

AGRICULTURAL SUPPORT, SIZE OF GOVERNMENT, AND ASSOCIATIONAL AND ORGANIZATIONAL RIGHTS: A DYNAMIC PANEL DATA ESTIMATION

TARIMSAL DESTEK, DEVLET BÜYÜKLÜĞÜ VE ÖRGÜTLENME-ORGANİZE OLMA HAKLARI: BİR DİNAMİK PANEL VERİ TAHMİNİ

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ABSTRACT

This study analyzes the economic and political determinants of agricultural transfers made to the agricultural sector in selected countries included in OECD's Agricultural Policy Monitoring and Evaluation (APME) program since 1987. Supports to producers constitute the largest share in agricultural support along with supports to consumers and general services supports. Therefore, demand-side political decision mechanism variables should also be included in agricultural support analyses. The study argues that countries that have a larger (smaller) government sector and higher (lower) associational and organizational rights scores tend to provide larger (smaller) transfers to the agricultural sector. While the dynamic panel data estimation results on data from 2010 to 2015 do not support that countries that have larger size of government sector provide more transfers to the agricultural sector, they support that higher associational and organizational support scores lead to larger support estimates. Also, agricultural employment and food dependencies were the other significant determinants of agricultural support.

Keywords: *Agricultural support, Agricultural producer supports, Size of government, Associational and organizational rights, Dynamic panel data analysis*

ÖZ

Bu çalışma, tarım sektörüne yapılan transferleri belirleyen ekonomik ve politik faktörleri, 1987'den itibaren OECD'nin Tarım Politikası İzleme ve Değerlendirme (TPİD) programında yer alan seçilmiş ülkeler bağlamında analiz etmektedir. Üretici destekleri, tarımsal destekler içinde en büyük payı teşkil etmektedir. Bu yüzden siyasal karar alma mekanizmasının talep-yönü değişkenlerinin tarımsal destek analizlerine dahil edilmelidir. Çalışma, kamu sektörünün ekonomideki payının ve dernekleşme-örgütlenme haklarının yüksek (düşük) olduğu ülkelerde tarımsal desteklerin daha yüksek (düşük) olma eğiliminde olduğunu ortaya atmaktadır. 2010-2015 yıllarını kapsayan dinamik panel data tahminleri kamu sektörüne ilişkin iddiayı doğrulamazken, dernekleşme-örgütlenmeye ilişkin çıkarımları desteklemektedir. Diğer taraftan, tarımdaki istihdam ve ülkelerin gıda bağımlılığı da tarımsal desteği belirleyen diğer anlamlı faktörler olarak bulunmuştur.

Anahtar Sözcükler: *Tarımsal destek, Tarımsal üretici destekleri, Devletin ekonomik büyüklüğü, Dernekleşme ve organize olma hakları, Dinamik panel veri analizi*

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1. Introduction

This study analyzes the relationships between agricultural support, which is measured as total support estimate (TSE), size of the government sector, and political factors regarding associational and organizational rights. The study analyzes agricultural support for countries that have been included in the Organization for Economic Cooperation and Development (OECD) Agricultural Support Monitoring and Evaluation (APME) annual studies (see, for the most recent report, OECD, 2017).

Agricultural support policies have been at the center of debate for long as they bear crucial economic, social, and political implications. Many countries adopt a wide range of agricultural support and protection mechanisms basically for improving or maintaining the life standards and survival of farmers, importance of basic needs of population, and agriculture's dependence on natural circumstances (see, Marković and Marković, 2014, for a review).

Agricultural policies are shaped not only by economic but also the political conditions in a country. In most of the agricultural support cases, economic and political reasons that determine agricultural support are intermingled. Income in the agricultural sector of the economies is volatile. Beyond climate-related reasons, the status of the other sectors of the economies, urbanization, agricultural productivity, developments in international trade, and advancement in food and crop storage technologies have resulted in changes in income in the agriculture sector of the economies. Income volatility is one of the political economy reasons for agricultural support that farmers need to maintain a stable income. Potential positive and negative externalities from agricultural production are the other reasons for government intervention in the agricultural sector. Thus, understanding the determinants of agricultural support can have crucial economic, social, and political implications.

