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Analyzing the Role of Government Efficiency on Financial Development for OECD Countries

Aysel Amir, Korhan K. Gokmenoglu¹

Abstract: This paper fulfills a gap in the existing literature by analyzing the impact of government efficiency and corruption on the financial development of 31 OECD countries for the period 2002 to 2015 inclusively. To ensure robustness in our estimations, we employed several econometrics techniques, included control variables in our models, used several proxies for the variables under investigation, split the data into subgroups based on the degree of democracy, and repeated the analysis for these groups. Obtained findings provide strong evidence that government efficiency has a significant effect on financial development, and the sign of all the control variables are compatible with the a-priori theoretical expectations. The results of this study propose several policy recommendations to enhance financial development such as enhancing social cohesion through education on the use of tax contributions, revising budget procedures to ensure efficient spending of resources and to improve institutional quality, and reducing corruptive pursuits by targeting the informal economy activities and modifying the rule of law.

Keywords: Financial development, government efficiency, OECD countries, panel data

JEL Classifications: C33, D73, H11

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Introduction

Financial development is defined as developments in the size, stability, and efficiency of the financial sector and improving the access available to financial instruments and intermediaries within the financial system (Beck, Demirguc-Kunt and Levine, 2000). These enhancements are generally achieved by renovations concerning accessible information and the monitoring of investments, the supervision of associated risks inherent with trading and diversification, the ability to both pool and mobilize savings, and finally, the exchange of financial goods and services (Levine, 2005). One of the earliest studies regarding financial development (Schumpeter, 1911) alliterated the significance of this concept in regard to prospective economic growth opportunities. The findings of Schumpeter paved the way for the present vast literature concerning the importance and determinants of financial development. Although there is well-established literature regarding financial development, the literature thus far ignores the role of government efficiency pointedly. A “government's” ability to reform and

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achieve a set of monetary and fiscal objectives successfully is implicated by its efficiency; hence government efficiency is expected to have impacts on financial development. Given the potential importance of government efficiency and the silence of the literature regarding its' role as a potential determinant of financial development, our study aims to fulfill the mentioned gap in the existing literature by investigating government efficiency as a potential contributor to financial development. The findings of our study are of importance for policy implications that aim to promote financial development.

The importance of financial development is well-documented in the existing literature. A large extent of the literature has been devoted to the impact of financial development on economic growth, and it has provided substantial evidence for this relationship (Levine, 1999; Beck, Georgiadis and Straub, 2014; Menyah, Nazlioglu, and Wolde-Rufael, 2014; Pradhan, Arvin and Bahmani, 2018; Benczúr, Karagiannis and Kvedaras, 2018). Financial development has been viewed to spur economic growth and elevate poverty, as it reduces costs embedded within the financial system (Huang, 2010). There are critical implications of financial development for many other financial and economic variables; such as efficient allocation of resources (Levine, 1999; Ductor and Grechyna, 2015, Fernández and Tamayo, 2017), remittances, and transactional costs (Freund and Spatafora, 2008; Gupta, Pattillo, and Wagh, 2009), money supply into the financial sector and controlling inflation (Lu, Guo, Dong and Wang, 2017), credit union lending (Amoah, Aboagye, Bopkin, and Ohene-Asare, 2018), and international trade (Leibovici, 2018) have been proven within the literature as well. The substantial documented importance of financial development has led studies to examine its' determinants.

Due to the supporting evidence that financial development promotes economic growth and has interactions with several other economic and financial variables, a vast literature on the determinants of financial development has emerged. Studies investigated many potential factors as possible determinants of financial development; including inflation (Ayadi, Arbak, Naceur, and De Groen, 2015; Cherif and Dreger, 2016; Kilinc, Seven and Yetkiner, 2017), trade openness (Ruiz, 2018; Ashraf, 2018), income level (Sanfilippo-Azofra and Torre-Olmo, 2018; Tayssir and Feryel, 2018; Dutta and Sobel, 2018), human capital (Ibrahim and Sare, 2018, Dutta and Sobel, 2018), financial reforms (Ayadi et al., 2015), and bank development (Hamdi, 2015).

Although several research papers have documented the relationship between institutional factors and financial development (Acemoglu, Johnson, and Robinson, 2005; Andrianova, Demetriades and Shortland, 2008; Wang, Cheng, Wang and Li, 2014), government efficiency has been widely ignored in the literature. Government efficiency reflects three components; public sector performance, public sector efficiency, and data envelopment scores – efficiency corresponding to a frontier (Hauner and Kyobe, 2010). Government efficiency also indicates governments' ability to use their resources efficiently and rationally, improve their offered services, and decrease costs associated with providing those services. It accounts for the perceptions of public service quality, civil service quality, independence from political pressure, policy formation, implementation quality, and the creditability of the government to commit to said policies (Kaufmann, Kraay, and Mastruzzi, 2003). Studies have also considered other factors such as the degree of democracy within a country and its'

demographic conditions when evaluation/measuring the level of government efficiency (Hauner and Kyobe, 2010; Asatryan and De Witte, 2015). Many researchers have verified the importance of government efficiency and its relationship with other fundamentals such as institutional quality (Alonso and Garcimartin, 2013), and innovation (Oluwatobi, Efobi, Olurinola, and Alege, 2015). Charron and Lapuente (2013) investigated the government efficiency of 17 European countries to investigate why so many nations with similar institutional quality aspects differ in governmental quality. This study stresses the importance of investigating the impact of government efficiency on financial development specifically.

OECD (Organization Economic Co-operation and Development) is an intergovernmental economic organization in which government bodies of member countries work together to construct/improve economic and social policy in hopes of fostering greater economic growth, prosperity, and sustainable development. OECD countries can be characterized by high income, accompanied by high human development, democratic economies. Also, OECD countries are considered to be some of the most financially developed ones across the globe. They tend to outperform all other regions/economies in terms of financial depth, access, and stability within their financial institutions and financial markets. Whilst, they obtain considerably low scores for financial efficiency (Global Financial Development Report, 2017/2018). Thus, although OECD countries are of great financial development, the efficiency of their financial sector/system is questionable. Given the importance of financial development for the growth and prosperity goals set by OECD countries to achieve and the documented insufficient financial efficiency of these countries, the current focus has led researchers to investigate this topic. Although the effect of financial development on other financial and economic fundamentals have been investigated widely (Naeem and Li, 2019; Fidrmuc and Scharler, 2013; Hahn, 2003), research on determinants of financial development is relatively scarce.

