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Financial resource of public social security expenditure, the rule of law, and economic inequality: international comparison of legal origins

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ABSTRACT

This study indicates that the strength of the rule of law affects social security expenditure and its financial resources. However, legal origins affect the strength of the rule of law. We use data from 36 member countries of the Organisation for Economic Co-operation and Development. The legal origins affect the rule of law and have different marginal effects on public financial resources. Further, social security expenditures have a correction effect on economic inequality. However, the marginal effect of the social security expenditure on economic inequality differs based on its legal origins. Increasing social security expenditure affects correcting economic inequality to elaborate concerning all legal origins. Particularly in countries that adopted French legal origins, high social security expenditure further improves economic inequality. In contrast, increases in social security expenditures of countries with English legal origins do not improve economic inequality to a large extent. The results of this study suggest that differences in legal origins result in various types of capitalism.

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1. Introduction

Developed countries are characterised as welfare states to varying degrees, with challenges in increasing social security expenditure. According to Wilensky (1975), developed countries exhibit a converging trend of developing as welfare states and simultaneously expand their social security systems and coverage¹. Therefore, similarities can be found in the financial resources of these countries.

However, by observing the Organisation for Economic Co-operation and Development (OECD) member countries, we identified considerable public spending differences on social welfare policies and financial resources across countries. The Scandinavian countries (specifically Sweden) have significant tax and social insurance contribution expenses. However, the government provides substantial social security and is positioned as a ‘big government.’ Meanwhile, Anglo-Saxon countries, such as

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Table 1. Classification of the welfare state and the legal origins.

Esping-Andersen (1990)	La Porta et al. (1998)
Liberal regime Australia, Canada, Ireland, New Zealand, Switzerland, United Kingdom, United States	English origin Australia, Canada, Hong Kong, India, Ireland, Israel, Kenya, Malaysia, New Zealand, Nigeria, Pakistan, Singapore, South Afrika, Sri Lanka, Thailand, United Kingdom, United States, Zimbabwe
Conservative regime Belgium, France, Italy, Netherland, Austria, German, Japan	French origin Argentina, Belgium, Brazil, Chile, Colombia, Ecuador, Egypt, France, Greece, Indonesia, Italy, Jordan, Mexico, Netherland, Peru, Philippines, Portugal, Spain, Turkey, Uruguay, Venezuela
	German origin Austria, German, Japan, Korea, Switzerland
Social democratic regime Denmark, Finland, Norway, Sweden	Scandinavian origin Denmark, Finland, Norway, Sweden

Source: These tables are categorised per Esping-Andersen (1990) and La Porta et al. (1998).

the United States and the United Kingdom, have formed market-based security systems that emphasise self-responsibility and are positioned as ‘small government.’

Considering the welfare state’s establishment and development process, based on Esping-Andersen’s (1990, 1999) theory of welfare regimes, we believe that the differences in each country’s historical and cultural backgrounds led to the establishment of the various systems of the welfare states. He criticises the method of measuring the welfare state’s degree of development by using public social expenditure; the theory of welfare regimes also created a de-commoditisation index using benefit levels and receipt requirements. The welfare regimes theory classified the welfare state into three types in decreasing order of de-commodification score: ‘social democratic regime,’ ‘conservative regime,’ and ‘liberal regime.’² The three types of welfare states were, in our perspective, pioneering impact studies on the welfare state. According to Fazeli and Fazeli (2012) and Isakjee (2017), Esping-Andersen’s insights provide implications for the arguments for the variety of capitalism made by Hall and Soskice (2001) and Amable (2003)³. These studies show that there are different types of capitalism in different countries. The idea of variety of capitalism differs from the considerations of Wilensky (1975). He argued that the factor of economic growth influences social security expenditures and that this expenditure converges by each country’s stage of development.

Apart from Esping-Andersen (1990, 1999), another study that led to the diversity of capitalism is the legal origin theory proposed by La Porta et al. (1998, 2000, 2002) and La Porta et al. (2008, 2013). The legal origins are categorised into English, French, German, and Scandinavian⁴. According to La Porta et al. (1998, 2000, 2002), the legal origins influence the institutions of creditor protection, minority investor protection, degree of law enforcement, and the structure of stock ownership in each country. The legal origin theory suggests that each country’s civil, commercial, and securities laws differ based on legal origins. Ergungor (2004) characterised each country’s financial markets as bank-based or market-based based on legal origin.

Table 1 compares the classification of welfare regime theory with legal origins. Except for Switzerland, classified as a liberal regime, the classification of the welfare regime theory and legal origin theory is the same. Therefore, legal origins can be considered to influence the formation of the welfare state.

We examine the rule of law concerning legal origins⁵. The rule of law is a fundamental principle of the Anglo-American legal system that eliminates rule by tyranny

and restrains power by law. According to the World Development Report (World Bank, 2017), the development of the rule of law requires the following three points: First, the shift from an informal and pluralistic system of law to a unified modern one. Second, acceptance of legal constraints on their power by powerful elites, and third, a country's successful adaptation of foreign legal systems for their purposes. Therefore, the rule of law is a principle based on constitutionalism, which aims to guarantee the rights and freedom of the governed by eliminating the rule of people and binding all governing powers by law. It is intricately linked to liberalism and democracy. Therefore, the degree of the rule of law may vary depending on the legal origin. Moreover, we assume that the degree of the rule of law is linked to the degree of quality of social security in each country.

This study shows that the degree of social security expenditure depends on the rule of law, which depends on legal origins. We also investigate the dependence of social security expenditure on the legal origins concerning the rule of law and its impact on economic inequality. This study shows that differences in legal origins lead to different welfare states, leading to a diversity of capitalism. We recognise the importance of a social environment, adaptable with legal origins, and criticise to introduce policies of other countries without considering their legal origins.