Agricultural support is a broader concept than subsidies to farms, farmers, farm landowners, or to a particular crop or produce. In OECD's APME framework, agricultural support is defined as "the annual monetary value of gross transfers to agriculture from consumers and taxpayers arising from government policies that support agriculture, regardless of their objectives and economic impacts" (OECD, 2017: 12). This indicator includes the total support estimate (TSE), measured as a percentage of GDP, the producer support estimate (PSE), measured as a percentage of gross farm receipts, the consumer support estimate (CSE), measured as a percentage of agricultural consumption, and the general services support estimate (GSSE), measured as a percentage of total support. Agricultural support is also expressed in monetary terms, in million USD and million EUR. TSE transfers represent the total support granted to the agricultural sector, and consist of producer support (PSE), consumer support (CSE) and general services support (GSSE). PSE transfers to agricultural producers are measured at the farm gate level and comprise market price support, budgetary payments and the cost of revenue foregone. CSE transfers from consumers of agricultural commodities are measured at the farm gate level. If negative, the CSE measures the burden (implicit tax) on consumers through market price support (higher prices), that more than offsets consumer subsidies that lower prices to consumers. GSSE transfers are linked to measures creating enabling conditions for the primary agricultural sector through development of private or public services, institutions and infrastructure. GSSE include policies where primary agriculture is the main beneficiary, but does not include any payments to individual producers. GSSE transfers do not directly alter producer receipts or costs or consumption expenditure (OECD, 2017). Among these, this study analyzes TSEs as percentages in GDPs as the broadest measure of agricultural support.

TSE consists of general services support estimate (GSSE), transfers to consumers from the tax payers (CSE), and producer support estimates (PSE). In the period 2014-2016, most of TSE was composed of PSEs (OECD, 2017: 40). Therefore, factors that pertain to the behavior and organizational abilities of agricultural producers need to be included in agricultural support analyses to measure the impact of demand-side factors as well as supply-side factors.

The abilities of farmers and other stakeholders in the agricultural sector of the economies to get organized and establish associations are crucial for reaching a competitive regulatory equilibrium. In a competitive equilibrium framework, there is a market for policies and equilibrium policies are determined through a bargaining process within a supply-demand mechanism for policy-making (Stigler, 1971; Posner, 1974; Peltzman, 1976; Becker, 1983). Park and Jensen (2007) looked into electoral competition, which is a supply-side factor that pertains the behaviors of politicians regarding their abilities to adopt targeted policies in explaining agricultural support. On the demand-side, lobbying spending of the agricultural sector, number and size of farm and farmer associations, organizational capabilities of farms, and size and concentration of agricultural firms would explain the variations in agricultural support across countries over time. Thus, along with relevant control variables, this study uses the associational and organizational rights subcategory scores within the Freedom Index of Freedom House as a proxy for the mentioned demand-side variables. In the Freedom Index scoring of associational and organizational rights, freedom for assembly (rights regarding peaceful protests; permission to protest; law enforcement treatment of protestors; use of social media and similar channels to protest; obstacles for town-hall style meetings, conferences, panel discussions; petitions and gathering signature to support certain policies), freedom for nongovernmental organizations (difficulties of registration and functioning or nongovernmental organizations; laws regarding raising money for nongovernmental organizations; governmental pressure on donors of nongovernmental organizations; treatment of the members of nongovernmental organizations), and freedom for trade unions and similar organizations (whether trade unions are allowed to establish and operate without government interference; pressure on workers to join or not to join trade unions; pressure on workers regarding strike; unions' freedom to bargain; freedom for the establishment of agricultural workers' organizations; freedom for business organizations and professional organizations to operate without government interference) are mainly considered (Freedom House, 2018). Although not all of these organizational and associational rights items are directly related to the agricultural sector or to the farmers, they are believed to facilitate farmers' and other agricultural sector stakeholders' pressure and influence on policy-making in order to advance their interests. It is assumed that farmers can get organized better (worse) and they can apply more (less) pressure on political-decision making mechanism to advance their interests where associational and organizational rights scores are higher (lower).