Because the sole importance of government efficiency as a determinant of financial development has been ignored in the literature thus far, this study aims to highlight said importance and investigates the impact of critically government efficiency on financial development for 31 OECD countries. Following the previous literature, we used corruption, employment, population, and urbanization as control variables. To ensure robustness in the obtained empirical findings, we apply several measures. Firstly, we employed several panel data estimation methods to see whether they confirm each other. Secondly, for the population and urbanization variables, we adopted different proxies, again to check that our results are not sensitive to proxy selection. As a last measure for the robustness of our findings, we split the whole sample into subgroups, namely EU23 countries, fully democratic countries, and flawed democratic countries, to investigate the importance of political regimes, thus accounting for another institutional quality aspect. The mentioned approach enables us to conclude as to how the political regimes of a country impact its' financial development establishment. Our findings indicate that government efficiency promotes financial development for OECD countries. These findings are of importance for policymakers to form policies that improve financial development, which in turn promotes the improvement of many economic variables.

The structure of the rest of the study is as follows: Section 2 provides a literature review on financial development studies, Section 3 describes both the data and models used to conduct the investigation, Section 4 reports and evaluates the empirical findings of the analysis, and Section 5 concludes the study and provides policy recommendations based on our findings.

Literature Review

Throughout the existing literature, the impact of governance on financial development has been incorporated in some shape or form. Most commonly, the literature accounts for governance with the inclusion of government size (Naceur, Cherif and Kandil, 2014), government quality (Cooray, 2011), government expenditure (Beck, Degryse and Kneer, 2014; Bahadir and Valev, 2015; Benczúr et al., 2018) or governmental debt (Aceves and Amato, 2017). However, the literature has thus far failed to represent how the efficiency of government itself may affect financial development. Although government efficiency's direct impact on financial development is yet to be discussed, it has been used as an indicator for several financial variables. Hallerberg, Strauch, and Von Hagen (2007) found that institutions' ability to strengthen fiscal discipline was dependent on the type of government. Bergman, Hutchison, and Jensen (2016) found that government efficiency, along with fiscal rule strength, was vital for the sustainability of public financing for the European Union. Heylen, Hoebeek, and Buyse (2013) findings suggested that efficient governments are more successful in fiscal consolidation and can reduce expenditures to a greater degree than less efficient governments. Cooray (2011) highlighted the importance of both government size and quality for financial sector efficiency, stating that better governmental quality also results in a larger financial sector. Governments are essentially responsible for regulating/imposing economic policies (government spending, taxation, employment, trade, and market regulations), which ultimately form and affect the structure of income distribution, in turn implicating the financial sector. Given the fact that governmental quality/efficiency has crucial implications for the financial sector, it warrants the need to analyze the possible ramifications that government efficiency may have on financial development.

To ensure that our findings were robust and that our model refrained from omitted variable bias, we opt to include control variables commonly found in prior financial development literature. Corruption is stated as engaging in an illegal activity in which often a bribe (in the form of a payment) is exchanged for a service that creates costs for the society. The detrimental effect of corruption on the economic performance of a country has been widely documented (d'Agostino, Dunne, and Pieroni, 2016; Cieřlik and Goczek, 2018). Corruption also has detrimental consequences for financial markets as it induces higher borrowing costs for firms, impairs corporate governance, and results in hindered stock valuations (Ng, 2006), thus implicating financial development prospects. Chinn and Ito (2006) suggested that reducing corruption fosters greater financial development through more significant stock market development for a large sample of economies. The negative impact of corruption on financial development has been documented by Bahadir and Valev (2015) and Kılınc et al. (2017) as well. Muye and Muye (2017) indicated that corruption impacts the long-run behavior of the financial sector, suggesting that corruption hampers financial development as it disrupts

market turnover. Given the importance of corruption on financial variables documented by the existing literature, we opt to include corruption in our empirical models.

In the existing literature, the population is one of the most frequently used variables as a potential determinant of financial development. Raza, Shahzadi, and Akram (2014) found population growth to be an antecedent of financial development for developing and developed countries. Tayssir and Feryel (2018) included a population variable to see if the central bank promotes financial development. The study suggests that population size significantly induces the financial development of developed countries through its positive impact on trade openness. Law and Singh (2014) confirmed that both population and human capital are contributors to financial development. Ruiz (2018) found the population to have a statistically negative impact on financial development for both developing and industrial economies. The population has also been included within the existing literature devoted to financial development-economic growth nexus. Durusu-Ciftci, Ispir, and Yetkiner (2017) included a population growth rate variable to investigate the financial development-growth nexus, where population growth is a significant contributor to financial development. Thus, the existing literature provides substantial evidence to suggest that the population should be considered as a control variable when investigating the determinants of financial development.

Urbanization has also been accounted for as a control variable widely within the financial development literature. Sarma and Pais (2011) incorporated urbanization as a socioeconomic factor when investigating the impact of financial inclusion on financial development. They concluded that urbanization promotes financial inclusion, which indirectly induces financial development. The findings of Sarma and Pais (2011) were confirmed by Mishi, Vacu, and Chipote (2014) in the case of South Africa. Urbanization was found to be of significance when analyzing the impact of human capital on financial development (Dutta and Sobel, 2018). Kumar (2013) indicated that urbanization assists financial development in increasing long-term growth and development for Fiji. Chen and Chen (2016) found that urbanization in China promotes greater labor participation, reducing unemployment and furthering financial development. Finally, Shahbaz, Bhattacharya, and Kumar (2017) concluded that urbanization has a positive significant demographic impact on financial development since urbanization has resulted in higher foreign direct investments in China and India. Therefore, due to the presence of considerable financial development literature incorporating an urbanization measure, it is plausible to consider the use of an urbanization control variable within our study.

