indicator represents the working poverty rate, consuming at US$2 a day at PPP. Vulnerable employment (indicator 3) is an important variable to define job quality in emerging countries and also in the world. It is compose to unpaid family workers and own-account workers as a percentage of total employment. Finally, the fourth indicator is the proportion of workers in informal employment, as proportion of total employment except agricultural sector. It is a major aspect which makes debate from the point of view of the quality of employment. Very heterogeneous between countries, one speaks about

[5] See http://stats.oecd.org/Index.aspx?lang=fr
[6] See http://www.ilo.org/empelm/what/WCMS_114240/lang--en/index.htm
[7] See http://www.uis.unesco.org/pages/default.aspx

dualism of the economy to qualify the differences which separate a formal employee who profit from social protection, and an informal worker who is excluded from it. Both indicators are inverted.
The second dimension refers to working time and work-life balance. It is characterized by "excessive" working time i.e. the share of the workers working 48 hours or more per week (indicator 5) and the variation of rate of employment between the men and the women (indicator 6). Indicators 5 and 6 are inverted. Finally, the last indicator constituting the second dimension come from the Gender Statistics database proposed by the World Bank. It refers to Maternity leave benefits, which indicates the extent of compensation during the entire length of maternity leave or part thereof. In many cases, the cash benefit or wages paid during the covered period vary according to various criteria (indicator 7).
The third dimension expresses the job security and social protection. It contains one main indicator: public social security benefits expenditure including health care in percentage of GDP (indicator 8).
The fourth dimension deal with the social dialogue. In countries where the standards of work are more fragile than in the developed countries, unionisation rate and collective bargaining rate (indicator 9) translate the influence and the presence of the trade-union organizations in firms. These indicators are regrouped into the Freedom House civil rights indicator.

2.4. PCA and the aggregated indicator of Job Quality

In a first time, we want to determine endogenously the weight of each variable (i.e. each dimensions) in the aggregated index (job quality index 1.1) by using Principal Correspondence Analysis (PCA).
Principal component analysis (PCA) is one of the various models of analysis of data. Like other models, the objective is to isolate the common factors between different variables by reducing the mass of information so as to allow an economic description easier.
We can represent the data in a matrix X with N lines (N country) and p columns (p various variables). Graphically, we can represent N country in a space with p dimension. Contrary to the analysis in multiple correspondence, the distance used is the Euclidean distance:

$$d^2(i,i') = \sum_{j=1}^{p} (x_{i,j} - x_{i',j})^2$$

This distance between N points in dimensional space p is a perfect representation of the similarity between the lines in matrix X. PCA state makes it possible to find a space dimensional including less dimensions making it possible to retain the essential information understood in the initial distance between the lines. Best dimensional space is that which maximizes the dispersion of the point-line projected.
The objective is thus to reduce the number of variables. There are two principal criteria used to select the number of factors to be extracted: the criterion of Kaiser and Scree test (Cattell, 1966).
The weights for calculating the job quality indexes are determined with the help of principal components analysis for the entire sample of countries and years. The analysis partitions the variance of the variables used in each dimensions. The weights are then determined in a way that maximizes the variation of the resulting principal component, so that the indices capture the variation as fully as possible.
Data are calculated on a yearly basis. However, not all data are available for all countries and all years. In calculating the job quality indices, all variables are linearly interpolated before applying the weighting procedure. Instead of linear extrapolation, missing values at the border

of the sample are substituted by the latest data available. When data are missing over the entire sample period, the weights are readjusted to correct for this.
The criterion of Kaiser supposes that if a factor explains more than the original variable, it is necessary to extract it. As the sum of the eigenvalues (or inertia) of the p variables is equal to p, we only keep factors which an eigenvalue higher than 1. While following the two criteria (Kaiser and scree-test), we keep only one factor because it is sufficient to describe the phenomenon: Eigenvalue for the first factor (see appendix 1) is 2.419. In our case, the first factor explain nearly 60% of total inertia. This factor can be interpreted as a socio-economic security index.
It is thus possible to determine in an endogenous way the weight of each variable in our aggregate indicator of job quality (factor 1).

$$Job\ Quality\ Index = (0.206 * Dimension1 + 0.205 * Dimension2 + 0.317 * Dimension3 + 0.28 * Dimension4)$$