In addition to the associational and organizational rights scores, agricultural value-added, agricultural employment, and size of agricultural land are the other proxies for potential influence of the agricultural sector on the political-decision making mechanism. The study particularly investigates whether larger (smaller) size of government, higher (lower) scores of associational and organizational rights, larger (smaller) share of agricultural employment, larger (smaller) size of agricultural land, and larger (smaller) share of agricultural value-added lead to higher (lower) agricultural support. The study is laid out as follows: The next section reviews the relevant literature. Section three is for the description of the data that the study utilizes. Section four is allotted for the empirical analysis. Findings are discussed in section

2. Literature Review

In a study that adopted a political economy approach to agricultural protectionism in EU countries between 1975 and 1989, Olper (1998) showed that agricultural support increased when market conditions were against the agricultural sector (counter cyclicity) and in countries that have a comparative disadvantage in agriculture. Clements et al. (1998) studied subsidies using panel data from 1975 to 1992 for forty countries. They found that individual country-specific factors, size of government, and current account deficit were the significant determinants of subsidies. They also suggested that globalization and openness would not prevent reduction in subsidies. Park and Jensen (2007) studied the relationship between agricultural support and electoral competition in OECD countries through a cross-classified multilevel model. They showed that 'electoral systems that encourage politicians to target narrow (broad) constituencies are associated with relatively high (low) levels of agricultural subsidies'. Lopez (2001) showed that campaign contributions influenced agricultural subsidies.

Who benefits from agricultural support is an important policy question to achieve the objectives of the support. Therefore, agricultural support policies must consider subsidy incidence in agricultural support. Kirwan (2009), in a study that used data from United States (US), showed that agricultural support was mostly enjoyed by farmers while a smaller portion of it was enjoyed by farm landowners.

Contrary to the argument that agricultural support is instrumental in maintaining and improving the life standards of farmers, Tedesco et al. (2015) found that agricultural support worsened the poverty rates in developing countries and most of the food exporter countries got negatively impacted by agricultural support.

3. Data

Agricultural support data for this study have been obtained from the OECD's APME data set. This data set includes data on various measures of agricultural support for many fifty-two OECD and non-OECD EU countries that represent the two-third of the world's agricultural value added (OECD, 2017: 25). The rest of the data have been obtained from various sources, which include Freedom House, Institute for Democracy and Electoral Assistance (IDEA), Parlgov.org, and World Bank.

The OECD-APME data set contains a negative descriptive overall trend of agricultural support in terms of the share of total agricultural support in gross domestic product (GDP) between 2010 and 2015 (time variable z-value = -2.69, N = 150; Number of groups = 25) ¹:

¹ The negative overall trend is also present for the whole data period (1986-2016) (time variable z-value = -9.78, N = 609; number of groups = 24) between in agricultural support in terms of the share of total agricultural support in gross domestic product (GDP). See Appendix 1 for the 1986-2016 graph.