Numerous financial papers have displayed the critical role of employment in financial aspects. Bayar (2016) indicated that employment is a positive contributor to financial development for 13 emerging economies. The study suggests that the higher the employed population within a country, the higher the need for financial services, as more financial services are used, financial development increases. De Koker and Jentsch (2013) claimed that informal employment hampers financial development through diminished incentives to utilize formal financial services. Nandru, Byram, and Rentala (2016) suggested that employment status positively impacts bank account ownership. Devlin (2005) found that employment status is an important determinant of financial exclusion for the case of the UK. Kumar (2013) suggested the creation of more job opportunities would enhance financial inclusion indirectly through an increase in

income level in. Sarma and Pais (2011) indicated that formal sector employment proportion could significantly gauge financial inclusion. Soumaré, Tchana Tchana, and Kengne (2016) found that full-time employed most frequently used financial services, implying that employment positively contributes to financial inclusion for ECOWAS countries. Thus, it is considered plausible to incorporate employment as a measure within our model as it is evident from the existing literature that employment is commonly used as a control variable.

Many studies have stated that democracy shapes institutional aspects of a country and that it affects many financial variables. Tayssir and Feryel (2018) included a democracy index to investigate the central bank's ability to promote financial development and argued that independence and transparency, as a result of the democratic level, are vital for improvements in financial development for developed countries. Other studies included democracy while analyzing the determinants of financial development (Naceur et al., 2014; Gazdar and Cherif, 2015; Raza et al., 2014; Muye and Muye, 2017). Their findings indicate that reforms in a democracy are crucial for further financial development. Studies also show that there is a strong relationship between indicators of democracy and corruption, suggesting more democratic economies experience scarce corruptive activities (Saha, Gounder, and Su 2009; Jetter, Agudelo, and Hassan, 2015). Jetter and Parmeter (2018) included democracy to investigate from a global perspective the drivers of corruption, once again emphasizing that heightened democracy will result in alleviated corruption. As democracy is considered another critical measure of institutional quality, we devised subgroups based on the sample countries' democratic levels to account for this aspect.

Data and the Method

Variables

To investigate the determinants of financial development, we obtained annual data for 31 OECD countries from 2002 to 2015 inclusively. The dependent variable; financial development (FD); was measured using the financial development index formed by the IMF, which accounts for the depth, access, and efficiency of both financial markets and financial institutions. Government efficiency (GOVEFF) is the primary independent variable within our models and is represented by the government effectiveness indicator provided by Worldwide Governance Indicators (WGI). This variable ranges from -2.5 to 2.5, where higher values indicate greater government efficiency. GOVEFF is a comprehensive aggregate indicator which "... captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Worldbank, 2019). We used corruption (CORRUPT), employment (EMPLOY), population (POP), and urbanization (URBAN) as the control variables in our models. Corruption was measured with the use of the corruption perception index provided by the International Country Risk Guide (ICRG). The lower rankings of the index represent higher levels of corruption. We adapted the models with the use of two measures for the population and urbanization variable to validate our findings regarding robustness. We obtained the data for employment, population, and urbanization from Worldwide Development

Indicators (WDI) presented on Worldbank's database. Details of data are given in Table 1 located in the appendix.

We split the whole sample of 31 OECD countries to form subgroups to improve the robustness of our results as analyzing the democratic aspect allows us to account for another indication of the institutional quality. Subgroups were devised with the use of the democratic index provided by the Economist Intelligence Unit (EIU). These subgroups include; 23 European countries, fully democratic countries, and flawed democratic countries. Countries which form the mention subgroups are reported in Table 2 of the appendix.

Plots and Descriptive Statistics

Descriptive statistics for our variables are provided in table 1 below.

Table 1. Financial development and Government efficiency in OECD countries.

Variables	Financial Development				Government efficiency			
	2002	2010	2015	Mean	2002	2010	2015	Mean
Australia	0.889	0.912	0.877	0.670	1.700	1.800	1.600	1.275
Austria	0.616	0.705	0.647	0.656	1.900	1.800	1.500	1.733
Belgium	0.606	0.662	0.698	0.656	2.000	1.600	1.400	1.667
Canada	0.756	0.857	0.884	0.832	1.900	1.800	1.800	1.833
Czech Republic	0.348	0.352	0.377	0.359	1.000	0.900	1.000	0.967
Denmark	0.646	0.763	0.687	0.698	2.100	2.100	1.800	2.000
Estonia	0.293	0.359	0.328	0.327	0.700	1.100	1.100	0.967
Finland	0.624	0.686	0.690	0.667	1.800	2.200	2.200	2.067
France	0.718	0.789	0.773	0.760	1.600	1.400	1.400	1.467
Germany	0.758	0.767	0.762	0.762	1.700	1.600	1.700	1.667
Greece	0.484	0.655	0.568	0.569	0.800	0.600	0.300	0.567
Hungary	0.426	0.575	0.435	0.479	0.500	0.700	1.100	0.767
Iceland	0.783	0.573	0.610	0.655	2.000	1.600	1.500	1.700
Ireland	0.710	0.746	0.710	0.722	1.600	1.300	1.500	1.467
Israel	0.488	0.648	0.617	0.584	1.100	1.400	1.400	1.300
Italy	0.765	0.785	0.820	0.790	0.800	0.400	0.400	0.533
Japan	0.770	0.874	0.891	0.845	1.100	1.500	1.800	1.467
South Korea	0.817	0.840	0.842	0.833	0.900	1.200	1.000	1.033
Latvia	0.255	0.356	0.279	0.297	0.600	0.700	1.100	0.800
Luxembourg	0.280	0.769	0.762	0.758	2.000	1.700	1.700	1.800
Mexico	0.311	0.395	0.407	0.371	0.300	0.200	0.200	0.233
Netherlands	0.834	0.771	0.683	0.763	2.000	1.700	1.800	1.833
New Zealand	0.566	0.590	0.580	0.579	1.700	1.800	1.900	1.800
Norway	0.601	0.747	0.682	0.677	1.900	1.900	1.900	1.900
Portugal	0.650	0.722	0.743	0.705	1.200	1.000	1.200	1.133
Spain	0.844	0.868	0.904	0.872	1.800	1.000	1.200	1.333
Sweden	0.717	0.743	0.727	0.729	2.000	2.000	1.800	1.933
Switzerland	0.962	0.963	0.962	0.962	2.000	1.900	2.000	1.967
Turkey	0.403	0.498	0.534	0.478	0.100	0.300	0.200	0.200
United kingdom	0.844	0.865	0.850	0.853	1.800	1.600	1.700	1.700
United states	0.880	0.884	0.884	0.883	1.700	1.600	1.500	1.600

Source: Produced by authors.

