

Jan Jacek Sztaudynger

University of Lodz

Faculty of Economics and Sociology

Department of Econometrics

e-mail: jan.jacek.sztaudynger@uni.lodz.pl

Economic growth and the optimal inequality of income¹

Abstract

Inequality of income is one of the significant factors forming social capital. Two views dominate among economists dealing with the influence of income inequality on economic growth.

On the one hand, a too low level of income inequality does not motivate people to increase their labour productivity. Low inequality of income might result from an extended social care system and a GDP burdened with social transfers. A good example may be a situation when an unemployed person refuses to accept a job offer and prefers unemployment benefits to a slightly higher salary. Moreover, a lack of incentives for an employee who fails to acknowledge the economic sense of increasing the productivity of his or her work might lead to a slower growth of the economy.

On the other hand, a contrary view suggests that an increase in inequality of income has a negative impact on the economy. The accumulation of wealth by a small number of citizens raises doubts about the good use of that wealth for the investments necessary for the growth of the economy. Excessive inequality of income is confronted with the disapproval of a significant part of society and is regarded as unfair and unjustified. It may also increase the crime rate, decrease trust and, more generally, lead to the weakening of social capital.

The arguments presented above lead to the hypothesis that the influence of income inequality on the growth of the economy has a non-linear, parabolic character.

We have confirmed this hypothesis in growth models of the US and Swedish economies. We assess the historically optimal inequality of income measured by the Gini coefficient at 46% and 24% for the US and Sweden, respectively. The

¹ The article contains excerpts from the paper of Pawlak and Sztaudynger (2008).

optimal inequality of income for Poland was assessed previously at 29%. The dissimilarities may result from differences in culture, society, educational level and diligence.

Keywords: income inequality, economic growth, optimal inequality

JEL Classification: O15, O47

1. Introduction

Social capital, alongside the classical factors—physical capital and human capital—is an important factor in economic growth. The social capital resource consists of many social and economic phenomena, such as the level of interpersonal trust, trust in institutions, crime, or a sense of belonging to a community.

A sense of belonging to a community depends on whether the community provides security, access to education, and the belief that my income is fair compared to the income of the people I encounter on different planes, not only at work but also in the commercial (seller-buyer) sphere, within the family or in the neighbourhood. A subjective sense of income fairness depends to a large degree on income differentiation. Although income inequality, as such, is not considered to be part of social capital, in our opinion it is a significant indicator of this capital.

We are interested in the results of the verification of the hypothesis that income inequality, socially recognised as relatively “fair”, positively influences economic growth. This relative “fairness” will be sought by means of the optimal income inequality model. The selection of the optimum criterion is the key in this respect. In the described research, it was the standard maximisation of economic growth—the growth rate of labour productivity (GDP per employee). One can, however, imagine other criteria of optimality, e.g., maximising the employment growth rate (minimising unemployment) or maximising the quality of life. The latter is unfeasible due to too short time series, but what is most intriguing is how to divide income so that society is most satisfied.

This article will compare the results of separate surveys for several countries. These are the United States, where income differentiation is one of the highest among developed countries, Sweden with one of the lowest levels of income inequality, and Poland.

I will justify the view that the optimal income inequality due to the GDP growth rate is different in the countries studied, which makes it difficult or impossible to use panel data.

The approach used an econometric model of economic growth to which a synthetic measure of income inequality was introduced in a non-linear way. There are two seemingly contradictory views on the direction of the influence of income inequality on economic growth. One of these views presents the positive

impact of income inequality, while the other indicates that as the income gap increases, the growth of the economy slows down. An extensive list of several dozen publications confirming one or the other point of view is included in the doctoral thesis of Pawel Kumor (2010).

We believe that obtaining statistically significant assessments of the model to which income inequality has been introduced in a non-linear way allows for the reconciliation of the two views. We think that with insufficient income differentiation, its increase will, through increased labour productivity, accelerate the economy. On the other hand, any further increase in income inequality, when it is already high, will have a negative effect, slowing the economy down.