2. Analytical framework

2.1. Composition of Social Security Expenditures

This subsection analyses the component factor of social security expenditures to explain the dependent variables used by the regression analysis. The decomposing ratio of social security expenditures to the gross domestic product (GDP) into 'Ability of tax revenue,' 'Fiscal soundness,' and 'Fiscal sustainability' results in Equation (1).

$$\frac{Social_{it}}{GDP_{it}} = \frac{Social_{it}}{Tax_{it}} \times \frac{Tax_{it}}{Debt_{it}} \times \frac{Debt_{it}}{GDP_{it}}, \quad (1)$$

where i is the country, and t is the year. Equation (1) shows the elements of the financial resources included in the ratio of Social Security expenditures to GDP. $Social/GDP$, the ratio of social security expenditure to GDP, is an indicator of the size of social security expenditure to the scale of the economy. $Social/Tax$, the ratio of social security expenditure to tax revenue, is an index showing the ability of tax revenue to disburse social security expenditure. $Tax/debt$ measures the amount of public spending left over from past generations or the fiscal soundness in its current stage. The index measures the extent of government spending exceeding tax revenue over the years until the present. $Debt/GDP$, the ratio of debt to GDP, indicates the sustainability level of national finance.

In this study, we use the four types of variables included in Equation (1): the size of social security expenditure, the ability of tax revenue, fiscal soundness, and fiscal sustainability, as the dependent variables in the regression analysis. We estimate the

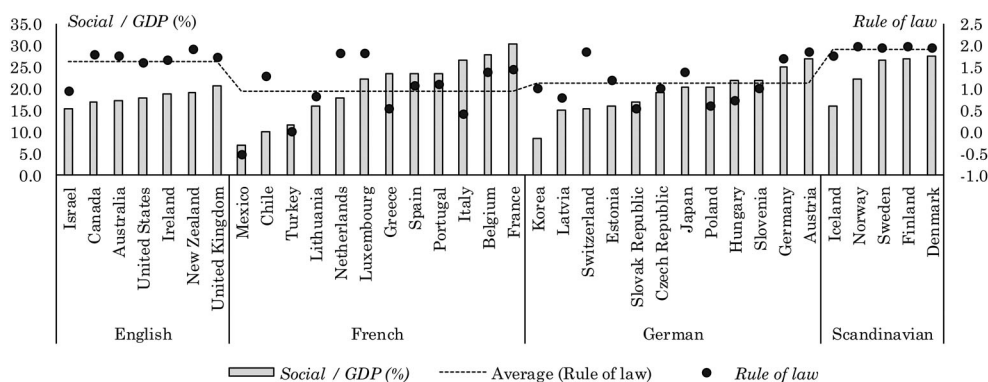


Figure 1. Country name, legal origin, and the rule of law.

Source: Data for legal origin are referenced from La Porta et al. (2008). *Social/GDP* is the ratio of public social security expenditure to GDP. The data source of *Social/GDP* is published by OECD Social expenditure statistics. The *Rule of Law* is published by the Worldwide Governance Indicators of The World Bank Group (2020).

Note: Target countries are 36 OECD countries. English, French, German, Scandinavian denote type of legal origin. The data for each country is the average of the data from the years 2004 to 2018. The missing values used the data of the previous year. If the previous year's data also did not exist, it was treated as a missing value. The data used is unbalanced panel data.

relationship between these four types of variables and the rule of law considering each legal origin.

2.2. Economic Inequality

This subsection reviews the relationship between social security expenditure and economic inequality⁶. In a welfare state, income redistribution is implemented through social security expenditures, taxes, and social insurance premiums to correct economic inequality. According to Palda (1997), there is higher social security expenditure and higher tax revenues in a big government, however, most of the income is redistributed to the middle class. The redistribution of income to low-income earners is no more effective than in the case of a small government.

Tanzi and Schuknecht (2000) investigate the income distribution by income class in 13 developed countries. They compare the redistributive function of taxes and social security with big government and small government. Consequently, they question the redistributive function of the big government. Although the welfare state corrects economic inequality, they report that the effects of income redistribution are not always equal. Korpi and Palme (1998) analysed 18 industrialised countries to investigate their social security and redistributive functions. In Sweden, Norway, and Finland, the scale of social security expenditures and benefits is large, and the effect of income redistribution is high. Contrarily, liberal regimes, including the United States and the United Kingdom, report a small scale of social security expenditure and no apparent effect on income redistribution. Tridico (2017) examines inequality theoretically and finds that while financialisation promotes inequality, public expenditure not only contributes to the reduction of inequality but also promotes economic growth.

Table 2. Variables definitions and sources.

Variables	Definition	Source
<i>Public social security expenditure</i>		
<i>Social/GDP</i>	Ln (Public social security expenditure / GDP) (%)	<i>Social / GDP</i> : OECD Social expenditure statistics.
<i>Social/Tax</i>	Ln (Public social security expenditure / Tax revenue) (%)	<i>Social</i> : OECD Social expenditure statistics. <i>Tax revenue</i> : The World Bank, World Development Indicators.
<i>Tax/Debt</i>	Ln (Tax revenue / General government gross debt) (%)	<i>Tax</i> : The World Bank, World Development Indicators.
<i>Debt/GDP</i>	Ln (General government gross debt / GDP) (%)	<i>Debt</i> : IMF, World Economic Outlook Database. <i>Debt / GDP</i> : IMF, World Economic Outlook Database.
<i>GINI</i>	Gini index (0 to 1)	<i>GINI</i> : The World Bank, World Development Indicators.
<i>Rule of Law</i>	The rule of law indicator (–2.5 to 2.5)	<i>Rule of Law</i> : The World Bank Group, The Worldwide Governance Indicators.
<i>Legal Origin</i>		
<i>English</i>	English legal origin (Dummy variables) 1 if legal origin = English, otherwise 0	<i>English</i> : La Porta et al. (2008)
<i>French</i>	French legal origin (Dummy variables) 1 if legal origin = French, otherwise 0	<i>French</i> : La Porta et al. (2008)
<i>German</i>	German legal origin (Dummy variables) 1 if legal origin = German, otherwise 0	<i>German</i> : La Porta et al. (2008)
<i>Scandinavian</i>	Scandinavian legal origin (Dummy variables) 1 if legal origin = Scandinavian, otherwise 0	<i>Scandinavian</i> : La Porta et al. (2008)
<i>Control Variables</i>		
<i>GDP Capita</i>	Ln (GDP per capita (PPP) adjusted) (USD)	<i>GDP Capita</i> : IMF, World Economic Outlook Database.
<i>Population</i>	Ln (Population) (Mill. USD)	<i>Population</i> : IMF, World Economic Outlook Database.
<i>Pension</i>	Ln (Pension fund's asset / Population) (Mill. USD)	<i>Pension fund's asset</i> : OECD Global pension statistics. <i>Population</i> : IMF, World Economic Outlook Database.
<i>Over65</i>	Population ages 65 and above / Population (%)	<i>Over65</i> : The World Bank, World Development Indicators.
<i>GDP</i>	Ln (GDP (PPP) adjusted) (Bill. USD)	<i>GDP</i> : IMF, World Economic Outlook Database.
<i>Unemployment</i>	Unemployment rate (%)	<i>Unemployment</i> : IMF World Economic Outlook Database.
<i>Inflation</i>	Consumer prices index (%)	<i>Inflation</i> : IMF World Economic Outlook Database.