Switzerland has the highest financial development for all three periods (2002, 2010, and 2015) and on average (0.962). Other countries with considerable high financial development on average include; Canada (0.832), Japan (0.845), South Korea (0.833), Spain (0.872), the United Kingdom (0.853), and the United States (0.833). Latvia experienced the lowest financial development amongst all sampled countries for the analyzed period. Concerning government efficiency, Finland expressed the greatest government efficiency compared to all sampled countries for the periods analyzed and on average (2.067). Turkey appears to have the smallest magnitude on average (0.200). Based on our table, it is evident that higher levels of financial development are associated with greater government efficiency.

Following the descriptive statistics, both financial development and government efficiency have been graphed for all sample countries in order to visually represent the variables throughout our study period. Plots for financial development and government efficiency of the sample countries are displayed in Figures 1 and 2, respectively, located in the appendix. Plots of financial development suggest that it is time-variant. We can observe a common downward trend from 2007, in most of the sampled countries. Unlike financial development, plots for government efficiency have no easily observed trend.

Models and Methods

We used four models to investigate our research question. The basic model includes three variables, namely government efficiency, employment, and population. Then we added urbanization and corruption to established models two, three, and four. These models are given below:

- I. $FD = \beta_0 + \beta_1 LGOVEFF_{it} + \beta_2 LEMPLOY_{it} + \beta_3 LPOP(n)_{it} + u_{it}$
- II. $FD = \beta_0 + \beta_1 LGOVEFF_{it} + \beta_2 LEMPLOY_{it} + \beta_3 LPOP(n)_{it} + \beta_4 LURBAN(n)_{it} + u_{it}$
- III. $FD = \beta_0 + \beta_1 LGOVEFF_{it} + \beta_2 LEMPLOY_{it} + \beta_3 LPOP(n)_{it} + \beta_4 LURBAN(n)_{it} + \beta_5 LCORRUPT_{it} + u_{it}$
- IV. $FD = \beta_0 + \beta_1 LGOVEFF_{it} + \beta_2 LEMPLOY_{it} + \beta_3 LPOP(n)_{it} + \beta_4 LCORRUPT_{it} + \beta_5 LURBAN(n)_{it} + u_{it}$

Where i and t denote time and cross-section, respectively. For robustness, we used different proxies for population and urbanization variables. In these models (n) represents different proxies for these two variables and takes the value of A or B. Type A models use population density, and type B models employ total population to reflect the population. Both model types A and B enlisted the use of two urbanization proxies. In models two and three total urban population in percentage form is used, in model four total urban population in figures is used as a proxy of urbanization to show that estimations are not sensitive to proxy selection.

To estimate the models, we carried out three different panel data econometrics methods; Fixed-effects (within) regressions, Random-effects (GLS) regression, and Feasible

Generalized Least Squares Regression (FGLS); for robustness. A simple panel data model is represented by the below equation:

$$y_{it} = \alpha_i + \gamma_t + \beta x_{it} + \varepsilon_{it} \quad i = 1 \dots N, t = 1 \dots T \quad (1)$$

Where y_{it} represents the vector of the dependent variable, x_{it} is the matrix of independent variables; ε_{it} is the random disturbance, α_i and γ_t are the intercept parameters representing individual the effect of cross-section units and time. The main distinction between fixed effects and random effects models is related to their handling of the intercept parameters. That is, in contrast to fixed-effects model, which treats these parameters as a regression parameter; random-effects model handles them as parts of random disturbance. Some studies use the Hausman (1978) test to choose whether fixed or random-effects model is appropriate. However, according to Baltagi (2008), this test, in essence, cannot be employed for model selection purposes. In the case of a correlation between intercept parameters and independent variables, the random-effects model produces inconsistent estimates, and under this circumstance, fixed-effects model has to be employed. Hausman test investigates whether there is a significant difference between the slope parameters of fixed and random effects models, which can be interpreted as the inconsistent estimates of the random-effects model; hence, it favors using the fixed-effects model. However, the consistent estimates of the fixed effects model are conditional on the cross-section and time effects of the sample under investigation, thus cannot be generalized. Many studies do not take into account the failure of this orthogonality test (Stern, 2004). To refrain from the mentioned problem, we estimated both fixed and random effects models and observed whether there is any inconsistency among the obtained empirical findings. Random-effects regressions are estimated by Generalized Least Squares (GLS), and the model equation is defined as follows:

$$y_{it} = \alpha + \beta x_{it} + u_{it} + \varepsilon_{it} \quad i = 1 \dots N, t = 1 \dots T \quad (2)$$

Where α represents the mean value for all cross-sectional intercepts and u_{it} represented deviations from the individual intercepts from the mean value; these are assumed to be uncorrelated with one another and not autocorrelated across cross-sections. ε_{it} is the random disturbance term regarding each cross section and each time period.

Another problem with panel data estimation is heteroskedastic and correlated error structure, which can plague the estimations. Most of the time, in contrast to our underlying assumptions variance, might be different for each cross-section due to size differences. To correct these problems a robust estimation should be used. To investigate our research question, we estimated a large number of models, only a few of which diagnostic tests provided some evidence for heteroskedastic and correlated error structure. In case of severe problems regarding underlying assumptions of the error term, robust estimators give significantly different results in comparison to their non-robust counterparts. To examine whether there is a significant difference between fixed/random effects model and the robust estimator, we also performed feasible generalized least squares (FGLS) estimator, which provides robust panel standard errors. FGLS estimator is asymptotically efficient and thus is applied in this paper.

Empirical Findings

Empirical estimates obtained from our analysis are reported in the several tables that follow below. Based on the findings reported for the whole sample set of 31 OECD countries, displayed in tables 2, 3, and 4 we observe government efficiency to have a significant positive impact on financial development, coherent with our *a priori* theoretical expectations. The coefficients for government efficiency are positively significant for model types A and B, where both models find the variable's coefficient to be of a similar magnitude. Government efficiency coefficients also appear to be positively significant for all econometric techniques applied; fixed-effects (within) regressions, random-effects regressions, and generalized least squares regressions, thus the results of each confirm one another. Since government efficiency is found to be significant within a range of 95 to 99 percent confidence intervals, our findings suggest that greater improvements within government efficiency of OECD countries will enhance their financial development. These findings are in line with the previous studies that incorporated a governmental aspect when analyzing financial development (Naceur, Cherif, and Kandil, 2014; Aceves and Amato, 2017). For example, Cooray (2011) concluded that government quality is essential to foster greater financial sector development.