Table 2. Weight of dimensions of job quality in the job quality index

Indicators	Dimension 1	Dimension 2	Dimension 3	Dimension 4
Weighting criteria	20.628	20.551	31.754	27.067

As we can see in table 2, the highest weight is assigned to the third dimension (job security and social protection). The value of the Job Quality Index corresponds to the mean of the normalized scores for each country on the first PCA axis. Thus we obtain the composite indicator of job quality where $\in [-3.67; 3.229]$ between 1990-2015. The aggregate indicator takes values ranging between -3,67 (Afghanistan in 1993) and 3.229 (France in 2010). Descriptive statistics of variables included in the scalar index of job quality appear in appendix 2 for the years 1990-2015.
Following these standardizing job quality index, we transformed these variable into a Weighted Index of Job Quality, obtain by PCA, between 0 - weak JQI - and 1 - strong JQI integrate in the two models. We obtained the job quality index (see appendix 6 for the year 2010).

3. The Mankiw, Romer and Weil (MRW) models augmented by job quality

Data used to estimate the different equations come from different sources: (i) The Penn World Tables Mark 7.1 (Heston, Summers and Atten, 2015), (ii) Barro and Lee (2013) Educational attainment, and (iii) our job quality index. We use the GDP per capita, measured in constant dollar (RGDPL) in Heston, Summers and Atten (2012, 7.1) to measure income: PPP Converted GDP Per Capita (Laspeyres), at 2005 constant prices from the period 1990-2015 on the basis of five-year span data ($ln\, y_{i,t}$). The average investment share (*invest*) is the arithmetic average of the investment share of per-capita income for the period 1990-2015 (PWT 7.1) on the basis of five-year span data. Data on population are the annual average of the population growth rate (variable POP in PWT 7.1) on the basis of five-year span data. For the variable of Human Capital, we take here the average share of the population older than 15 years that has attained secondary school between 1990 and 2015 (Barro and Lee, 2013) on the basis of five-year span data.
The theoretical model used here is the Solow growth model, augmented by human capital (Mankiw, Romer and Weil, 1992). As Bazillier (2008) mentioned, the model is based on a neo-

classical production function, for which diminishing returns apply to three factors: Labour (L), Physical capital (K) and Human capital (H). Constant returns to scale characterize this Cobb-Douglas production function. Along the steady-state growth path, savings equal total investment in physical and human capital. Several authors have tried to measure the influence of others factors on long-term economic growth, thanks to this model. The empirical study will measure the impact of job quality on growth by means of spillovers effects on different production factors.

We follow here the methodology of Murdoch and Sandler (2002). The purpose is to empirically test the results of Mankiw, Romer and Weil (1992) and to see if the inclusion of our job quality index improves the results of the model.

Following the methodology used by Islam (1995), Murdoch and Sandler (2002) we propose the following estimating equation in order to estimate the conditional convergence effect including job quality (*jqi)* index:

$$(ln\, y_{i,t}) = \gamma_0 + \gamma_1 (ln\, y_{i,t-1}) + \gamma_2 \ln(invest) + \gamma_3 \ln(n_i + g + \delta) + \gamma_4 \ln(school) + \gamma_5 \ln(jqi) + \hat{\epsilon} \quad (1)$$

Theoretically with: $\gamma_2 = -\gamma_3 = \frac{\alpha}{(1-\alpha)}$ $(restricted\ equation)$, $\gamma_4 = \frac{\beta}{(1-\alpha)}$

and where jqi is the arithmetic average value of our job quality index between 1990 and 2015 on the basis of five-year span data.

Invest and *school* are, respectively, the shares of physical and human capital in the observational period, and $(n_i + g + \delta)$is the effective growth rate of labor plus depreciation.

The sum $(n_i + g)$ operates in an identical fashion to depreciation in reducing the growth of physical and human capital per Capita. The *i* subscript denotes the country, and $\hat{\epsilon}$ indicates an unmeasured random country specific effect. Following Barro and Lee (2013), human capital accumulation (variable *school*), corresponds to the percentage of population older than 15 years that has attained secondary schooling between 1990 to 2015.

Following MRW, we assume that $g + \delta$ =0.05. The model is estimated for the years 1990 to 2015 and for a sample of 154 countries (world sample), developing countries (95 countries), and finally on emerging countries (29 countries).