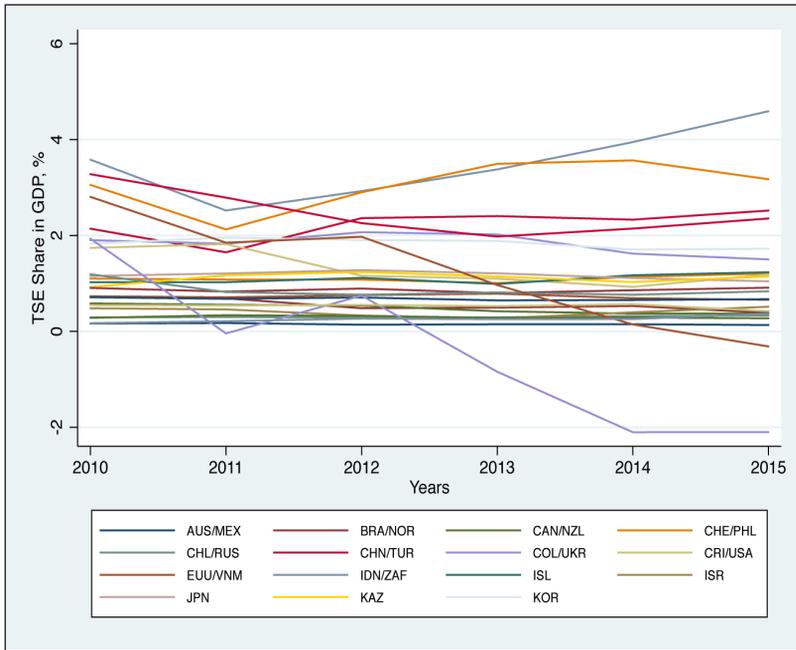


Figure 1. Share of Total Agricultural Support in OECD-APME Countries and EU28 (2010-2015)
 UKR = Ukraine, AUS = Australia, ZAF=South Africa, NZL=New Zealand, CHL= Chile, ISR = Israel, CAN = Canada, USA=United States, BRA=Brazil, MEX=Mexico, RUS=Russia, NOR=Norway, ISL=Iceland, CHE=Switzerland, KAZ=Kazakhstan, JPN=Japan, VNM=Viet Nam, CRI=Costa Rica, COL=Colombia, KOR=Korea, CHN=China, TUR=Turkey, PHL=Philippines, IDN=Indonesia

While some countries showed an overall continuous increase, most of the countries had a declining trend of the share of agricultural support in GDP. Indonesia, China, and Philippines had increases in TSE share after 2011 but increase was stable only in Indonesia and China as Philippines showed a decrease after 2012. Ukraine and Viet Nam had the sharpest decline in TSE share after 2012.

Similar to the trend that is present in the 1986-2016 period, there was a significant overall negative trend of TSE in GDP in this period (z-score = -2.69) as well². The decline in the share of TSE in GDP is more apparent when relatively more developed OECD countries³ and EU28⁴ countries are looked into separately as a group for a broader time scope between 1986 and 2016 (Figure 2):

² See Appendix 2 for individual country graphs for 1986-2016 period.

³ Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

⁴ EU28: Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Greek-Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom.

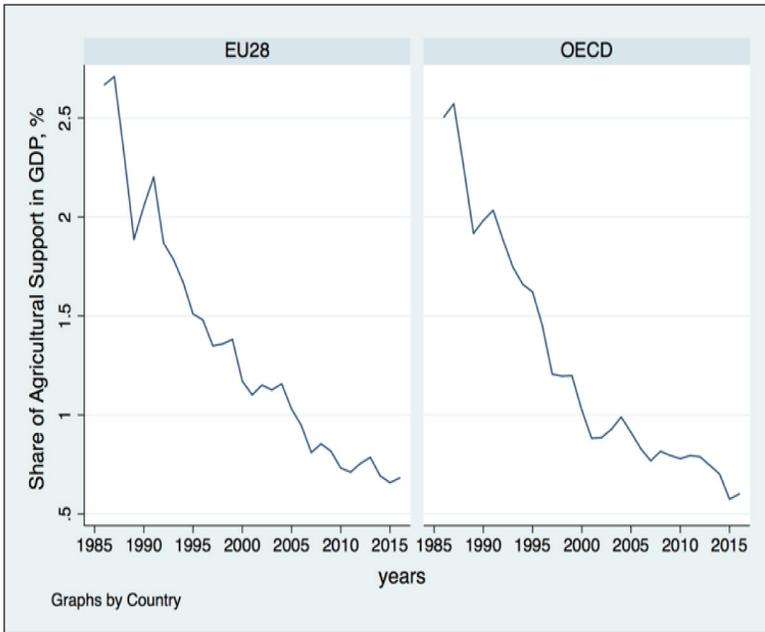


Figure 2. Share of Agricultural Support in GDP in EU28 and OECD Countries (1986-2016)

As shown in (Figure 2), the share of TSE in GDP fell from 2.50% in 1986 to .60% in 2016 in OECD countries. In the EU28 countries, the share of TSE in GDP fell from 2.57% in 1986 to .68% in 2016. TSE share in GDP presents a cyclical pattern in both EU28 and OECD countries especially after 1991. Despite the cyclical pattern, the general trend, however, is a decline of TSE share in both EU28 and OECD countries between 1986 and 2016. (Figure 3) below depicts the TSE share in GDP for individual countries in OECD-APME for 2010-2015:

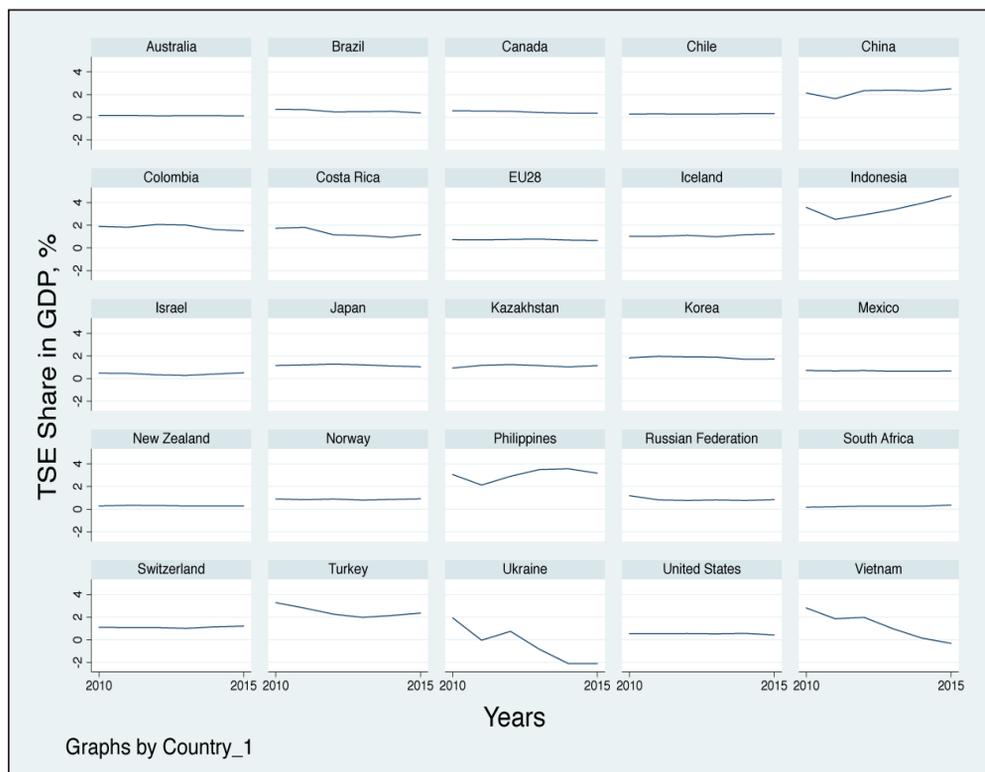


Figure 3. Share of TSE in Individual Countries in OECD-APME (2010-2015)

EU28: Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Greek-Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom.

As shown in (Figure 3) while some countries had a fairly stable path of TSE share in GDP between 2010 and 2015, some others presented a decrease between 2010 and 2011; an increase between 2011 and 2012; then, a decrease after 2012. While Australia, Brazil, Canada, Chile, European Union 28, Israel, Japan, Kazakhstan, Korea, New Zealand, Norway, Russian Federation, Switzerland, South Africa, and U.S. had a relatively stable path of TSE share, Indonesia, China, Colombia, Costa Rica, the Philippines, Turkey, Ukraine, and Viet Nam, particularly, had a more volatile share of agricultural support over time. Also, the shares of agricultural support in Ukraine and Viet Nam were significantly lower relative to the rest of the countries. (Table 1) provides overall, between, and within summary statistics of TSE share in GDP, size of government, and associational and organizational rights scores:

Table 1. Panel Summary Statistics (selected variables, 2010-2015)

Variable		Mean	Std. Dev	Min	Max	Obs.
TSE share in GDP, %	overall	1.11	1.01	-2.10	4.59	N = 150
	between		.127	-.40	3.49	n = 25
	within		1.00	-.60	3.44	T = 6
Share of government expenditures in GDP, %	overall	26.45	8.04	13.40	43.54	N = 148
	between		.428	14.00	40.25	n = 25
	within		8.03	21.87	32.05	T = 5.92
Association and organizational rights	overall	9.09	3.37	1	12	N = 150
	between		.121	8.95	9.23	n = 6
	within		3.37	.858	12.14	T = 25

The overall mean share of TSE in GDP is 1.11% with a minimum of -2.10% (Ukraine) and maximum of 4.59% (Indonesia) in the 2010-2015 period. Between countries, minimum TSE share was -.40% maximum share was 3.49%. The mean overall share of government expenditures in GDP is 26.45% with a minimum of 13.40% (the Philippines) and maximum of 43.54% (Ukraine) in the same period. As shown below, while Ukraine had the largest size of government in terms of the share of public expenditures in GDP, it had the lowest TSE share in GDP between 2010 and 2015. The mean associational and organizational score was 9.09 with a minimum of 1 and maximum of 12. All three variables have higher within variation than the between variation.