Based on the empirical findings recorded for models A and B with the use of fixed-effects (within) regressions, we find corruption displays a significantly negative relationship with financial development, as reported in table 2. This suggests an elevation of corruptive activities within developed countries would deplete their financial development prospects. Once more, coefficients are found to be of statistical significance between a 95 and 99 percent confidence interval. Our findings coincide with previous research that examined the impact of corruption on financial development. Both Bahadir and Valev (2015) and Kilinc et al. (2017) suggested that corruptive activities hinder financial development for the sample countries investigated. Our corruption coefficient estimates further validate their results; therefore, they imply in order to boost financial development, developed countries must combat the corruptive activities in which they experience. Based on the existing literature, the importance of reducing corruption is also vital to improve economic growth prospects (d'Agostino et al., 2016; Cieřlik and Goczek, 2018), which will heighten financial development indirectly.

Our investigation found strong evidence that employment exhibits a significant positive relation with financial development for developed countries for model types A and B and for all econometric techniques applied; fixed-effects (within) regressions, random-effects regressions, and generalized least squares regressions. This suggests an increase in the employed population of developed countries would promote their financial development, thus confirming the findings of Bayar (2016). We also find our total population variable (POP1) and population density variable (POP2) to be positively significant in the majority of our estimation. This implies that growth in population will lead to the enhancement of financial development for OECD countries. Our findings are aligned with the vast literature that provides substantial evidence on the population as a positive contributor to financial development (Raza et al., 2014; Law and Singh, 2014; and Durusu-Ciftci et al., 2017). Both urbanization variables included within our analysis (URBAN1 and URBAN2) also have positively significant coefficients throughout all

estimations. Thus, suggesting that urbanization of developed countries positively enhances financial development. This finding is aligned with the existing literature on financial inclusion (Sarma and Pais, 2011; Mishi et al., 2014) and financial development (Jauch and Watzka, 2016; Shahbaz et al., 2017). Therefore, the used control variables within the study are in line with the findings of previous research and are all considered to be significant positive contributors to the financial development of developed economies.

Table 2. The effects of government efficiency on FD in OECD economies (fixed-effects)

	Model A				Model B			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
lgoveff	0.051 ^b	0.051 ^b	0.056 ^a	0.056 ^a	0.051 ^b	0.051 ^a	0.056 ^a	0.056 ^a
lemploy	0.080 ^b	0.084 ^b	0.091 ^b	0.091 ^b	0.081 ^b	0.084 ^b	0.091 ^b	0.091 ^b
lpop1					0.377 ^a	0.305 ^a	0.323 ^b	-0.128
lpop2	0.369 ^a	0.296 ^a	0.315 ^a	0.091 ^b				
lurban1		0.378 ^c	0.463 ^b			0.367 ^c	0.451 ^b	
lurban2				0.480 ^b				0.451 ^b
lcorrupt			-0.122 ^a	-0.123 ^b			-	-
							0.122 ^b	0.122 ^a

Note: ^a, ^b and ^c indicate statistical significance at 1%, 5%, and 10%, respectively.

OECD countries (31): Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States.

Table 3. The effects of government efficiency on FD in OECD economies (FGLS)

	Model A				Model B			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
lgoveff	0.280 ^a	0.274 ^a	0.277 ^a	0.305 ^a	0.321 ^a	0.297 ^a	0.293 ^a	0.293 ^a
lemploy	0.167 ^a	0.205 ^a	0.197 ^a	0.162 ^a	0.180 ^a	0.203 ^a	0.204 ^a	0.204 ^a
lpop1					0.077 ^a	0.077 ^a	0.078 ^a	-
								0.213 ^a
lpop2	0.025 ^a	0.030 ^a	0.030 ^a	0.003 ^a				
lurban1		0.230 ^a	0.212 ^a			0.300 ^a	0.291 ^a	
lurban2				0.075 ^a				0.291 ^a
lcorrupt			-0.008	0.013			0.019	0.019

Note: ^a, ^b and ^c indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 4. The effects of government efficiency on FD in OECD economies (GLS)

	Model A				Model B			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
lgoveff	0.072 ^a	0.067 ^a	0.071 ^a	0.085 ^a	0.085 ^a	0.078 ^b	0.081 ^a	0.081
lemploy	0.039	0.064 ^c	0.065 ^c	0.040	0.035	0.062 ^c	0.062 ^c	0.062 ^c
lpop1					0.074 ^a	0.070 ^a	-	-0.592
							0.086 ^a	
lpop2	0.048 ^c	0.042	0.039	0.009				
lurban1		0.634 ^a	0.693 ^a			0.616 ^a	0.659 ^a	
lurban2				0.080 ^a				0.659 ^a
lcorrupt			-0.071 ^c	-0.021			-0.052	-0.052

Note: ^a, ^b and ^c indicate statistical significance at 1%, 5%, and 10%, respectively.

To ensure we obtained robustness within our empirical findings, we applied several econometric techniques; fixed-effects (within) regression, random-effects regressions, and generalized least squares regression. The findings of all three techniques reconfirmed the findings of one another, as seen in tables 2, 3, and 4, thus strengthening the validity of our findings. Secondly, to warrant that our findings are not sensitive to the proxy selection, we employed the use of two different proxies for urbanization and population variables included within our study. Our results showed that the proxies draw to the same conclusions as coefficients display the same signs and are of similar magnitude throughout all models. Due to close similarities displayed throughout the majority of findings, our results are considered to be robust estimators.

The whole sample set was then split, and subgroups were devised based on perceived democracy to account for political regimes, another institutional quality aspect. Estimations for the subgroups; EU 23, fully democratic, and flawed democratic countries are reported in tables 5 and 6 for both models A and B, with the use of generalized least squares regression. Obtained findings show that government efficiency is a significant positive contributor for EU 23 and flawed democratic countries. This is following the findings of Hauner and Kyobe (2010) and Alonso and Garcimartin (2013), who found democracy to be a significant determinant of government efficiency. Both models A and B also suggest that corruption hinders financial development for flawed democratic countries. These findings are in accordance with other studies that analyzed indicators of democracy that concluded that greater democratic countries suffer from less corruption (Jetter, 2015; and Parmeter, 2018). Finally, the findings associated with control variables; employment, population, and urbanization, are consistent with the previous findings of the whole sample set of 31 countries.