The following hypotheses were verified:

- (1) income inequality has a significant impact on economic growth;
- (2) optimal income inequality exists, which is related to both economic efficiency and social justice, and a deviation from this value will bring measurable economic losses—a slowdown in economic growth;²
- (3) optimal income inequality varies from country to country.

2. Income inequality and economic growth

I analyse economic growth using the labour productivity function. Taking into account the influence of two variables: the capital/labour ratio as well as the technical and organisational level, this function has the following form (Sztaudynger, 2005, p. 15):

$$X_t / L_t = A_t f(K_t / L_t), \quad (1)$$

where:

X_t	Gross Domestic Product,
X_t / L_t	labour productivity,
L_t	employment,
K_t	value of fixed assets at constant prices,
K_t / L_t	capital/labour ratio,
A_t	represents the technical and organisational level.

Function (1) can be converted as follows:

$$\overset{\circ}{X}_t / \overset{\circ}{L}_t = \overset{\circ}{A}_t + f(\overset{\circ}{K}_t / \overset{\circ}{L}_t), \quad (2)$$

where circles over the variables denote growth rates. If, in place of the growth rate of technical infrastructure, we introduce the investment rate, which is often done in growth models, then function (2) will take the following form:

² The first two hypotheses have been confirmed for Poland (cf. Kumor & Sztaudynger, 2007a; 2007b).

$$X_t / L_t = A_t + f(I_t / X_t), \quad (3)$$

where:

- \dot{X} / L labour productivity growth rate,
- I / X investment rate (investments in relation to GDP at current prices),
- \dot{A} growth rate of total factor productivity.

The growth model may include several other growth factors: technical and organisational progress, the inflation rate, convergence, as well as social capital or human capital. These variables have not been introduced into model (3); hence they are represented by the growth rate of total productivity denoted by \dot{A} , also known as the Solow residual.³

In the analyses of factors of economic growth, social capital is becoming increasingly important. Social capital is defined as the degree to which the organisation of society is characterised by a network of organisations, a set of norms and trust, all of which aid cooperation and provide benefits as well as create the potential to solve social problems (Sirianni & Friedland, 1995). To the aforementioned trust, Sztompka (2002) adds solidarity and loyalty created by connections and networks of contacts. Defining social capital, he emphasises the fact that these organisations are often developed in the process of forming self-governing, voluntary associations and informal groups (pp. 222, 224). He also stresses that mutual benefits not only have an economic and financial dimension but are also related to power and prestige (p. 368).

Gracia (2002) defines social capital as:

the ability of society to coordinate social entities in the framework of a joint project. Such coordination capacity can only be based on shared social values: on the culture of the common good. (pp. 189–201)

In the definitions quoted, it is emphasised that social capital serves cooperation, organisation or the coordination of society.

Research on social capital has been conducted since the mid-1980s by, among others, Putnam, Coleman, and Bourdieu (Sirianni & Friedland, 1995). Social capital is not directly scalar measurable. The factors that determine it are difficult to measure, which is probably why the variables which indirectly represent this capital started to be introduced into econometric growth models only from the beginning of the 1990s. One such variable is income inequality.⁴ Research on the impact of income inequality on economic growth⁵ was initiated in 1993 by Galor and Zeira (Ferreira, 1999, p. 8) based on the following model:

³ It is worth noting that the size of this residual decreases as the number of other growth factors not previously taken into account increases (Solow, 1967, p. 45).

⁴ An extensive collection of data on income inequalities in more than a dozen countries can be found on the World Bank website: <http://databank.worldbank.org/data/source/world-development-indicators>.

⁵ The following quasi-reverse dependence is also the subject of interest of economists: the impact of the level of income on income differentiation which can be described by the Kuznets curve (Ferreira, 1999, p. 2). I will not deal with this issue.

$$\overset{\circ}{X} / \overset{\circ}{L} = A + f(\overset{\circ}{I} / \overset{\circ}{X}, Gini), \quad (4)$$

The Gini coefficient is the measure of income (wage) inequality.