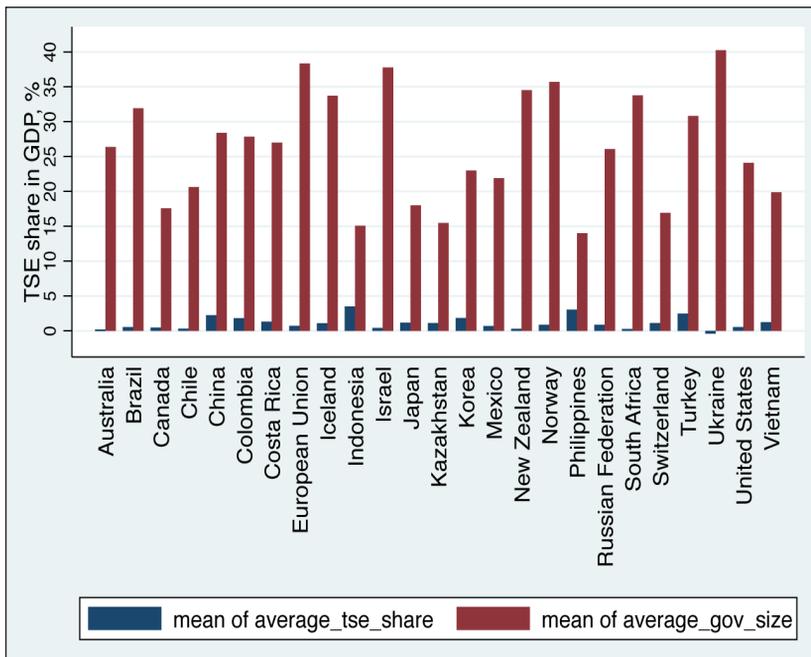


Figure 4. Average TSE share and Size of Government by Country (2010-2015)

As shown in (Figure 4), Indonesia, the Philippines, Turkey, and China had relatively higher mean TSE shares in GDP between 2010 and 2015. Ukraine had a negative mean TSE share in GDP and Australia, South Africa, Chile, and New Zealand had a relatively lower TSE share in GDP, in the same period. While Ukraine, Israel, and European Union had relatively larger size of government, Indonesia, Kazakhstan, and Philippines had relatively lower size of government.

4. Empirical Analysis

The OECD-APME data set is suitable for a panel data analysis. The empirical analysis of the study has been limited to 2010-2015 period due to heavily missing observations in the data set. Instead of applying an intensive multiple imputation on the data set for all missing observations, the study period has been limited to 2010 and 2015. It should be noted here that, as in any study, the choice of time window will impact the results of the study. Therefore, findings should be treated as such.

The data have been analyzed using Dynamic Panel Data (DPD) estimations. In panel data with large total number of cross sections (N) and small number of time periods (T), within transformation to obtain deviations of the dependent and independent variables causes the correlation of variables with the error terms [the Nickell (1981) dynamic panel bias]. As a remedy, Anderson and Hsiao (1981) suggested instrumental variable panel data estimation, which uses the second and third lags of the lagged dependent variable as instruments. For DPD, Holtz-Eakin et al. (1988) and Arellano and Bond (1991) suggested using the lagged values of the instrumental variables (the internal instrumental variables) and additional external instrumental variables for the first-differenced variables to exhaust all available information in the sample [the Arellano and Bond (A-B) estimation]. Arellano and Bover (1995) and Blundell and Bond, (1998) further suggested that the lagged values of the levels were poor instruments for the first-differenced variables, and the inclusion of lagged differences as well as lagged levels would produce more efficient estimates [the Arellano–Bover/Blundell–Bond(A-B/B-B) system estimation] (see Roodman, 2009, for background, modeling, and software application of DPD models).