Table 5. The effects of government efficiency on FD in subgroups (GLS Model A)

	EU 23			Fully Democratic			Flawed Democratic		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
lgoveff	0.046 ^c	0.057 ^b	0.064 ^a	0.068	0.068	0.092 ^c	-0.000	0.011	0.024
lemploy	0.115 ^a	0.115 ^a	0.081 ^b	0.088 ^b	0.088 ^b	0.090 ^b	0.121 ^c	0.131 ^b	0.076
lpop2	0.050	0.051	0.015	0.012	0.012	0.010	0.293 ^a	0.274 ^a	0.194 ^a
lurban1	0.528 ^b	0.613 ^a		-0.407 ^c	-0.240		0.954 ^a	1.055 ^a	
1urban2			0.058 ^c			0.032			0.149 ^a
lcorrupt		-0.076	-0.031		-0.063	-0.073		-0.122 ^b	-0.071

Note: ^a, ^b and ^c indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 6. The effects of government efficiency on FD in subgroups (GLS Model B)

	EU 23			Fully Democratic			Flawed Democratic		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
lgoveff	0.053 ^b	0.063 ^a	0.063 ^a	0.076	0.078	0.078	0.023	0.029	0.030
lemploy	0.110 ^a	0.112 ^a	0.112 ^a	0.085 ^b	0.080 ^b	0.080 ^b	0.102	0.110 ^c	0.110 ^c
lpop1	0.056 ^c	0.057 ^b	-0.588 ^a	0.034	0.033 ^b	0.193	0.140 ^a	0.143 ^a	-0.828 ^a
lurban1	0.570 ^a	0.645 ^a		-0.359	-0.160		0.872 ^a	0.971 ^a	
1urban2			0.645 ^a			-0.160			0.971 ^a
lcorrupt		-0.065	-0.065		-0.075	-0.075		-0.095 ^c	-0.095 ^a

Note: ^a, ^b and ^c indicate statistical significance at 1%, 5, and 10%, respectively.

Conclusion and policy recommendation

This study investigates the determinants of financial development for 31 OECD countries. Our research aims to fill a gap in the literature by considering the impact of government efficiency on the financial development level of the countries under investigation. For robustness, we take several measures; that is, we included several macroeconomic and social factors as control variables, used several econometrics tests, employed different proxies for the variables, and splitting the whole sample into subsamples, and redid the analysis. Our results showed that government efficiency and corruption are important determinants of financial development. The findings provided robust and theoretically acceptable results for the control variables as well.

Our empirical results provide a guideline for the policymakers to enhance financial development, which is important for economic growth and is beneficial for other financial fundamentals (Benczúr et al., 2018). The obtained findings indicated that government efficiency positively contributes to the financial development of OECD countries. To promote government efficiency, we suggest re-examining budgetary procedures to assure that funding is allocated and spent where most efficient. Improving political stability will also result in greater efficient government spending, thus enhancing government efficiency. Enhancing political stability along with macroeconomic stability to increase investors' confidence and trust within the financial sector will result in further financial development. Besides this, policymakers should consider improving institutional quality as it will increase government efficiency as well as deepen financial markets and improve the allocation of resources, thus increasing financial development, allowing developed economies to reap the benefits that come from reforming the financial sector. Our estimations for subgroups indicate that democracy heightens government efficiency. Thus policy recommendations are of great importance regarding the flawed democratic subgroup. Enhancing democracy will induce government efficiency, a positive contributor to financial development, and reduce corruption, which diminishes financial development, therefore resulting in greater financial development.

The results of our investigation imply that corruption has a detrimental effect on financial development. Suggestions to reduce corruption include; promoting faith in the countries government by showing the citizens that taxes are spent on benefits for the community, reducing informal economy activities, reestablishing the rule of law, and enhance political democratization. Regulations and policies set should not be too rigid or inflexible as this would result in further corruption, therefore, lowering financial development.

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Appendix

Table 1. Data sources and descriptive statistics

Variable	Definition	Source
Financial development (FD)	Financial development index, developed by IMF staff from 1980 and onwards, analyzing financial institutions and markets in terms of depth, access, and efficiency.	Financial development index database, International Monetary Fund http://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B
Government effectiveness (GOVEFF)	Ranging from -2.5 to 2.5, higher values indicating greater government efficiency	Worldwide Governance Indicators (WGI)
Employment (EMPLOY)	Employment percentage of the population	Worldwide Development Indicators (WDI)
Total population (POP1)	Total population figure	Worldwide Development Indicators (WDI)
Population density (POP2)	Average number of people per sq. km of land area	Worldwide Development Indicators (WDI)
Urbanization (URBAN1)	Total urban population in percentage form	Worldwide Development Indicators (WDI)
Urbanization (URBAN2)	The total urban population figure	Worldwide Development Indicators (WDI)
Corruption (CORRUPT)	lower rankings regarded as higher levels of corruption,	International Country Risk Guide (ICRG), PRS Group, TABLE 3B: Researcher's Dataset
Fully democratic	Countries considered as entirely democratic based on Democracy index	Economist Intelligence Unit (EIU) The Economist
Flawed democratic	Countries considered not entirely democratic based on Democracy index	Economist Intelligence Unit (EIU) The Economist