4. Instrumental variables

According to the literature, we can think that the level of Job Quality could depend on the convergence in income levels.
The endogeneity of job quality can be observed by a correlation between this variable and the residuals. Hausman (1978) has proposed a method to test the endogeneity and the consistence of the OLS method. We need to find instrumental variables which are correlated with the variable ln jqi but not with the error terms. We decided to test the validity of three instrumental variables.

"Two theoretical dimensions of democratization-public contestation and the right to participate--examined by Robert A. Dahl (1971) seem to correspond to those characteristics of political systems that best differentiate more democratic systems from less democratic ones. In this sense, we have called these dimensions "**competition**" (first instrument) and "**participation**" (third instrument). The existence of legal competition means that individuals and groups are free to organize themselves and to oppose the government. It also implies the existence of some degree of equality in the sense that different groups are equally free to compete for power. The degree of participation in crucial decision-making processes either through elections or by some other means is indicative of the relative number of people taking part in politics in general" (Vanhanen, 1992).

The first instrument measures the degree of competition (Competition) which is describe as smaller parties share of the votes cast in parliamentary or presidential elections. This variable is proposed by Vanhanen.

The second instrument is the Political Constraint Index (POLCON). Polconiii variable is taken from Henisz, W. J. (2002). The POLCON data uses a spatial modeling technique to synthesize a number of variable characterizing the structures and ideological alignments of countries' political system, including the number and types of veto points and the party control (and fractionalization) of different government bodies.

The third instrument is a measures of democratization the participation based on the assumption that the higher the level of participation (as indicated by the percentage share of the adult population voting in elections), the more the population is involved in the struggle for power. However, a high level of participation in elections indicates a distribution of power among the population only on the condition that the share of the smaller parties is also high (Vanhanen 1971: 32).

Bazillier (2008) already used these instrumental variables and assume that legal variables are not directly correlated with gdp per capita.
Appendix 5 shows results for relevancy. It is noticeable that the three instrumentals variables appear to be significantly correlated with the level of job quality.

In order to implement a significant variable, we propose, in a first time, an estimation of the steady-state per-capita income in the world (150 countries). After that, we restrict our study on developing countries (105 countries), and finally, we restrict our analysis on emerging countries (29 countries).

5. Instrumental Variables estimates

We estimate the equation 1 by using Instrumental Variables estimators in order to obtain consistent estimates of the impact of job quality on conditional convergence in the world. According to the results of validity and relevance tests (see appendix 5), we use alternatively the first instrument, the combinations of the first and the second instruments and the combinations of the three instruments. The results of the estimations are given in the following tables.

a. The effects of Job Quality in the World (2sls method)

Table 1. Results of the conditional convergence (1990-2015) on the basis of five-year span – World Sample: 2sls Method with fixed effects.

Dependent variable : $(\ln y_{i,t})$

Instrument set	IV1	IV1,2	IV1,2,3
Constant	5.44	5.61	5.61
	(11.32)***	(12.13)**	(12.13)**
$y_{i,t-1}$	0.54	0.53	0.53
	(13.40)***	(13.48)***	(13.49)***
Investment	0.14	0.13	0.13
	(3.77)***	(3.48)***	(3.49)***
$(n_i + g + \delta)$	0.17	0.17	0.17
	(5.77)***	(5.65)***	(5.65)***
School	0.35	0.32	0.32
	(4.01)***	(3.87)***	(3.88)
Job Quality	**0.52**	**0.65**	**0.65**
	(1.73)*	**(2.33)****	**(2.32)***
Statistical tests:			
R^2	0.95	0.93	0.93
Sargan test	na	0.30	na
Partial R (excluded instruments)	0.20	0.21	0.46
F-test	47.56	28.63	19.08
Number of countries	148	147	147
Number of observations	734	729	729

* 10%, ** 5%, *** 1% level of significance. **Variables are in log.**

The coefficient of job quality is always strongly positive and significant whatever the subsets of instruments chosen. In all cases, job quality have a positive impact on long-term per capita income which means that countries could have different growth paths according to their levels of job quality. The coefficient takes a high value with a mean of 0.6 which is higher to the estimated coefficient of education, investment and economically active population.