Note: The data are from the years 2004 to 2018. The missing value uses the data of the previous year. If the previous year's data also does not exist, it was treated as a missing value. The data used is unbalanced panel data.

Source: Prepared by the authors.

Prior research suggests that income redistribution by the welfare state has different effects on big government and small government. Therefore, this study investigates the link between the size of social security expenditures and economic inequality. In the process, the analysis considers the impact of legal origins.

3. Data and models

This section explains the dataset and descriptive statistics used in this study. The data was collected from 36 OECD member countries, and Figure 1 summarises the country names, legal origins, *Social/GDP* ratio, and the *Rule of Law*. *Social/GDP* and *Rule of Law* for each country are based on the arithmetic mean of relevant data from 2004

Table 3. Descriptive statistics value.

	Mean	Median	SD	Min.	Max.	95% CI	Obs.
<i>Social/GDP</i>	2.935	2.984	0.340	1.747	3.472	0.029	540
<i>Social/Tax</i>	4.062	4.081	0.184	3.263	4.510	0.016	540
<i>Tax/Debt</i>	4.204	4.140	0.730	2.512	6.722	0.062	540
<i>Debt/GDP</i>	3.879	3.898	0.742	1.326	5.469	0.063	540
<i>GINI</i>	0.317	0.310	0.056	0.227	0.511	0.005	527
<i>Rule of Law</i>	1.271	1.388	0.616	−0.674	2.100	0.052	540
<i>English</i>	0.194	0.000	0.396	0.000	1.000	0.033	540
<i>French</i>	0.333	0.000	0.472	0.000	1.000	0.040	540
<i>German</i>	0.333	0.000	0.472	0.000	1.000	0.040	540
<i>Scandinavian</i>	0.139	0.000	0.346	0.000	1.000	0.029	540
<i>GDP Capita</i>	10.450	10.505	0.372	9.590	11.498	0.031	540
<i>Population</i>	2.531	2.349	1.533	−1.234	5.791	0.130	540
<i>Pension</i>	8.140	7.866	2.036	0.442	11.629	0.174	530
<i>Over65</i>	15.705	16.364	3.863	5.513	27.576	0.327	540
<i>GDP</i>	6.071	5.889	1.520	2.296	9.932	0.128	540
<i>Unemployment</i>	7.616	6.849	4.107	2.243	27.475	0.347	540
<i>Inflation</i>	2.322	2.022	2.235	−1.684	16.332	0.189	540

Note: SD means standard deviation. 95% CI means 95% confidence interval. Obs. means the number of observations. The missing value uses the value of the previous year. If there is no data for the previous year, the year is considered a missing value.

Source: Created by authors based on the data in IMF (2020), OECD (2020a, 2020b), The World Bank (2020) and The World Bank Group (2020) in Table 2.

to 2018. The classification of legal origins is per La Porta et al. (2008)⁷. Figure 1. indicates that the average of the rules of law is relatively high in the case of Scandinavian and English origins. However, it is relatively low in the case of French and German legal origins.

Table 2 lists the variable definitions and data sources. We collected data from the OECD's (2020b) Social Expenditure Statistics, World Bank's World Development Indicators (Kaufmann & Kraay, 2020), World Bank Group's (2020) Worldwide Governance Indicators, and IMF's (2020) World Economic Outlook Database October 2019 to develop the variables required for analysis. Table 3 shows the descriptive statistics of the data used. In cases where data were missing, we used the value of the previous year. If there were no data for the previous year, it was considered a missing value.

First, we reviewed the relationship between *Social/GDP* and the *Rule of Law* in using a simple regression model, as shown in Figure 2. The value by country is the average of values from 2004 to 2018. The regression model was estimated using Ordinary Least Squares. The number of observations is 36. According to the estimation results in Figure 2, the relationship between *Social/GDP* and *Rule of Law* is positive and is significant at the 1% level.

Figure 3 represents the variables in Equation (1). According to Figure 3, the social security expenditure among English origin countries is relatively low, and tax revenue is also low. The debt of countries with English legal origins is the same as that with German legal origins, but the Gini index tends to be high. As countries with French and German legal origins have high social security expenditure against tax revenues, they tend to have higher debt. However, countries with French legal origins exhibit more significant economic inequality than those with German legal origin. The social security expenditure and tax revenue levels are also high for countries with the Scandinavian legal origin; therefore, debt and economic inequality is low in this case.

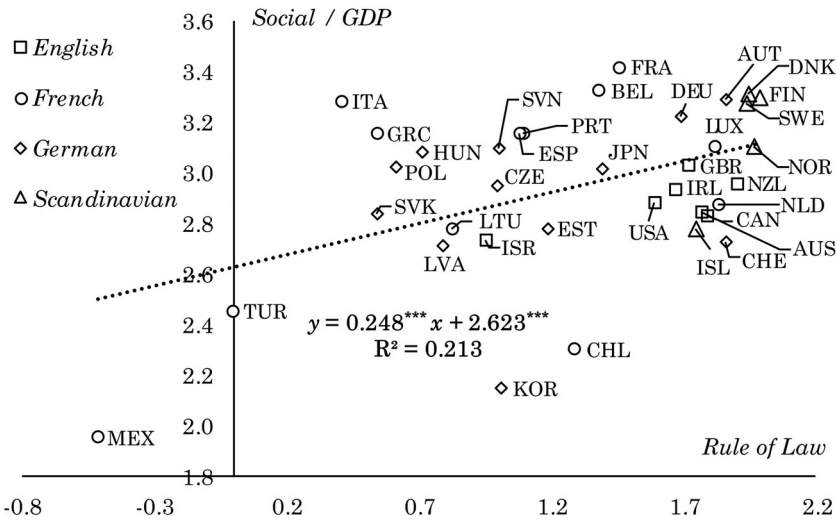


Figure 2. Relationship between social security expenditure and the rule of law.