Having a sample with relatively larger N, small T, and with a dependent variable that is potentially influenced by its lagged values, independent variables that are potentially endogenous (not strictly exogenous), unobserved heterogeneity, heteroscedasticity, and autocorrelation, the study conducts an A-B/B-B linear DPD model that can be structured as in the following:

$$\left(\frac{TSE}{GDP}\right)_{i,t} = \sum_j^p \alpha_j \left(\frac{TSE}{GDP}\right)_{i,t-j} + X_{i,t} \beta_1 + Z_{i,t} \beta_2 + \nu_i + \varepsilon_{i,t}$$

$$i=1,\dots,N \quad t=1,\dots,T_i \quad j=1,\dots,p.$$

where $\left(\frac{TSE}{GDP}\right)_{i,t}$ (multiplied by 100) is the share of TSE in GDP for the i^{th} country at time t ; $X_{i,t}$ is a vector of exogenous variables for the i^{th} country at time t ; $Z_{i,t}$ is the a vector of endogenous variables for the i^{th} country at time t ; ν_i are the country-level effects for the i^{th} country; and, $\varepsilon_{i,t}$ are the error terms. α_j and β s in the model are the parameters that will be estimated. In this model, lagged first differences of the dependent variable are instruments for the level equation. The A-B/B-B estimation results are as follows:

Table 2. Dynamic Panel Data Estimation Results Dependent Variable: TSE share in GDP

Variable	Coefficient
L.TSE share in GDP	-0.015
	(-0.13)
Share of government expenditures in GDP	-0.048**
	(-5.88)
L. Share of government expenditures in GDP	0.005
	(0.81)
L2. Share of government expenditures in GDP	-0.024*
	(-3.97)
Share of agricultural employment in total employment	0.061**
	(6.35)
L. Share of agricultural employment in total employment	0.016*
	(3.89)
L2. Share of agricultural employment in total employment	-0.003
	(-0.27)
Share of food imports in merchandise imports	0.008
	(0.32)
L. Share of food imports in merchandise imports	0.167**
	(4.10)
L2. Share of food imports in merchandise imports	-0.008
	(-0.19)
Association and organizational rights score	0.059*
	(3.20)
Constant	0.054
	(0.14)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ z-scores are in parantheses.

By the construct of the A-B/B-B estimation, the first lagged value of TSE share was included as an explanatory variable in the model and it did not have a significant influence on the TSE share, *ceteris paribus* (for all findings henceforth). As one of the variables of interest of this study, size of government (measured as the share of public expenditures in GDP) had no significant impact on TSE share with its current year values. However, its second lagged values had a negative significant impact on TSE share in GDP.

The share of agricultural employment in total employment had a positive impact in the current and the first lag. This result is expected as larger agricultural employment could be associated with more political influence through lobbying and voting response of agricultural workers. Food imports (exports) can serve as a measure for a country's food dependencies. Share of food exports in merchandise exports had a lagged positive significant impact on agricultural support. As a variable of interest, associational and organizational rights score had a positive significant impact, indicating that agricultural support was significantly higher in countries where associational and organizational rights are better.

The estimates of general and presidential election year dummies, additional political decision-making mechanism variables that aim to capture electoral cycles in agricultural support, have not been found to be statistically significant at 5% significance level during estimation trials. Share of rural population, agricultural value added, agricultural land area, share of food exports in exports, GDP (constant), per capita GDP (constant), external balance, and foreign direct investment (in and out) have also been used in trials but they were excluded from the analysis either due to the lack of significance of the estimates at 5% significance level or due to multicollinearities.