We can interpret this result as follow: a one standard deviation change in the log variable of job quality (0.65) will increase the GDP per-capita by 29.9 % (0.65*0.46).
If we take 0.13 as a mean of the estimated coefficient for the variable of investment, a one standard deviation change in the log variable of investment will increase the GDP per-capita by 3.77%. And if we take 0.32 as a mean of the estimated coefficient for the variable of education, a one standard deviation change in the log variable of education will increase the GDP per-capita by 20.8%.

b. The effects of Job Quality in Developing countries (2sls method)

Table 2. Results of the conditional convergence (1990-2015) on the basis of five-year span – developing countries Sample: 2sls Method with fixed effects.

Dependent variable: ($\ln y_{i,t}$)

Instrument set	IV1	IV1,2	IV1,2,3
Constant	5.61	5.69	5.69
	(10.28)***	(10.67)**	(10.70)**
$y_{i,t-1}$	0.52	0.52	0.52
	(11.25)***	(11.27)***	(11.28)***
Investment	0.13	0.13	0.13
	(3.02)***	(2.82)***	(2.82)***
$(n_i + g + \delta)$	0.18	0.18	0.18
	(4.77)***	(4.69)***	(4.69)***
School	0.31	0.29	0.29
	(3.18)***	(3.13)***	(3.13)***
Job Quality	**0.69**	**0.75**	**0.75**
	(2.16)**	**(2.44)****	**(2.46)****
Statistical tests:			
R^2	0.88	0.88	0.93
Sargan test	na	0.58	0.86
F-test	40.50	22.77	15.26
Number of countries	105	104	104
Number of observations	521	516	516

* 10%, ** 5%, *** 1% level of significance. **Variables are in log.**

We showed in the previous section that job quality could have a strong impact on the long-term per-capita income. It is therefore necessary to study if the relationship is still valid for the developing countries. The results are consistent with the previous ones. Job quality also have a positive effect on long-term per-capita income in developing countries by using the 2sls method.
We note that all combinations of instruments are consistent: the coefficient of job quality is now 0.75. A one standard-deviation change will increase the GDP by around 28.5%. In this model again, if we take 0.29 as a mean of the estimated coefficient for the variable of education,

a one standard deviation change in the log variable of education will increase the GDP per-capita by 19.7%. Finally, if we take 0.13 as a mean of the estimated coefficient for the variable of investment, a one standard deviation change in the log variable of investment will increase the GDP per-capita by 5.72%.

c. The effects of Job Quality in the emerging countries (2sls method)

Table 3. Results of the conditional convergence (1990-2015) – Emerging countries Sample - (2sls Method) fixed effects

Dependent variable : ($\ln y_{i,t}$)

Instrument set	IV1	IV1,2	IV1,2,3
Constant	6.77	6.88	7.22
	(5.96)***	(6.04)**	(6.19)**
$y_{i,t-1}$	0.46	0.45	0.43
	(5.17)***	(5.06)***	(4.57)***
Investment	0.25	0.25	0.24
	(2.65)***	(2.59)***	(2.36)***
$(n_i + g + \delta)$	0.23	0.24	0.25
	(3.33)***	(3.36)***	(3.33)***
School	0.45	0.42	0.35
	(2.02)***	(1.90)***	(1.50)
Job Quality	**0.88**	**0.96**	**1.19**
	(1.42)	**(1.70)**	**(1.85)***
Statistical tests:			
R^2	0.83	0.83	0.82
Sargan test	na	0.28	0.001
F-test	16.78	8.46	5.69
Number of countries	29	29	29
Number of observations	145	145	145

* 10%, ** 5%, *** 1% level of significance. **Variables are in log.**

Previously, we have measure the effects of job quality on economic growth between 1990 and 2015. For all these tests of robustness, we have found the same results for the effect of job quality, which can be considered as robust. We find a conditional convergence both for the World and for developing countries. It is therefore necessary to study if the relationship is still valid for the emerging countries (see table 3). Job quality also have a positive effect on long-term per-capita income in developing countries but only for the combinations of the three instruments. The coefficient of job quality is now 1.19 and then a one standard-deviation change will increase the GDP by around 41.6%.

It seems that the introduction of job quality contribute to the conditional convergence in emerging countries whereas we have to note that the education (school) variable is not significant here. The coefficient of the investment variable is 0.24 and is significantly positive. A one standard-deviation change will increase the GDP by around 5.52%.

Conclusion and implication

The first aim of this paper was to build an aggregated index of job quality. Job quality index is constructed after using Principal Correspondence Analysis (PCA). Thus, we endogenously attribute a weight for each dimension according to their discriminating power.