Note: ***, **, *, each significant at the 1%, 5%, 10% level. The value is average from 2004 to 2018 by country. The regression model was estimated by OLS. The number of observations is 36. The country code uses ISO 3166-1 Alpha-3.

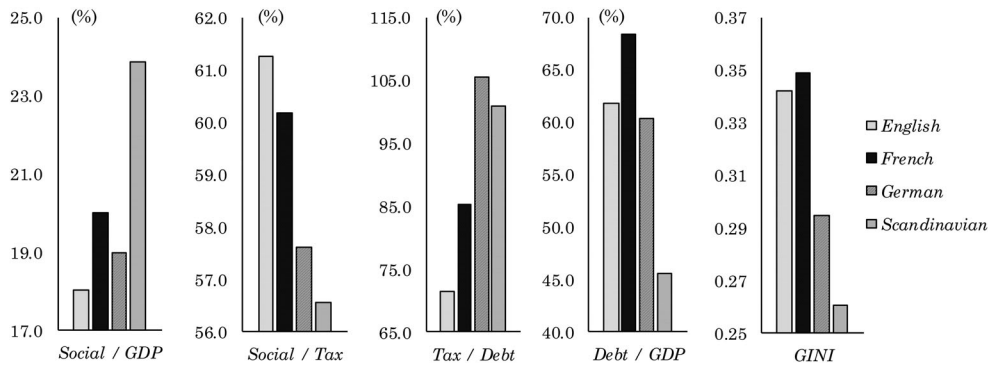


Figure 3. Public social expenditure and Gini index by legal origins.

Note: Values are averaged from 2004 to 2018 for each country and are further averaged by legal origin.

Based on the above, does the effect of the rule of law depend on legal origins? The following regression model was developed to confirm whether the rule of law differs depending on legal origins.

$$Rule\ of\ Law_{it} = \alpha_0 + \alpha_1 Legal\ Origins_i + \alpha_2 Control\ Variables1_{it} + \varepsilon_{it}, \quad (2)$$

where i is the country, t is the year, ε is the error term, and *Control Variables1* includes the *GDP per Capita* and *Population*⁸. Additionally, this model includes a dummy variable for the year. As the legal origins dummy variable does not change during the target period, it cannot be measured by the fixed-effect model performed

after completely removing the effects of the time-invariant covariates. Therefore, the random effects model is used to estimate the model represented in Equation (2).

The following estimations are made to analyse the relationship between the components of social security expenditure and the rule of law derived from the legal origins.

$$\begin{aligned} \text{Public Social Security Expenditure}_{it} = & \beta_0 + \beta_1 \text{Rule of Law}_{it} + \beta_2 \text{Legal origin}_i \\ & + \beta_3 \text{Rule of Law} \times \text{Legal Origin}_{it} \\ & + \beta_4 \text{Control Variables2}_{it} + u_{it}, \end{aligned} \quad (3)$$

where, *Social/GDP*, *Social/Tax*, *Tax/Debt*, and *Debt/GDP* are the dependent variables, and u is the error term. *Control Variables2* contains the variables *Pension*, *Over65*, *GDP*, *Unemployment*, and *Inflation*. We investigate the relationship between dependent variables and the interaction term. This model estimates whether the country's legal origin affects the rule of law, affecting public social security expenditure. We estimate this regression model with a random effects model.

We must consider the ratio of the elderly population and pension funds as factors that affect social security expenditure. Considering the legal institution, differences in pension systems and tax systems affect the financial resources of social security expenditure. However, the primary sources of social security expenditure are tax revenue and pension insurance premiums. Moreover, the economic scale, unemployment rate, and inflation rate affect tax revenues. This model also includes year dummy variables.

Finally, we investigate the relationship between economic inequality and public social security expenditure by legal origins.

$$\begin{aligned} \text{GINI}_{it} = & \gamma_0 + \gamma_1 \text{Social}_{it}/\text{GDP}_{it} + \gamma_2 \text{Rule of Law}_{it} + \gamma_3 \text{Social}_{it}/\text{GDP}_{it} \times \text{Rule of Law}_{it} \\ & + \gamma_4 \text{Control Variables3}_{it} + e_{it}, \end{aligned} \quad (4)$$

where i is the country, t is the year, and e is the error term. Here, the *GINI* index is the dependent variable, and *Control Variables3* is the unemployment rate. We also insert the interaction term in Equation (4). This is because it is possible to estimate whether the difference in the legal origins that countries have adopted in the past will affect the level of social security expenditure, which will affect economic inequality. Here, as economic inequality is based on income inequality, the unemployment rate directly affects economic inequality. We also estimate this regression model with a random effects model⁹.

4. Estimation results and discussion

In this section, we explain the estimation results from Equations (2) to (4). Table 4 summarises the estimation results of Equation (2). The model excludes the legal origin, which is the base category of the dummy variable. The model uses balanced

Table 4. Estimation result 1.

		<i>Rule of Law</i>	
<i>English</i>		0.556*** (3.544)	0.361** (2.270)
<i>French</i>	−0.556*** (−3.544)		−0.195 (−1.449)
<i>German</i>	−0.361** (−2.270)	0.195 (1.449)	
<i>Scandinavian</i>	0.111 (0.547)	0.667*** (3.593)	0.472*** (2.603)
<i>GDP Capita</i>	0.586*** (8.913)	0.586*** (8.913)	0.586*** (8.913)
<i>Population</i>	−0.052 (−1.409)	−0.052 (−1.409)	−0.052 (−1.409)
<i>Constant</i>	−4.529*** (−6.167)	−5.085*** (−7.144)	−4.890*** (−6.921)
<i>Year</i>	Yes	Yes	Yes
Adj. R ²	0.630	0.630	0.630
LM test	347.286***	347.286***	347.286***
Obs.	540	540	540

Note: ***, **, *, each significant at the 1%, 5%, 10% level. The value in parentheses is the t value. *Year* is a year dummy if the dummy included in the model are described as Yes. Obs. means the number of observations. The random-effects model is used for this estimation. Since the dummy variable that indicates the legal origin does not change during the target period, it cannot be measured by the fixed-effect model performed after completely removing the effects of the time-invariant covariates.