There are two views in the literature regarding the influence of income inequality on economic growth: one with a negative impact and the other with a positive impact.

The view about the negative impact of initial income inequality on the rate of economic growth prevails. The mechanism of this impact can be explained as follows:

- (1) the poorer the average (median) voter, the higher the taxes, the stronger the political pressure on the redistribution of income, and the greater the disruptions (the grey zone that violates trust and social capital);
- (2) an increase in income inequality leads to social and political conflicts, which negatively affects social capital;
- (3) poor people have fewer life opportunities than the rich, and they do not fully realise their economic potential, as they usually do not receive a proper education or bank loans;
- (4) poor employees' performance is limited as they cannot imagine that they can be promoted (progress) above a certain level (cf. Persson & Tabellini, 1994, pp. 602–604; Ferreira, 1999, pp. 9–13; Morrissey, Mbabazi & Milner, 2002, pp. 5–7, 17).

A negative impact of the initial income inequality on the rate of economic growth was confirmed by, among others, Persson and Tabellini (1994, pp. 607–608) as well as Barro (2000, pp. 41–42)⁶ for developing countries (low GDP per capita).

Some studies, especially those concerning developed countries, show the positive impact of income inequality on economic growth in the medium and short-term (e.g. Barro, 2000; Dollar & Kraay, 2002, pp. 195–225;⁷ Morrissey, Mbabazi & Milner, 2002, p. 7;).

A positive impact may occur when there is insufficient remuneration (or excessive taxation) for the most industrious and effective individuals in the process of GDP creation. Small income differentiations would suppress any motivation for more efficient work. Therefore, increasing income inequality, when it was too small in the base period, will result—in my opinion—in productivity growth.

“Reconciling” these divergent results of econometric research is possible if we use a non-linear function with the maximum to describe the relationship between income inequality and economic growth. It will then be possible to determine the optimal level of income inequality $Gini_{opt}$, in terms of maximising economic growth—GDP growth per employee (Cornia & Court, 2001; Sztudaynger, 2003, pp. 76–77).

⁶ Barro assumed that the income inequality parameter would increase along with the GDP logarithm. On a panel data sample, he obtained a negative income inequality parameter estimate which grows along with an increase in GDP.

⁷ Dollar and Kraay refer to the research of Forbes (2000) as well as to the research of Li and Zou (1998).

3. Justice and efficiency

Income inequality in a market economy seems to be obvious and natural. For example, it is generally accepted that a better-educated employee with specialist knowledge, more professional experience or a managerial job is better paid than an employee without an education or specialisation, with shorter seniority or who is in a job not connected with accepting a great deal of responsibility.

This situation motivates the personal development of individuals. Employees interested in improving their financial situation devote more time to expanding their professional competences, acquiring specialist knowledge, developing new skills, or learning about modern technologies. By doing so, they are able to do the same job in a shorter time or achieve better qualitative results. On the macroeconomic scale, this means an increase in labour productivity in the economy and, as a result, also a higher level of domestic product, even when employment remains unchanged. It seems, therefore, that optimal income inequality can have a significant impact on bringing the economy closer to the level of potential output.

What happens, however, when income inequality is not seen as fair? Can the unfair—in social perception—distribution of income in the economy be effective on a macro scale? These questions lead to seeking methods for their empirical verification.

We believe that both too low and too high income inequality causes economic losses, deviating the economy from its potential growth. This situation can be seen in the figure 1.