The second contribution of this paper was to explore the impact of job quality on long-term per-capita income in the world (150 countries), in developing countries (105 countries) and also in emerging countries (29 countries). Results are obtained by using the Two-Stage Least Square Method to correct potential problems of endogeneity. Results indicates that a good job quality has a positive and significant impact on long-term per-capita income in all samples. After using instrumental variable regression, we observe that there is conditional convergence in the world between 1990 and 2015, in developing countries and in emerging countries.

In others words, these results implies that countries with same characteristics of investment, school and labor force could have different growth path depending on their level of job quality.

Our results are valid both for a world sample, for developing countries and also for emerging countries.

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Appendix 1. PCA Summary

N = 150 Countries	Principals	FI	F2	F3	F4
	Eigenvalue	2.419	0.788	0.472	0.321
	Total inertia %	0.604	0.196	0.118	0.802
	Cum. Total inertia	0.604	0.801	0.919	1

Appendix 2. The scalar index of job quality

Descriptive statistics of variables included in the scalar index of job quality

N = 150 countries	Dimension 1	Dimension 2	Dimension 3	Dimension 4
Descriptive statistics				
Maximum	0,992	0,928	1,000	1,000
Minimum	0,032	0,033	0,000	0,000
Means	0,619	0,512	0,296	0,584
Standard Deviation	0,274	0,168	0,249	0,295
Correlation matrix				
Dimension 1	**1****			
Dimension 2	**0,215****	**1****		
Dimension 3	**0,567****	**0,533****	**1****	
Dimension 4	**0,438****	**0,471****	**0,578****	**1****
Weight used in the scalar index				
Arithmetic mean	0.25	0.25	0.25	0.25

PCA	0.20	0.20	0.31	0.27

N.B. (**) 5% significant.

Appendix 3. Correlation Matrix

	ln GDP 1960	ln GDP 2010	ln (n+g+δ)	ln *Invest*	ln School	ln JQI
ln GDP 1960	**1**	**0.989**	**-0.244**	**0.149**	**0.689**	**0.709**
ln GDP 2010	**0.989**	**1**	**-0.232**	**0.188**	**0.696**	**0.713**
ln $(n + g + \delta)$	**-0.244**	**-0.232**	**1**	-0.013	**-0.401**	**-0.479**
ln *Invest*	**0.149**	**0.188**	-0.013	**1**	**0.190**	**0.104**
ln School	**0.689**	**0.696**	**-0.401**	**0.190**	**1**	**0.624**
ln JQI	**0.709**	**0.713**	**-0.479**	**0.104**	**0.624**	**1**

Note: Values displayed in bold are significant at 0.05 significance level. That means that the risk of being wrong when rejecting the null hypothesis that the correlations are not significantly different from 0 is less than 5%.

Appendix 4. Descriptive statistics of the variables

Table 1. Descriptive statistics of the variables - World Sample (150 countries)

	Mean	Std. Dev.	Min	Max
ln GDP 1960	8.65	1.29	4.62	11.20
ln GDP 2010	8.75	1.30	4.62	11.30
ln $(n + g + \delta)$	-2.70	0.30	-5.10	-1.34
ln *Invest*	-1.53	0.29	-3.35	-0.40
ln School	-0.76	0.65	-3.80	0.00
ln Job Quality Index	-0.83	0.46	-2.98	0.00

Table 2. Descriptive statistics of the variables – Developing countries (105 countries)

	Mean	Std. Dev.	Min	Max
ln GDP 1960	8.03	1.01	4.62	10.78
ln GDP 2010	8.14	1.03	4.62	10.78
ln $(n + g + \delta)$	-2.65	0.28	-5.10	-1.75
ln *Invest*	-1.54	0.33	-3.35	-0.40
ln School	-0.96	0.68	-3.79	-0.02
ln Job Quality Index	-0.99	0.38	-2.98	-0.18

Table 3. Descriptive statistics of the variables – Emerging countries (29 countries)

	Mean	Std. Dev.	Min	Max
ln GDP 1960	8.903	0.647	6.97	10.06
ln GDP 2010	9.03	0.63	7.25	10.14
ln $(n + g + \delta)$	-2.84	0.32	-4.30	-2.37
ln *Invest*	-1.50	0.22	-2.02	-0.77
ln School	-0.53	0.39	-1.49	0.00
ln Job Quality Index	-0.65	0.35	-1.64	-0.16