Source: Prepared by the author.

panel data without any missing variables. Accordingly, the number of observations is 540.

When compared with countries with English legal origin, the coefficient of *French* is negative and significant at the 1% level, and that of *German* is negative and significant at the 5% level. Neither the English and Scandinavian origin nor the French and German origin comparisons are significant. Compared with French, and German origins, the coefficient of *Scandinavian* is positive and significant at the 1% level in both cases.

Table 4 indicates that the English origin has a better institution of the rule of law than the French and German origins. The English origin is statistically no different in the level of the rule of law from the Scandinavian origin. French and German origin have almost the same level of the rule of law. Scandinavian origin has a better institution of the rule of law than French and German origins. The rule of law is not developed in legal origins, which has a civil law background.

Tables 5 and 6 show the estimation results of Equation (3). The dependent variables considered in these tables are *Social/GDP* and *Social/Tax*. The description of dummy variables is the same as in Table 4. The model uses unbalanced panel data with 530 observations¹⁰. In the model with *Social/GDP* as the dependent variable, all coefficients of the *Rule of Law* are positive and significant at the 1% level. In the English origin-based model, the coefficient of the interaction term on the *Rule of Law* × *French* is negative and significant at the 1% level. Similarly, the coefficient of the interaction term on the *Rule of Law* × *German* is negative and significant at the 1% level. However, the coefficient of the interaction term on the *Rule of Law* × *Scandinavian* was not significant.

In the French origin-based model, the coefficients of the interaction terms *Rule of Law* × *German* and *Rule of Law* × *Scandinavian* are not significant. The coefficient

Table 5. Estimation result 2–1.

	<i>Social / GDP</i>			<i>Social / Tax</i>		
<i>Rule of Law</i>	0.394*** (5.649)	0.112*** (2.769)	0.183*** (4.493)	0.276*** (3.992)	0.100*** (2.844)	0.180*** (4.482)
<i>Rule of Law</i> × <i>English</i>		0.282*** (3.486)	0.211*** (2.653)		0.176** (2.265)	0.096 (1.224)
<i>Rule of Law</i> × <i>French</i>	−0.282*** (−3.486)		−0.071 (−1.206)	−0.176** (−2.265)		−0.080 (−1.504)
<i>Rule of Law</i> × <i>German</i>	−0.211*** (−2.653)	0.071 (1.206)		−0.096 (−1.224)	0.080 (1.504)	
<i>Rule of Law</i> × <i>Scandinavian</i>	−0.119 (−1.057)	0.163* (1.668)	0.092 (0.950)	0.130 (1.106)	0.306*** (3.000)	0.226** (2.195)
<i>English</i>		−0.532*** (−3.620)	−0.414*** (−2.746)		−0.290** (−2.257)	−0.172 (−1.298)
<i>French</i>	0.532*** (3.620)		0.119 (1.224)	0.290** (2.257)		0.118* (1.616)
<i>German</i>	0.414*** (2.746)	−0.119 (−1.224)		0.172 (1.298)	−0.118* (−1.616)	
<i>Scandinavian</i>	0.350 (1.516)	−0.182 (−0.903)	−0.063 (−0.314)	−0.343 (−1.534)	−0.633*** (−3.205)	−0.515*** (−2.597)
<i>Pension</i>	0.016*** (2.832)	0.016*** (2.832)	0.016*** (2.832)	−0.006 (−1.010)	−0.006 (−1.010)	−0.006 (−1.010)
<i>Over65</i>	0.026*** (5.945)	0.026*** (5.945)	0.026*** (5.945)	0.008** (2.054)	0.008** (2.054)	0.008** (2.054)
<i>GDP</i>	0.015 (0.780)	0.015 (0.780)	0.015 (0.780)	0.045*** (3.508)	0.045*** (3.508)	0.045*** (3.508)
<i>Unemployment</i>	0.014*** (10.927)	0.014*** (10.927)	0.014*** (10.927)	0.014*** (10.312)	0.014*** (10.312)	0.014*** (10.312)
<i>Inflation</i>	−0.003 (−1.367)	−0.003 (−1.367)	−0.003 (−1.367)	−0.003 (−1.199)	−0.003 (−1.199)	−0.003 (−1.199)
<i>Constant</i>	1.534*** (7.095)	2.066*** (11.571)	1.947*** (12.073)	3.206*** (18.897)	3.496*** (27.286)	3.379*** (29.288)
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.525	0.525	0.525	0.452	0.452	0.452
LM test	295.955***	295.955***	295.955***	258.506***	258.506***	258.506***
Obs.	530	530	530	530	530	530

Note: ***, **, *, each significant at the 1%, 5%, 10% level. The value in parentheses is the t value. *Year* is a year dummy if the dummy included in the model are described as Yes. Obs. means the number of observations. The random-effects model is used for this estimation. Since the dummy variable that indicates the legal origin does not change during the target period, it cannot be measured by the fixed-effect model that is performed after completely removing the effects of the time-invariant covariates.

Source: Prepared by the author.

of the interaction term *Rule of Law* × *Scandinavian* is positive and significant at the 10% level.

All coefficients of *Rule of Law* are positive and significant at the 1% level in the model with *Social/Tax* as the dependent variable. In the English origin-based model, the coefficient of the interaction term on the *Rule of Law* × *French* is negative and significant at the 5% level. In the same model, the coefficients of the interaction term on the *Rule of Law* × *German* and the *Rule of Law* × *Scandinavian* are not significant.

In the French origin-based model, the coefficient of the interaction term, *Rule of Law* × *German*, is not significant. However, the coefficient of the interaction term, *Rule of Law* × *Scandinavian*, is positive and significant at the 1% level, while that of *Rule of Law* × *Scandinavian* is positive and significant at the 5% level.

Table 7 shows the marginal effect of the interaction term estimated in Table 5. In legal origins with higher marginal effects, the dependent variable tends to increase as

Table 6. Estimation result 2–2.

