Relationship of Development and Fiscal Indicators with Agricultural Producer Support in the OECD Economies

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Abstract

The paper seeks to quantify the effects of macro development and fiscal indicators on the agricultural producer support in the OECD countries during the period 1986-2009. The study is complementary to the body of microeconomic research that highlights the importance of support to agriculture industry. Data were obtained from the OECD's Producer and Consumer Support Estimates database and the World Bank's Word Development Indicators 2010 database. Producer Support Estimate (expressed in absolute value, in percent of total farm receipts - %PSE and per 1 ha of agricultural land) was taken as the dependent variable, whereas selected indicators describing performance of the economies were the independent variables. Simple linear regression analysis was conducted and resulted in many significant associations. In the period analyzed, there was a wide gap between the most and least supporting countries in terms of average %PSE and PSE per ha as well as substantial differences in degree of their inter-temporal variation occurred. Regression findings reveal, among others, that when countries were becoming richer, the %PSE was generally decreasing. Conflicting results were obtained for relationship between the %PSE and unemployment as in some countries it was negative, while in the others positive. Expansionary fiscal policy exerted opposite effects on the PSE in different countries.

Keywords: producer support estimate, high-income countries, macroeconomics, public finance

1. INTRODUCTION

In literature of economics, agricultural support has been analyzed from many angles since it affects producers, consumers, taxpayers, and government differently. Park and Jensen (2007) consider farm subsidies in the developed countries as a type of distributive policy that targets the agricultural sector at the expense of consumers and taxpayers. According to Anderson and Hayami (1986), the universal protection of agriculture among developed countries can be explained by rise in social affordability of total tax burden associated with this protection due to taxpayers' income growth. Also Swinnen (2009) emphasizes that one of factors that coincide with economic growth is a declining share of agriculture in labour force, and with this decline the per unit costs of increasing farm incomes through protection decrease for the rest of society. With a shrinking share of agriculture in employment, studies drawing on Mancur Olson's (1965) logic of collective action have hypothesized that this makes farmers easier and cheaper to organize politically, and therefore is likely to increase effective lobbying of farmers as they can supply political influence at lower (marginal) costs than other (larger, less coordinated) special interest groups, such as consumers and taxpayers (see Bilal 2000; Knetter and Prusa 2003; Jonsson 2007; Furtom et al. 2009). The studies on the political economy of agriculture and agricultural policies[1] have recently focused on the role of constitutions in the redistributive policies implemented by the government. The empirical results for OECD countries obtained by Anderson and Hayami (1986) demonstrate that electoral systems that encourage politicians to target narrow (broad) constituencies are associated with relatively high (low) levels of agricultural subsidies.

Amongst many issues raised by the successes and failures of agricultural policies are those connected with risk and uncertainty. Governments intervene on farmers' income risk through stable

[1] See Henning and Struve (2007), and Swinnen (2009) for summary and review of that literature.

macroeconomic parameters (inflation, exchange rate), fiscal policies and agricultural policies (level and composition of support). According to some studies (Mishra and Goodwin 1998; Hardaker et al. 2004; OECD 2005; Serra et al. 2005) farmers as a group are risk averse, although the degree of risk aversion varies across farmers and from one country to the next. Risk effects of agricultural policies occur in an uncertain world when farmers are risk averse and support policies either reduce revenue variability and/or increase income (OECD 2006). In recent years, risk-related measures have comprised two-thirds of total average support to OECD producers, as measured by the Producer Support Estimate (PSE), and their share in total has been over a half in almost all OECD and emerging economies (OECD 2009; Špicka 2010). Most forms of support including in the PSE decrease revenue variability (some to a large extend) but Market Price Support (MPS), as the most widespread risk-related measure and in most OECD countries, is the main risk reducing type of support (OECD 2004; OECD 2006).