Appendix 5. Instruments validity and relevance

EXCLUDED INSTRUMENT	F-STAT
(1) COMPETITION INDEX (VANHANEN INDEX)	47.56 (0.000)
(2) MEASURE OF POLITICAL RISK (POLCONIII)	25.85 (0.000)
(3) PARTICIPATION INDEX (VANHANEN INDEX)	22.86 (0.000)

P-VALUES IN PARENTHESES

Appendix 6. Details of the Job Quality Index in 2010

Country Code	Country Name	First Dimension	Second Dimension	Third Dimension	Fourth Dimension	Job Quality Index 1.1
AFG	**Afghanistan**	0,42	0,22	0,04	0,07	0,186
ALB	**Albania**	0,72	0,88	0,24	0,21	0,502
ARE	**United Arab Emirates**	0,92	0,22	0,04	0,30	0,350
ARG	**Argentina**	0,77	0,58	0,33	0,50	0,526
ARM	**Armenia**	0,78	0,64	0,22	0,31	0,475
AUS	**Australia**	0,89	0,91	0,58	0,30	0,685
AUT	**Austria**	0,88	0,70	0,65	0,57	0,706
AZE	**Azerbaijan**	0,74	0,73	0,23	0,30	0,486
BEL	**Belgium**	0,91	0,70	0,58	0,95	0,751
BEN	**Benin**	0,27	0,64	0,05	0,60	0,330
BFA	**Burkina Faso**	0,17	0,58	0,04	0,50	0,270
BGD	**Bangladesh**	0,33	0,35	0,02	0,05	0,175
BGR	**Bulgaria**	0,94	0,75	0,52	0,30	0,642
BHR	**Bahrain**	0,97	0,47	0,33	0,30	0,519
BHS	**Bahamas, The**	0,85	0,64	0,50	0,70	0,653
BIH	**Bosnia**	0,83	0,91	0,21	0,65	0,648
BLR	**Belarus**	0,96	0,62	0,44	0,88	0,687
BLZ	**Belize**	0,80	0,39	0,44	0,09	0,462
BMU	**Bermuda**	0,91	0,40	0,32	0,22	0,461
BOL	**Bolivia**	0,59	0,58	0,20	0,27	0,396
BRA	**Brazil**	0,77	0,66	0,37	0,39	0,540
BRB	**Barbados**	0,78	0,55	0,47	0,70	0,608
BTN	**Bhutan**	0,47	0,63	0,07	0,30	0,368
BWA	**Botswana**	0,74	0,59	0,21	0,60	0,493
CAN	**Canada**	0,90	0,72	0,55	0,30	0,633

CHE	**Switzerland**	0,84	0,67	0,57	0,35	0,624
CHL	**Chile**	0,80	0,64	0,48	0,16	0,543
CHN	**China**	0,72	0,61	0,28	0,35	0,480
CIV	**Cote d'Ivoire**	0,32	0,49	0,09	0,20	0,257
CMR	**Cameroon**	0,46	0,57	0,07	0,04	0,275
COD	**Congo, Dem. Rep.**	0,28	0,41	0,06	0,20	0,220
COG	**Congo, Rep.**	0,33	0,41	0,10	0,30	0,263
COL	**Colombia**	0,66	0,54	0,26	0,01	0,382
CRI	**Costa Rica**	0,81	0,55	0,42	0,08	0,494
CUB	**Cuba**	0,86	0,68	0,60	0,69	0,702
CYP	**Cyprus**	0,81	0,71	0,50	0,63	0,648
CZE	**Czech Republic**	0,92	0,75	0,56	0,33	0,656
DEU	**Germany**	0,90	0,69	0,57	0,35	0,645
DNK	**Denmark**	0,91	0,67	0,65	0,85	0,755
DOM	**Dominican Republic**	0,73	0,58	0,12	0,12	0,380
DZA	**Algeria**	0,67	0,51	0,26	0,30	0,430
ECU	**Ecuador**	0,69	0,57	0,27	0,50	0,485
EGY	**Egypt, Arab Rep.**	0,77	0,49	0,32	0,15	0,441
ESP	**Spain**	0,89	0,70	0,59	0,43	0,665
EST	**Estonia**	0,93	0,76	0,63	0,15	0,656
ETH	**Ethiopia**	0,36	0,56	0,05	0,08	0,246
FIN	**Finland**	0,92	0,72	0,60	0,68	0,721
FJI	**Fiji**	0,68	0,44	0,41	0,40	0,484
FRA	**France**	0,91	0,71	0,62	0,53	0,700
GAB	**Gabon**	0,57	0,56	0,51	0,30	0,500
GBR	**United Kingdom**	0,85	0,64	0,59	0,27	0,614
GEO	**Georgia**	0,66	0,60	0,19	0,33	0,427