	<i>Tax / Debt</i>			<i>Debt / GDP</i>		
<i>Rule of Law</i>	0.286 (1.098)	−0.114 (−0.839)	−0.490*** (−3.239)	−0.182 (−0.721)	0.179 (1.329)	0.478*** (3.253)
<i>Rule of Law</i> × <i>English</i>		0.399 (1.361)	0.776*** (2.625)		−0.361 (−1.261)	−0.660** (−2.300)
<i>Rule of Law</i> × <i>French</i>	−0.399 (−1.361)		0.376* (1.858)	0.361 (1.261)		−0.299 (−1.497)
<i>Rule of Law</i> × <i>German</i>	−0.776*** (−2.625)	−0.376* (−1.858)		0.660** (2.300)	0.299 (1.497)	
<i>Rule of Law</i> × <i>Scandinavian</i>	0.300 (0.687)	0.699* (1.848)	1.075*** (2.820)	−0.508 (−1.213)	−0.870*** (−2.394)	−1.169*** (−3.200)
<i>English</i>		−0.740 (−1.514)	−1.144** (−2.268)		0.596 (1.237)	0.944** (1.902)
<i>French</i>	0.740 (1.514)		−0.404 (−1.425)	−0.596 (−1.237)		0.348 (1.217)
<i>German</i>	1.144** (2.268)	0.404 (1.425)		−0.944** (−1.902)	−0.348 (−1.217)	
<i>Scandinavian</i>	−0.622 (−0.743)	−1.363* (−1.849)	−1.766*** (−2.386)	1.214 (1.497)	1.810*** (2.543)	2.158*** (3.020)
<i>Pension</i>	0.055*** (2.653)	0.055*** (2.653)	0.055*** (2.653)	−0.037* (−1.837)	−0.037* (−1.837)	−0.037* (−1.837)
<i>Over65</i>	0.009 (0.619)	0.009 (0.619)	0.009 (0.619)	0.014 (0.978)	0.014 (0.978)	0.014 (0.978)
<i>GDP</i>	−0.263*** (−5.136)	−0.263*** (−5.136)	−0.263*** (−5.136)	0.226*** (4.265)	0.226*** (4.265)	0.226*** (4.265)
<i>Unemployment</i>	−0.041*** (−8.363)	−0.041*** (−8.363)	−0.041*** (−8.363)	0.043*** (8.988)	0.043*** (8.988)	0.043*** (8.988)
<i>Inflation</i>	0.030*** (3.727)	0.030*** (3.727)	0.030*** (3.727)	−0.030*** (−3.935)	−0.030*** (−3.935)	−0.030*** (−3.935)
<i>Constant</i>	4.757*** (7.255)	5.498*** (10.934)	5.901*** (13.051)	2.789*** (4.243)	2.193*** (4.281)	1.845*** (4.007)
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.376	0.376	0.376	0.382	0.382	0.382
LM test	219.364***	219.364***	219.364***	222.859***	222.859***	222.859***
Obs.	530	530	530	530	530	530

Note: ***, **, *, each significant at the 1%, 5%, 10% level. The value in parentheses is the t value. *Year* is a year dummy if the dummy included in the model are described as Yes. Obs. means the number of observations. The random-effects model is used for this estimation. Since the dummy variable that indicates the legal origin does not change during the target period, it cannot be measured by the fixed-effect model that is performed after completely removing the effects of the time-invariant covariates.

Source: Prepared by the author.

the *Rule of Law* increases. In the model that uses *Social/GDP* as the dependent variable, the marginal effect of the interaction term is 0.394 for English origin, 0.275 for Scandinavian origin, 0.183 for German origin, and 0.112 for French origin. In the model that uses *Social/Tax* as the dependent variable, the marginal effect of the interaction term is 0.406 for Scandinavian origin, 0.276 for English origin, 0.180 for German origin, and 0.100 for French origin.

Table 6 shows the model's estimation results using *Tax/Debt* and *Debt/GDP* as the dependent variables. For the model using *Tax/Debt* as the dependent variable, the coefficient of the *Rule of Law* in the German origin-based model is negative and significant at the 1% level. In the English origin-based model, the coefficient of the interaction term on the *Rule of Law* × *French* is not significant, while that of the *Rule of Law* × *German* is negative and significant at the 1% level. The coefficient of the interaction term on the *Rule of Law* × *Scandinavian* is not significant.

Table 7. Marginal effects in regression models.

Interaction term with <i>Rule of Law</i>	<i>Social / GDP</i>			<i>Social / Tax</i>		
	Marginal effect		Country ^[Prob.]	Marginal effect		Country ^[Prob.]
<i>English vs. French</i>	0.394	0.112	<i>English</i> ^a	0.276	0.100	<i>English</i> ^a
<i>English vs. German</i>	0.394	0.183	<i>English</i> ^a	0.276	0.180	Not significant
<i>English vs. Scandinavian</i>	0.394	0.275	Not significant	0.276	0.406	Not significant
<i>French vs. German</i>	0.112	0.183	Not significant	0.100	0.180	Not significant
<i>French vs. Scandinavian</i>	0.112	0.275	<i>Scandinavian</i> ^a	0.100	0.406	<i>Scandinavian</i> ^a
<i>German vs. Scandinavian</i>	0.183	0.275	Not significant	0.180	0.406	<i>Scandinavian</i> ^a

Note: The marginal effects were calculated using the sum of the *Rule of Law* coefficient and the interaction term coefficient. If neither the coefficient of the interaction term nor of *Rule of Law* is significant, it is denoted as Not significant. In this table, the model selected has a highly significant level for the coefficient of the legal origin or the interaction term.

The column of Country describes the legal origin, which has a significant level of higher marginal effect. If both the coefficient of interaction term and of *Rule of Law* are significant at the 5% level or below, it is denoted as^a.

Source: Prepared by the author.

Table 8. Marginal effects in regression models.

Interaction term with <i>Rule of law</i>	<i>Tax / Debt</i>			<i>Debt / GDP</i>		
	Marginal effect		Country ^[Prob.]	Marginal effect		Country ^[Prob.]
<i>English vs. French</i>	0.286	−0.114	Not significant	−0.182	0.179	Not significant
<i>English vs. German</i>	0.286	−0.490	<i>English</i> ^a	−0.182	0.478	<i>German</i> ^a
<i>English vs. Scandinavian</i>	0.286	0.585	Not significant	−0.182	−0.690	Not significant
<i>French vs. German</i>	−0.114	−0.490	Not significant	0.179	0.478	Not significant
<i>French vs. Scandinavian</i>	−0.114	0.585	Not significant	0.179	−0.690	<i>French</i> ^b
<i>German vs. Scandinavian</i>	−0.490	0.585	<i>Scandinavian</i> ^a	0.478	−0.690	<i>German</i> ^a

Note: The marginal effects were calculated using the sum of the *Rule of Law* coefficient and the interaction term coefficient. A column of Country describes the legal origin, which has a significant level of higher marginal effect. If neither the coefficient of the interaction term nor of *Rule of Law* is significant, it is denoted as Not significant. In this table, the model selected has a highly significant level for the coefficient of the legal origin or the interaction term.