5. Conclusion

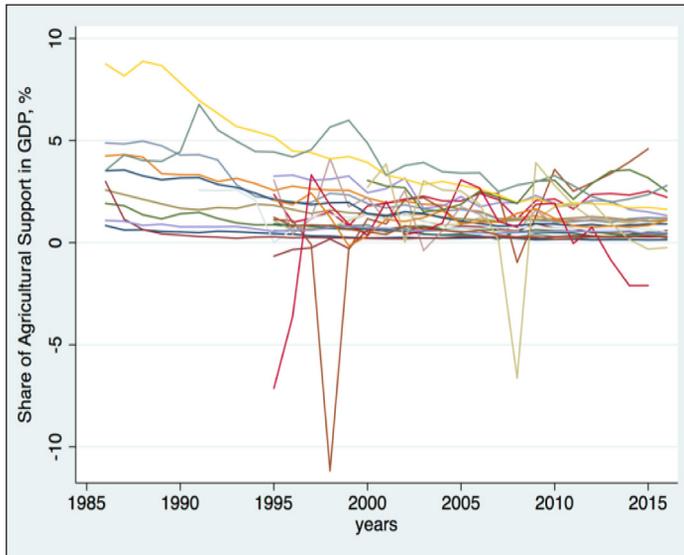
This study analyzed the effects of the size of government and associational and organizational rights scores on agricultural support measured as TSE share in GDP for countries in OECD's APME program. Through an A-B/B-B system dynamic panel data estimation, the study found significant negative impact of the past year values of the size of government and significant positive impact of associational and organizational rights scores on TSE share in GDP. Better associational and organizational rights can facilitate the mobilization of farmers and other stakeholders in the agricultural sector of the economy to influence policy-making to advance their interests. In the economies and political systems where farmers can get organized and form and operate associations freely, they can demand more support from governmental resources. Therefore, steps that will be taken to improve the associational and organizational rights can increase the competitiveness of agricultural stakeholders in influencing policy-making and slow down the decrease in the share of agricultural support in the economy. This, however, is not to say that the share of agricultural support should increase in economics as it will depend on welfare maximization conditions of each economy. It should be noted here that in order to better capture the effects of the demand-side factors on agricultural support, more direct agricultural variables such as the number of agricultural associations, the number of members in agricultural organizations, their budgets, or the number of agricultural protests and events would be helpful. Along with the size of government and associational and organizational rights, the share of agricultural employment in total employment and the share of food imports in merchandise imports were other significant determinants of agricultural support. These findings are also in line with economic theory and expectations. Under the light of these findings, the study shows that agricultural support is not only determined by pure economic factors but also some political factors such as associational and organizational rights.

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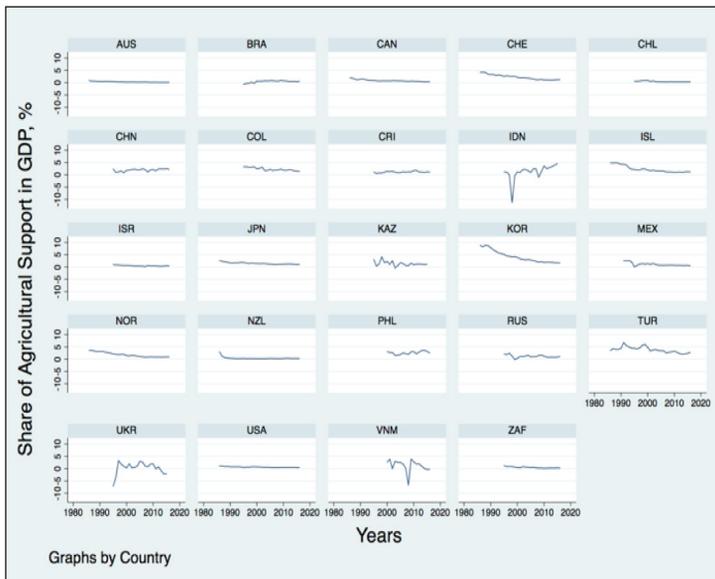
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Appendices



Appendix 1. Share of Total Agricultural Support in OECD-APME Countries and EU28 (1986-2016)
Note: Available years. Due to large number of individual countries no legend is provided.



Appendix 2. Share of TSE in Individual Countries in OECD-APME (EU28 included as a separate country or region; available years between 1986 and 2016).

UKR = Ukraine, AUS = Australia, ZAF=South Africa, NZL=New Zealand, CHL = Chile, ISR = Israel, CAN = Canada, USA=United States, BRA=Brazil, MEX=Mexico, RUS=Russia, NOR=Norway, ISL=Iceland, CHE=Switzerland, KAZ=Kazakhstan, JPN=Japan, VNM=Viet Nam, CRI=Costa Rica, COL=Colombia, KOR=Korea, CHN=China, TUR=Turkey, PHL=Philippines, IDN=Indonesia