GHA	**Ghana**	0,51	0,63	0,09	0,70	0,421
GRC	**Greece**	0,79	0,69	0,48	0,23	0,560
GTM	**Guatemala**	0,59	0,51	0,16	0,03	0,323
HKG	**Hong-Kong**	0,92	0,56	0,46	0,24	0,544
HND	**Honduras**	0,59	0,51	0,22	0,06	0,352
HRV	**Croatia**	0,87	0,94	0,51	0,45	0,688
HTI	**Haiti**	0,58	0,56	0,08	0,30	0,352
HUN	**Hungary**	0,95	0,76	0,64	0,30	0,689
IDN	**Indonesia**	0,51	0,51	0,11	0,13	0,305
IND	**India**	0,35	0,51	0,06	0,05	0,233
IRL	**Ireland**	0,78	0,79	0,68	0,38	0,675
IRN	**Iran, Islamic Rep.**	0,75	0,48	0,33	0,20	0,447
IRQ	**Iraq**	0,80	0,23	0,16	0,20	0,345
ISL	**Iceland**	0,91	0,68	0,66	0,96	0,778
ISR	**Israel**	0,86	0,67	0,61	0,26	0,627
ITA	**Italy**	0,86	0,72	0,59	0,98	0,754
JAM	**Jamaica**	0,74	0,59	0,23	0,50	0,485
JOR	**Jordan**	0,81	0,36	0,26	0,30	0,430
JPN	**Japan**	0,90	0,61	0,60	0,17	0,607
KAZ	**Kazakhstan**	0,84	0,62	0,45	0,52	0,600
KEN	**Kenya**	0,35	0,38	0,08	0,20	0,234
KGZ	**Kyrgyz Republic**	0,60	0,70	0,27	0,30	0,456
KHM	**Cambodia**	0,42	0,56	0,01	0,30	0,288
KOR	**Korea, Rep.**	0,85	0,57	0,43	0,11	0,513
KWT	**Kuwait**	0,96	0,40	0,40	0,02	0,480
LAO	**Lao PDR**	0,17	0,41	0,03	0,20	0,180
LBN	**Lebanon**	0,79	0,33	0,16	0,50	0,445
LBY	**Libya**	0,71	0,36	0,37	0,10	0,406
LKA	**Sri Lanka**	0,65	0,50	0,28	0,23	0,413

LSO	**Lesotho**	0,58	0,55	0,06	0,05	0,298
LTU	**Lithuania**	0,94	0,76	0,55	0,15	0,630
LUX	**Luxembourg**	0,92	0,69	0,67	0,49	0,706
LVA	**Latvia**	0,94	0,74	0,60	0,15	0,606
MAC	**Macao**	0,94	0,69	0,00	0,00	0,406
MAR	**Morocco**	0,71	0,46	0,20	0,40	0,423
MDA	**Moldova**	0,82	0,73	0,37	0,32	0,557
MDV	**Maldives**	0,80	0,46	0,12	0,40	0,444
MEX	**Mexico**	0,74	0,53	0,32	0,28	0,467
MKD	**Macedonia, FYR**	0,89	0,83	0,35	0,38	0,600
MLI	**Mali**	0,15	0,65	0,06	0,50	0,292
MLT	**Malta**	0,89	0,64	0,55	0,46	0,641
MNE	**Montenegro**	0,87	0,43	0,28	0,60	0,545
MNG	**Mongolia**	0,75	0,67	0,29	0,60	0,545
MOZ	**Mozambique**	0,13	0,64	0,05	0,50	0,276
MRT	**Mauritania**	0,76	0,47	0,15	0,30	0,402
MUS	**Mauritius**	0,85	0,57	0,39	0,16	0,510
MWI	**Malawi**	0,29	0,58	0,05	0,12	0,244
MYS	**Malaysia**	0,86	0,52	0,33	0,06	0,460
NAM	**Namibia**	0,68	0,59	0,20	0,30	0,429
NER	**Niger**	0,19	0,50	0,03	0,01	0,174
NIC	**Nicaragua**	0,57	0,55	0,23	0,04	0,357
NLD	**Netherlands**	0,80	0,71	0,74	0,54	0,713
NOR	**Norway**	0,89	0,99	0,62	0,71	0,787
NPL	**Nepal**	0,35	0,55	0,09	0,40	0,310
NZL	**New Zealand**	0,85	0,67	0,59	0,19	0,607
OMN	**Oman**	0,96	0,42	0,11	0,30	0,429
PAK	**Pakistan**	0,50	0,51	0,12	0,09	0,298
PAN	**Panama**	0,75	0,61	0,37	0,13	0,482
PER	**Peru**	0,63	0,59	0,22	0,04	0,377