When the coefficient of interaction term and *Rule of Law* are significant at the 5% level or below, it is indicated as^a.

When only the coefficient of the interaction term is significant under the 5% level, it is indicated as^b.

The coefficient of the interaction term on the *Rule of Law* × *German* is negative and significant at the 10% level in the French origin-based model. However, the coefficient of the interaction term on the *Rule of Law* × *Scandinavian* is positive and significant at the 10% level while that of *Rule of Law* × *Scandinavian* is positive and significant at the 1% level.

Table 8 shows the marginal effect of the interaction term estimated in Table 6. In legal origins with higher marginal effects, the dependent variable tends to increase as the *Rule of Law* increases. In the model where *Tax/Debt* is the dependent variable, the marginal effect of the interaction term is 0.585 for Scandinavian origin, 0.286 for English origin, −0.114 for French origin, and −0.490 for German origin. In the model where *Debt/GDP* is the dependent variable, the marginal effect of the interaction term is 0.478 for German origin, 0.179 for French origin, −0.182 for English origin, and −0.690 for Scandinavian origin.

Next, we discuss the estimation results from Tables 5 to 8. The scale of social security tends to be high, especially in countries where the rule of law is high and English and or Scandinavian legal origins are adopted. The ability to cover social security expenditure using tax revenue is lower in countries where the rule of law is

Table 9. Estimation result 3.

		<i>GINI</i>	
<i>Social/GDP</i>	−0.025* (−1.844)	−0.091*** (−8.044)	−0.026*** (−2.492)
<i>Social/GDP</i> × <i>English</i>		0.066*** (4.205)	0.001 (0.073)
<i>Social/GDP</i> × <i>French</i>	−0.066*** (−4.205)		−0.065*** (−4.802)
<i>Social/GDP</i> × <i>German</i>	−0.001 (−0.073)	0.065*** (4.802)	
<i>Social/GDP</i> × <i>Scandinavian</i>	−0.018 (−0.801)	0.048** (2.331)	−0.017 (−0.816)
<i>English</i>		−0.197*** (−4.157)	0.044 (0.926)
<i>French</i>	0.197*** (4.157)		0.241*** (5.890)
<i>German</i>	−0.044 (−0.926)	−0.241*** (−5.890)	
<i>Scandinavian</i>	−0.018 (−0.253)	−0.215*** (−3.263)	0.026 (0.398)
<i>Unemployment</i>	0.001*** (4.854)	0.001*** (4.854)	0.001*** (4.854)
<i>Constant</i>	0.409*** (10.200)	0.606*** (18.129)	0.365*** (11.629)
<i>Year</i>	Yes	Yes	Yes
Adj. R ²	0.681	0.681	0.681
LM test	374.774***	374.774***	374.774***
Obs.	527	527	527

Note: ***, **, *, each significant at the 1%, 5%, 10% level. The value in parentheses is the t value. *Year* is a year dummy if the dummy included in the model are described as Yes. Obs. means the number of observations. The random-effects model is used for this estimation. Since the dummy variable that indicates the legal origin does not change during the target period, it cannot be measured by the fixed-effect model that is performed after completely removing the effects of the time-invariant covariates.

Source: Prepared by the author.

high, and Scandinavian or English legal origins are adopted. By comparing the tax revenue and debt, we identify countries that adopted English and Scandinavian legal origin, where the rule of law is high, and debt tends to be low. Moreover, from the perspective of fiscal sustainability, there is a tendency for debt to be higher than GDP in countries where the rule of law is higher with German and French origin.

Table 9 shows the estimation results of Equation (3). The description of dummy variables is the same as in the previous model. The model uses unbalanced panel data with 527 observations and uses *GINI* as the dependent variable. The results show that all coefficients of *Social/GDP* are negative, and the English origin-based model is significant at 10%, the French origin-based model is significant at 1%, and the German origin-based model is significant at the 1% level. In the English origin-based model, the coefficient of the interaction term on *Social/GDP* × *French* is negative and significant at the 1% level. In contrast, the coefficients of the interaction terms related to *German* and *Scandinavian* are not significant in the same model. In the French origin-based model, the coefficient of the interaction term on *Social/GDP* × *German* is positive and significant at the 1% level while that of *Social/GDP* × *Scandinavian* is positive and significant at the 5% level. Nonetheless, the coefficient of the interaction term, *Social/GDP* × *Scandinavian*, is not significant in the German origin-based model.

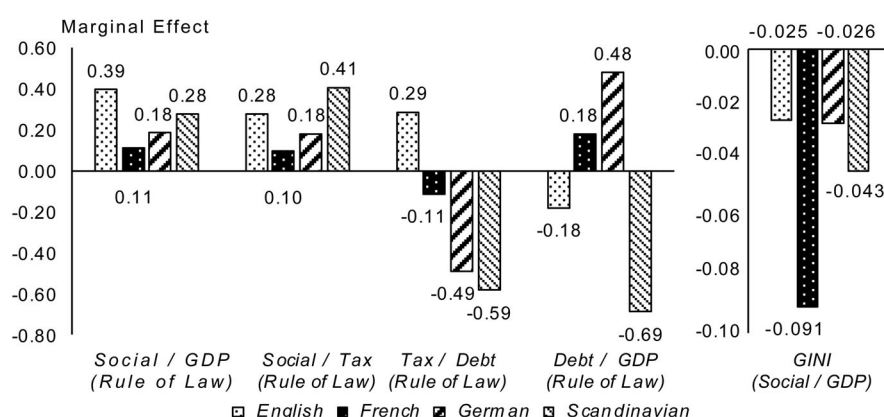
Table 10 shows the marginal effect of the interaction term estimated in Table 9. In legal origin with a higher marginal effect, the dependent variable tends to be higher

Table 10. Marginal effects in regression models.