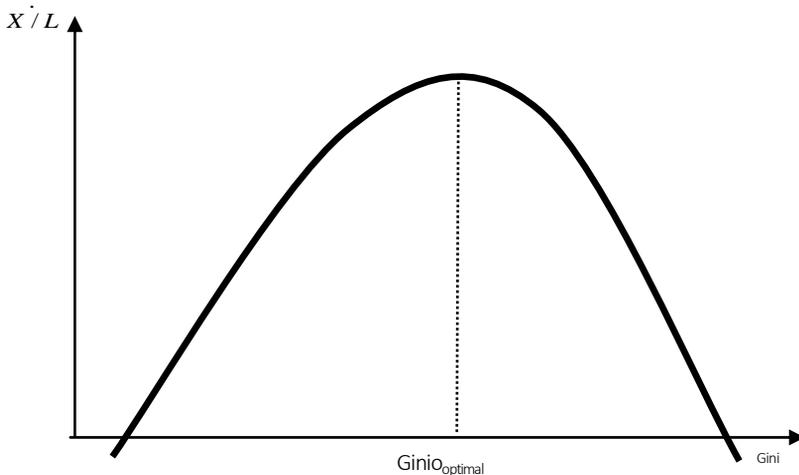


Fig. 1. Economic growth as an income inequality function

Note. Adapted from "Inequality, growth and poverty in the era of liberalization and globalization," by G. A. Cornia and J. Court, 2001, Helsinki, The United Nations University WIDER, and "Modyfikacje funkcji produkcji i wydajności pracy z zastosowaniami," by J. J. Sztudynger, 2003, Łódź, Wydawnictwo Uniwersytetu Łódzkiego.

Increasing income inequality when it is smaller than $Gini_{optimal}$ helps to accelerate the economy. In turn, increasing income inequality when it is greater than $Gini_{optimal}$ has the opposite effect. When income inequality is lower than optimal, employees with high development potential, well-educated specialists, feel that they are not remunerated well enough. The income they receive does not differ significantly, in their opinion, from the income of employees with lower professional qualifications. As a result of the lack of sufficient motivation, they will not use their full potential, and therefore aggregate production in the entire economy will be lower than the potential production.

This situation may be caused by a tax system that is too restrictive in relation to people earning the most, which will limit their production and investment activities. The effect is similar, as the domestic product will remain at a level lower than the potential GDP it is possible to achieve when there is fair (optimal) income inequality.

Now let us consider the situation when income inequality is higher than optimal. Employees with lower incomes begin to feel psychological discomfort. In their opinion, income inequality is unfair. The difference in earnings between the group of the worst and best earners is so great that it cannot be explained by the difference in the level of education, predispositions or professional qualifications. Therefore, income inequality ceases to be a motivating factor to increase labour productivity in this group of employees.

This may mean that the tax system is too liberal, and the group of the least-paid is a beneficiary of transfers of public funds to an insufficient degree. This causes unrest, social conflicts, and makes populist parties opt for the quick equalisation of income. In the economic sense, this leads to the situation when the group of least-paid earners is not involved enough in the creation and distribution of the domestic product.

What is optimal in terms of the economy, and at the same time socially just, is the differentiation of income in which all individuals—the less able and professionally active as well as the most entrepreneurial—participate to a similar, high degree in the economic development, engaging their physical and mental capabilities.

The level of social acceptance of income inequality may vary from country to country.

Figure 2 presents income inequality measured by the Gini coefficient in the United States and Sweden as well as income inequality in Poland.

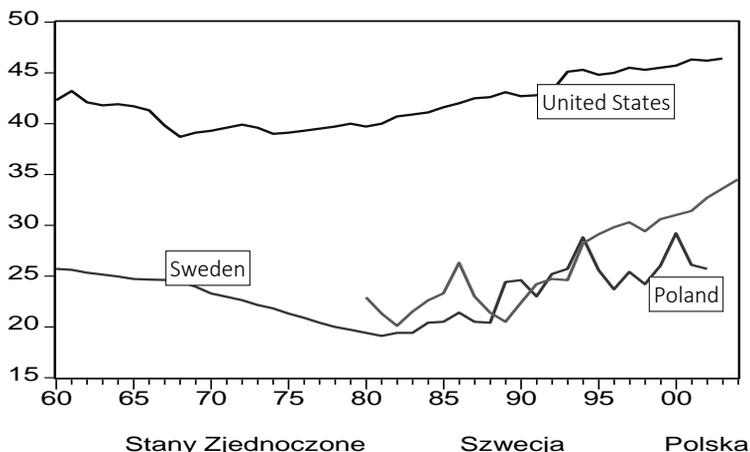


Fig. 2. GINI income inequality in the United States and Sweden, wage inequality in Poland

Note. Adapted from World Income Inequality Database V 2.0a by United Nations University, World Institute for Development Economics Research, 2005 (for USA and Sweden) and "Nierównomierność rozkładu płac," by P. Kumor, 2006, *Wiadomości Statystyczne*, 9, 1–12 (for Poland).