PHL	**Philippines**	0,54	0,57	0,23	0,10	0,364
POL	**Poland**	0,88	0,69	0,60	0,27	0,635
PRI	**Puerto Rico**	0,77	0,44	0,00	0,00	0,300
PRT	**Portugal**	0,84	0,72	0,59	0,29	0,629
PRY	**Paraguay**	0,65	0,50	0,19	0,04	0,351
QAT	**Qatar**	0,85	0,28	0,03	0,30	0,340
ROM	**Romania**	0,86	0,72	0,40	0,51	0,606
RUS	**Russian Federation**	0,94	0,74	0,50	0,42	0,654
RWA	**Rwanda**	0,22	0,62	0,05	0,30	0,265
SAU	**Saudi Arabia**	0,81	0,42	0,36	0,20	0,463
SEN	**Senegal**	0,46	0,55	0,05	0,50	0,342
SGP	**Singapore**	0,91	0,52	0,23	0,26	0,474
SLE	**Sierra Leone**	0,11	0,49	0,04	0,25	0,196
SLV	**El Salvador**	0,66	0,55	0,36	0,05	0,430
SRB	**Serbia**	0,89	0,91	0,36	0,45	0,651
SUR	**Suriname**	0,86	0,36	0,00	0,60	0,454
SVK	**Slovak Republic**	0,93	0,78	0,52	0,21	0,629
SVN	**Slovenia**	0,91	0,70	0,60	0,58	0,697
SWE	**Sweden**	0,91	1,06	0,71	0,80	0,856
SWZ	**Swaziland**	0,36	0,50	0,22	0,30	0,333
SYC	**Seychelles**	0,74	0,27	0,38	0,50	0,472
SYR	**Syrian Arab Republic**	0,79	0,44	0,17	0,21	0,397
TCD	**Chad**	0,29	0,56	0,03	0,20	0,242
TGO	**Togo**	0,17	0,63	0,31	0,40	0,361
THA	**Thailand**	0,73	0,59	0,19	0,03	0,389
TJK	**Tajikistan**	0,70	0,62	0,05	0,30	0,386
TKM	**Turkmenistan**	0,54	0,52	0,72	0,10	0,523

TTO	**Trinidad and Tobago**	0,88	0,51	0,42	0,21	0,522
TUN	**Tunisia**	0,71	0,59	0,34	0,30	0,485
TUR	**Turkey**	0,80	0,50	0,30	0,26	0,464
TZA	**Tanzania**	0,38	0,63	0,06	0,02	0,265
UGA	**Uganda**	0,42	0,58	0,06	0,01	0,258
UKR	**Ukraine**	0,87	0,73	0,45	0,44	0,617
URY	**Uruguay**	0,81	0,59	0,49	0,35	0,571
USA	**United States**	0,93	0,67	0,37	0,12	0,540
VEN	**Venezuela, RB**	0,75	0,67	0,30	0,13	0,469
VNM	**Vietnam**	0,62	0,68	0,16	0,15	0,391
YEM	**Yemen, Rep.**	0,76	0,23	0,12	0,30	0,341
ZAF	**South Africa**	0,84	0,67	0,25	0,28	0,499
ZMB	**Zambia**	0,22	0,68	0,10	0,22	0,279
ZWE	**Zimbabwe**	0,46	0,57	0,17	0,19	0,337