GINI			
Interaction term with <i>Social / GDP</i>	Marginal effect		Country ^[Prob.]
<i>English vs. French</i>	−0.025	−0.091	<i>English</i> ^a
<i>English vs. German</i>	−0.025	−0.026	Not significant
<i>English vs. Scandinavian</i>	−0.025	−0.043	Not significant
<i>French vs. German</i>	−0.091	−0.026	<i>German</i> ^a
<i>French vs. Scandinavian</i>	−0.091	−0.043	<i>Scandinavian</i> ^a
<i>German vs. Scandinavian</i>	−0.026	−0.043	Not significant

Note: The marginal effects have calculated the sum of the *Social / GDP* coefficient and the interaction term coefficient. The column of Country describes the legal origin, which has a significant level of higher marginal effect. If neither the coefficient of the interaction term nor of *Social / GDP* is significant, it is denoted as Not significant. In this table, the model selected has a highly significant level for the coefficient of the legal origin or the interaction term. If both the coefficient of interaction term and *Social / GDP* is significant at the 5% level or below, it is indicated as ^a.

Source: Prepared by the author.

**Figure 4.** Comparison of marginal effects estimated by regression models.

Note: The values are marginal effects estimated from the regression model. The name of the variable is the dependent variable. Variables in parentheses refer to the interaction term with the legal origins.

as *Social/GDP* increases. The marginal effect of the interaction term is −0.025 for English origin, −0.026 for German origin, −0.043 for Scandinavian origin, and −0.091 for French origin.

The estimated results of Tables 9 and 10 are interpreted here. Increasing social security expenditure corrects economic inequality across all legal origins. Especially in countries that adopted French legal origins, high social security expenditure ameliorates economic inequality. In contrast, an increase in social security expenditures of English legal origin countries contributes little to resolving economic inequality.

Figure 4 presents a graph to clearly compare the marginal effects calculated by each regression model. As seen in Figure 4, the increase in social security expenditure could lead to higher taxes in the English legal origins and a fiscal deterioration in the French and German legal origins. Furthermore, while an increase in social security expenditure reduces economic inequality, their marginal effect varies with the legal origins.

5. Conclusion and implication

This study analyses data from 36 OECD countries and finds that social security expenditures and its components depend on the degree of the rule of law, which depends on legal origins. We find that the impact of social security expenditure on economic inequality depends on each country's legal origins. Especially in countries where the degree of the rule of law is high, the size of social security in countries that adopted English and Scandinavian legal origins tends to be higher. The ability of tax revenue is lower and fiscal soundness (ratio of tax revenue to debt) is higher in countries with a high degree of the rule of law and have adopted Scandinavian and English legal origins. This indicates more tax revenue and less debt in these countries. In terms of fiscal sustainability, countries with a higher degree of the rule of law and German and or French legal origins are likely to have a higher debt to GDP ratio.

Concerning all legal origins, increasing social security expenditure has the effect of correcting economic inequality. Particularly in countries that adopted French legal origins, high social security expenditure further ameliorates economic inequality. In contrast, increases in social security expenditures of countries with English legal origin do not improve economic inequality to a large extent. Therefore, a government official needs to perceive the factors of their legal origin and the extent of the rule of law. It is then necessary to estimate how much social security expenditure is needed to reduce economic inequality. If the legal origins and or degree of the rule of law are different, the required social security contributions would be different to correct economic inequality.

A limitation of this study is that the model is estimated based on the historical indicator of the legal origin. However, it is considered that the impact of path dependency affects modern public spending and the rule of law. Therefore, the rule of law is influenced by legal origins, influencing public spending, and economic inequality. The suggestions in this paper are as follows. Depending on the legal origins, an increase in social security expenditure has different effects on reducing economic inequality. This phenomenon occurs because different legal origins have different levels of the rule of law. This difference suggests that increasing social security expenditure without considering the legal origins and the level of the rule of law may have little effect. Conversely, the improvident policy may lead to a deterioration of public finances and an increase in taxes, which may not have the desired effect.

We recognise the importance of a social environment, adaptable with legal origins, and criticise to introduce policies of other countries without considering their legal origins.

Notes

1. According to Wilensky (1975), a country is considered a welfare state if its social security expenditures exceed a certain percentage of its GDP. Additionally, the study examines the convergence theory of public spending on social welfare programs, which states that no matter what political and economic regime, cultural and historical background, or affluent society a country has, its social structure will become similar. Beblavy (2010) showed empirically that economic development is the main factor of increase in social expenditure.

2. Regarding Esping-Andersen's three types of welfare states, Castles and Mitchell (1992), Ferrera (1996), Lewis (1992), Sainsbury (1996), Siaroff (1994), and Bambra (2011) proposed an alternative. Their classification is primarily based on wages, labor, gender, healthcare, and government interventions on the welfare system.
3. Studies by Ebbinghaus (2012) and Ko and Min (2019) focus on the development of the welfare state in post-socialist countries. They find that social security spending has developed in formerly socialist states.
4. Legal origins are also being studied in the field of comparative law; for example, Zweigert and Kötz (1998) studied the classification of legal origins.
5. According to the description of methodology by Worldwide Governance Indicators, rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of the society, and the quality of contract enforcement, property rights, police, and courts, as well as the likelihood of crime and violence. Although the rule of law is inherently different from the nomocracy (Rechtsstaat) of continental law, the data are calculated based on realistic effectiveness based on the above criteria.
6. Economic inequality in this paper refers to income inequality.
7. According to La Porta et al. (2008), socialist countries are excluded because they are not the target countries of this study.
8. It is possible that higher-income levels of people have strengthened their influence on the government and maintained a high level of rule of law. Contrarily, the income level may be high because of the high level of rule of law. Due to the small population, the rights of people may become more significant than that of the government through the right to vote. Therefore, GDP per capita and population are added as control variables.
9. Although the correlation coefficient between Rule of Law and Pension in Equation (3) was 0.614, no correlation coefficients between independent variables greater than ± 0.5 were detected in the other models. Incidentally, the mean of correlation coefficients was -0.138 in Equation (2), -0.061 in Equation (3) and -0.115 in Equation (4).
10. If the data for a particular year are missing, it is proxied by the values of the previous year. If there are no data for the previous year, the year is considered to have missing values.

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Data availability statement

The datasets generated and/or analysed during the current study are available in the Organization for Economic Co-operation and Development repository https://stats.oecd.org/Index.aspx?DataSetCode=SOCX_AGG.

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