4. Optimal income inequality

In model (4), estimated for the United States, Sweden and Poland (Pawlak & Sztaudynger, 2008), we have confirmed the hypothesis about the non-linear, parabolic impact of income inequality on economic growth.

It turns out that the optimal income inequality for Sweden is almost twice lower than the optimal income inequality for the US economy. This situation is presented in the figure 3.

In the case of Sweden, the optimal income inequality, measured by the Gini coefficient, is 23.9% over the period 1964–2002. For the United States, the income inequality at the level of 45.7% should be considered optimal over the period 1964–2002. In Poland, the optimal wage inequality was estimated at approx. 29% (1985–2007) (Kumor, 2010, p. 145).

We believe that such wage inequalities best correspond to the social sense of pay differentiation justified by differences in effort and contribution (education, qualifications, work complexity and diligence) in the creation of GDP.

Income inequality, measured by the Gini coefficient, for developed countries, is usually within the range of 25% to 40%. The United States and Sweden are therefore unusual in this respect.

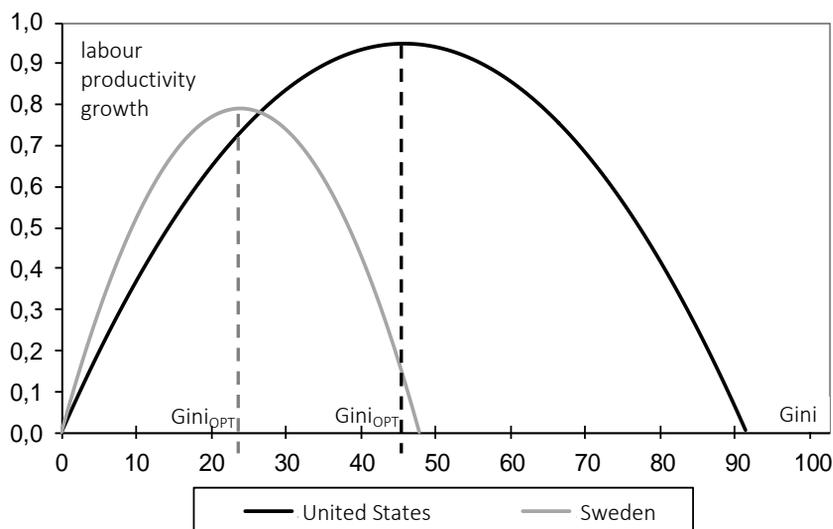


Fig. 3. The rate of labour productivity growth and income inequality

Why is there such a disproportion between the optimal income inequality in the United States and Sweden? We think that this results, first and foremost, from cultural and social differences. Sweden is known for its social equality policy, while the United States is a country where there is a significant hierarchical order of society.

In the United States, although equality formally exists, there are still significant differences between white and non-white citizens in the sphere of education and wealth. These differences are largely inherited by subsequent generations. Sweden is a more homogenous country when it comes to the colour of the skin or the origin of its inhabitants. Immigrants appeared when a strong attitude towards the equality of citizens had already developed in society.

With the optimal income inequality, we can estimate the losses incurred by the US and Swedish economies due to the deviation of income inequality from the optimum.

5. Conclusions

The research results confirm the hypothesis about the influence of income inequality on economic growth. By introducing income inequality into the model of economic growth in a non-linear, parabolic way, the value of the optimal income inequality for the economies of the United States, Sweden and Poland was calculated.