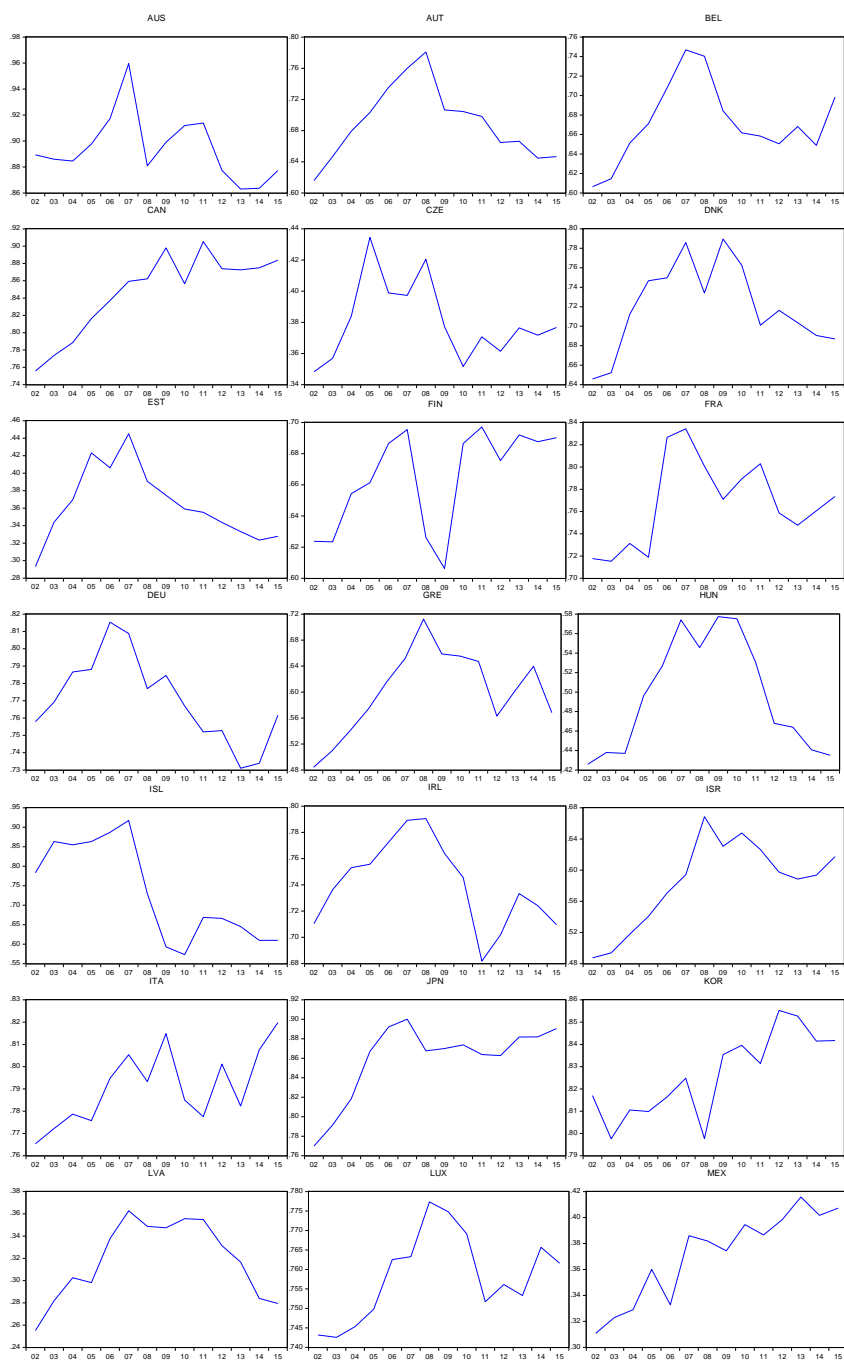
Source: Produced by the authors

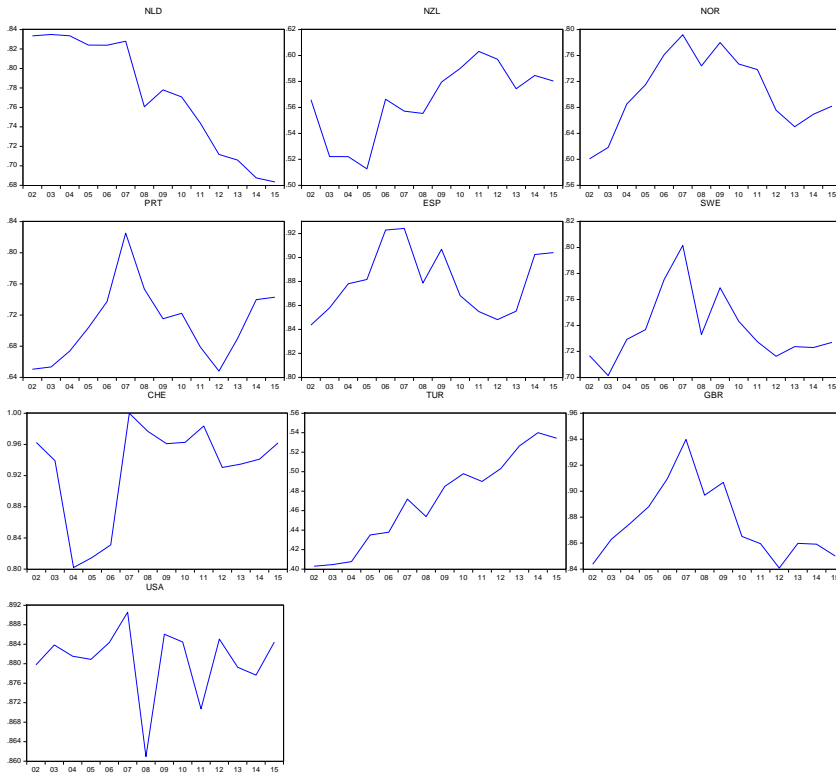
Table 2. Countries

31 OECD	EU 23	Fully Democratic	Flawed Democratic
Australia	Australia	Australia	Belgium
Austria	Belgium	Austria	Czech Republic
Belgium	Czech Republic	Canada	Estonia
Canada	Denmark	Denmark	France
Czech Republic	Estonia	Finland	Greece
Denmark	Finland	Germany	Hungary
Estonia	France	Iceland	Israel
Finland	Germany	Ireland	Italy
France	Greece	Luxembourg	Japan
Germany	Hungary	Netherlands	Latvia
Greece	Iceland	New Zealand	Mexico
Hungary	Ireland	Norway	Portugal
Iceland	Italy	Spain	United States
Ireland	Latvia	Sweden	
Israel	Luxembourg	Switzerland	
Italy	Netherlands	United Kingdom	
Japan	Norway		
Korea	Portugal		
Latvia	Spain		
Luxembourg	Sweden		
Mexico	Switzerland		
Netherlands	Turkey		
New Zealand	United Kingdom		
Norway			
Portugal			
Spain			
Sweden			
Switzerland			
Turkey			
United Kingdom			
United States			