In our review of the current literature we found that agricultural support in the developed countries has received much attention from the researchers with regard to its impact on farm economy (input, output, income, prices, technology, farm structure etc.), consumers and international markets. However, studies investigating its relationship with macroeconomic, and especially fiscal factors are relatively fewer. An exemption are those dealing with exchange rate effects on agricultural policy measures such as MPS and PSE (Inomata 1986; Bojnec and Swinnen 1997; Liefert 2011). The general economic performance (measured by GDP, GVA, unemployment rate) as a determinant of the regional producer support in Germany was studied by Anders et al. (2007) and Elsholz and Harsche (2008).

Good or bad, the reality is that a bias towards running budget deficits is an entrenched feature of fiscal policy making in most developed economies. The latest global crisis has increased pressure on the governments' budgets and may eventually provoke a transformation of agricultural policies. As public debts will continue to rise, painful spending cuts would make the population more sensitive to some agricultural expenditures. It is especially important for the future CAP as the Member States, mainly those being net contributors to the EU budget would reject the old-style CAP. Changes in agricultural policies (e.g. subsidies) may pose regulatory risk to farmers as their incomes may be negatively impacted by changes in government action.

The remainder of this article is organized as follows. Section two presents the underlying data used for the empirical analysis and explains the methodology. Then, our calculation results are presented and discussed in the section three. The final section summarises the main findings and offers some concluding remarks.

2. METHODS AND DATA

The objective of the paper is to pay an attention to the impact of economic development and public finance performance on agricultural support, or more specifically to answer the questions: (i) How do development and fiscal indicators influence the agricultural producer support?; (ii) How these effects differ between the OECD countries?

A comprehensive review of the recent available literature related to agricultural support and its connections with the national economy's performance formed the basis of the empirical research.

To obtain an overview of the relationship between PSE and relevant macroeconomic and fiscal variables, we collected data on a sample of members countries of the Organisation for Economic Cooperation and Development (OECD). The investigation period covers the years from 1986 to 2009. However, not all considered data were available for all countries in our sample for this

length of time. In such cases analysis was restricted to shorter periods.

The source of the data on the level of support has been annual statistics of the OECD on PSE. This indicator measures the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income (OECD 2010). PSE has been constructed to evaluate and monitor agricultural policy changes (Josling and Valdes 2004) and, as indicated by Tangermann (2006), it is not an exercise in estimating the effects of policies, but an attempt at measuring the efforts made by policy makers.

To establish the association between the macroeconomic indicators and the PSE, simple linear regression models were used in order to avoid difficulties in interpreting our results. The R^2 value was examined for each regression as an indication of the goodness of fit of the model. There were good reasons not to expect strong correlations between PSE and selected variables as simple correlations may fail to be significant because of omission of other variables. Significance of estimated regression coefficients was tested using Student's t test.

As independent variable we used PSE expressed in absolute value, in percent and per 1 hectare of agricultural land. The percentage PSE (%PSE) measures the ratio of the PSE to the value of total gross farm receipts (including budgetary support). The PSE data were statistically analyzed with the standard procedures of analysis of variance. The methodology for the examination of instability in agricultural policy was to calculate the variation in the PSE for the period 1996-2009 on the basis of the coefficient of variation. In order to separate significant differences in mean values of PSE between the selected countries, LSD test was applied.

Table 1 Description of considered explanatory variables

Variables	Names	Unit	Aggregation method
General economy			
Gross Value Added	*GVA*	Constant 2000 US$[1]	Gap-filled total
Gross Domestic Product	*GDP*	Constant 2000 US$[1]	Gap-filled total
GDP per capita	*GDP.PCAP*	Constant 2000 US$[1]	Weighted average
Unemployment	*UEM.TOTL*	% of total labour force	Weighted average
Rural population	*RUR.TOT*	% of total population	Weighted average
Employment in agriculture	*AGR.EMPL*	% of total employment	Weighted average
Inflation, GDP deflator	*GDP.DEFL*	Annual %	Median
Official exchange rate	*OXR*	Local currency unit per US$, period average	
Government finance			
Cash surplus/deficit	*BAL.CASH*	% of GDP	Weighted average
Central government debt	*DOD.TOTL*	% of GDP	Median
Expense	*XPN.TOTL*	% of GDP	Weighted average
Subsidies and other transfers	*XPN.TRFT*	% of expense	Median
Tax revenue	*TAX.TOTL*	% of GDP	Weighted average
Taxes on goods and services	*TAX.GSRV*	% of revenue	Median