If we conclude that the research results are reliable, we can say that the analysed economies, due to their suboptimal income inequality, lose almost 1 percentage point of their growth rate annually. On average, this means a slowdown in the economies of approx. one third. It is worth realising what a big loss the economy incurs if the economic policy of a country does not take into account such a significant measure of social capital as income inequality.

Our research shows that the optimal income inequality in the United States is almost twice as high as in Sweden. The optimal inequality in Poland is a few points higher than in Sweden. The reasons for these differentiations are to be found in educational, cultural and social differences.

To a large extent, such large differences hinder research on the basis of panel data samples, and in many cases even undermine their rationale.

References

- Barro, R. J. (2000). Inequality and growth in a panel of countries. *Journal of Economic Growth*, 5(1), 5–32.
- Cornia, G. A., & Court, J. (2001). *Inequality, growth and poverty in the era of liberalization and globalization*. Helsinki: The United Nations University WIDER. <https://www.wider.unu.edu/publication/inequality-growth-and-poverty-era-liberalization-and-globalization>
- Dollar, D., & Kraay, A. (2002). Growth is good for poor. *Journal of Economic Growth*, 7(3), 195–225.
- Ferreira, F. H. G. (1999). *Inequality and economic performance. A brief overview to theories of growth and distribution*. World Bank Poverty Net. <http://siteresources.worldbank.org/INTPGI/Resources/Inequality/ferreira.pdf>
- Forbes, K. J. (2000). A Reassessment of the Relationship between Inequality and Growth. *American Economic Review*, 90(4), 869–897.
- Gracia, E. (2002). Kryzys argentyński w świetle nauki społecznej Kościoła. *Społeczeństwo*, 2, 189–201.
- Kumor, P. (2006). Nierównomierność rozkładu płac. *Wiadomości Statystyczne*, 9, 1–12.
- Kumor, P. (2010). *Wpływ nierówności dochodów na wzrost gospodarczy* (Unpublished doctoral dissertation written under the supervision of J. J. Sztudynger). University of Łódź.
- Kumor, P., & Sztudynger, J. J. (2007a). Optymalne zróżnicowanie płac w Polsce – analiza ekonometryczna. *Ekonomista*, 1, 45–59.
- Kumor, P., & Sztudynger, J. J. (2007b). Zastosowanie modelu wzrostu gospodarczego do szacowania optymalnej nierówności płac. *Gospodarka Narodowa*, 214(3), 49–65.
- Li, H., & Zou, H. (1998). Income Inequality is not Harmful for Growth: Theory and Evidence. *Review of Development Economics*, 2(3), 318–334.
- Morrissey, O., Mbabazi, J., & Milner, C. (2002). *Inequality, trade, liberalization and growth*. Centre for the Study of Globalization and Regionalization, Working Paper 2002, No. 102/02, University of Warwick.

-
- Pawlak, W., & Sztudynger, J. J. (2008). Wzrost gospodarczy a optymalne zróżnicowanie dochodów w USA i Szwecji. *Annales. Ethics in Economic Life*, 11(1), 259–271.
- Persson, T., & Tabellini, G. (1994). Is inequality harmful for growth? *American Economic Review*, 84(3), 600–621.
- Sirianni, C., & Friedland, L. (1995, August 20). *Social capital and civic innovation: Learning and capacity building from the 1960s to the 1990s*. A paper prepared for the American Sociological Association Annual Meeting, Washington D.C.
- Solow, R. M. (1967). *Teoria kapitału i stopy przychodu*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Sztudynger, J. J. (2003). *Modyfikacje funkcji produkcji i wydajności pracy z zastosowaniami*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Sztudynger, J. J. (2005). *Wzrost gospodarczy a kapitał społeczny, prywatyzacja i inflacja*. Warszawa: Wydawnictwo Naukowe PWN.
- Sztompka, P. (2002). *Socjologia. Analiza społeczeństwa*. Kraków: Wydawnictwo Znak.
- United Nations University, World Institute for Development Economics Research. (2005). World Income Inequality Database V 2.0a.