Source: Produced by authors

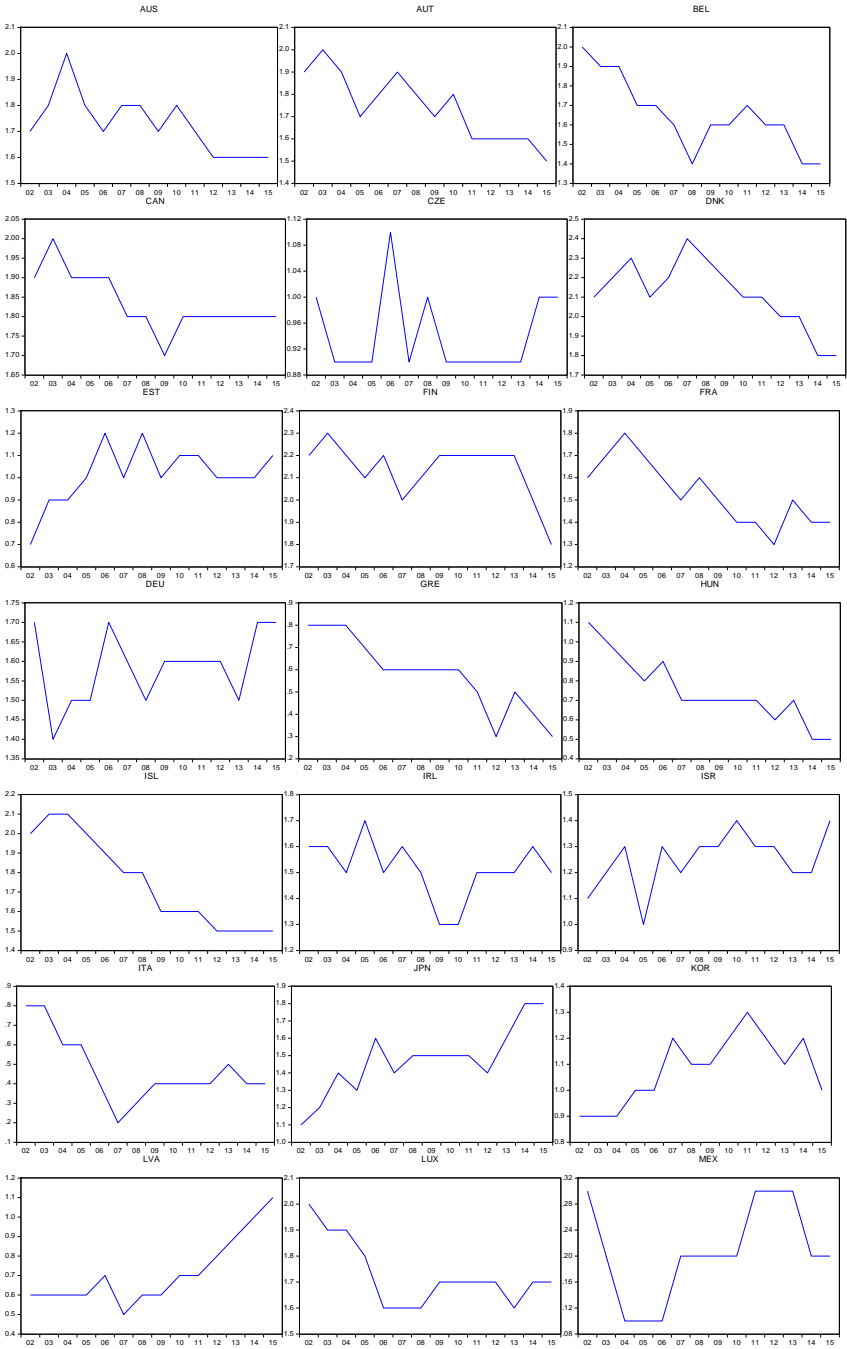
Figure 1. Plots of financial development for individual OECD countries 2002–2015

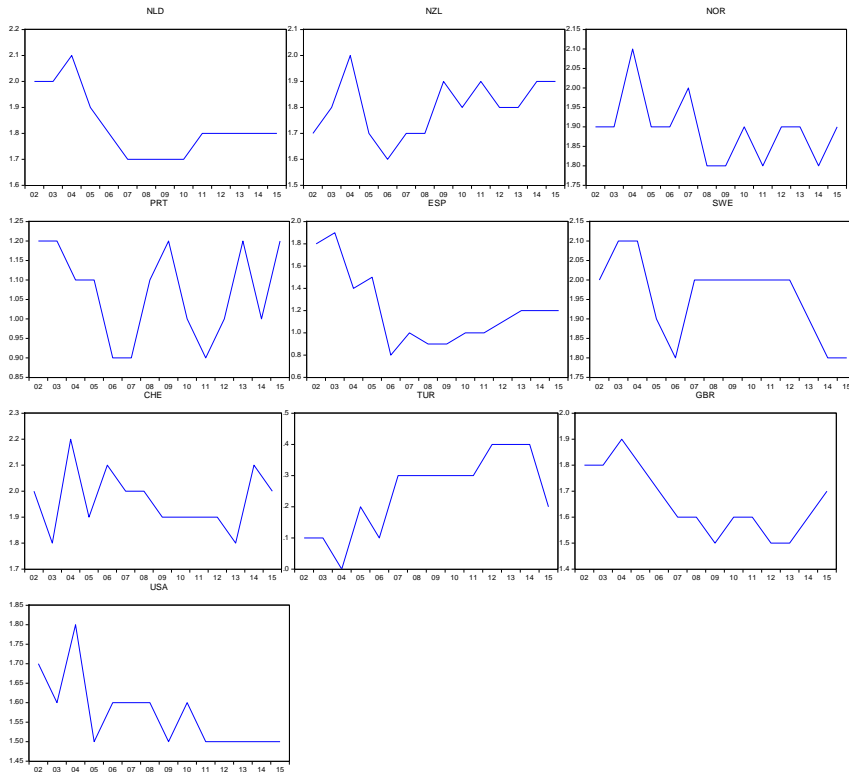




Source: Produced by the authors

Figure 2. Plots of government efficiency for individual OECD countries 2002–2015





Source: Produced by the authors