Note: [1/]Dollar figures are converted from domestic currencies using 2000 official exchange rates.
Source: Authors' own compilation based on World Bank (2010).

The explanatory data applied for the empirical analysis were aggregated data for the member states of the OECD and the EU as well as data for individual states drawn from the World Bank WDI 2010 database. Obviously country's economics is a complicated area and there are many factors to consider. So, several potential variables representing macroeconomic and fiscal situa-

tion during the period studied were first taken into consideration but finally (after correlation analysis) we selected those reported in the Table 1.

3. RESULTS AND DISCUSSION

3.1. Development of OECD support to agriculture as measured by PSE

In 2009, the value of support to producers in the OECD as a whole was estimated at USD 253 billion or EUR 182 billion. Of reported total 2009 PSE, the EU's share alone was around 48% ($121 billion). The EU together with other three countries accounted for 85%: Japan at 18% ($46 billion), the United States at 12% ($31 billion) and Korea at 7% ($17 billion).

The PSE data when subjected to analysis of variance revealed significant differences among the groups of countries (Table 2). Minimum average total PSE for 1986-2009 was recorded in New Zealand and Iceland, while the maximum one in Japan. Minimum PSE share of total producer receipts was again in New Zealand, whilst the maximum – in Switzerland, Norway and Iceland. In terms of support per hectare, Japan and Korea (with support above $9 thousand) differed significantly from other countries. Australia, Canada, New Zealand and the USA ranked below the OECD average both in terms of %PSE and PSE per hectare.

Table 2 The level of producer support and its inter-temporal variation, 1986-2009

Countries	Measures of support											
	PSE (Mill. $)				*%PSE* (%)				*PSE/ha* ($)			
	N	Mean		CV	N	Mean		CV	N	Mean		CV
Australia	24	1245	ab	27	24	6.1	b	45	22	3	a	27
Canada	24	5341	b	26	24	23.5	d	32	22	77	ab	26
Iceland	24	174	a	22	24	66.4	gh	12	22	77	ab	22
Japan	24	49469	e	18	24	56.5	f	9	22	9447	d	16
Korea	24	18290	c	22	24	63.7	g	11	22	9132	d	26
New Zealand	24	109	a	146	24	2.1	a	192	22	7	a	134
Norway	24	2964	ab	14	24	67.6	h	6	22	2824	c	14
Switzerland	24	5317	b	11	24	68.5	h	8	22	3141	c	14
USA	24	36286	d	24	24	16.8	c	30	22	88	ab	24
EU	24	109531	f	15	24	33.0	e	15	22	538	b	17
OECD	24	251527	g	7	24	30.6	e	15	22	192	ab	8

Notes: N – number of observations; Means in the same column bearing different letters are significantly different, means bearing the same letter do not differ significantly ($p<0.05$); CV- Coefficient of variation defined as the ratio of the standard deviation to the mean, reported here as a percentage (%).
Source: Own calculations.

Interventions and policies intended to help farm producers manage risk – either through *ex ante* prevention and mitigation measures or through *ex post* coping mechanisms, may need to look at variations in support levels in order to prove effective. Table 2 illustrates how the PSE variability over a twenty-four year period differed between OECD countries. Considerable variation in all three support measures was revealed for New Zealand and Australia, i.e. countries with the lowest relative level of the PSE (% and per 1 ha). Contrary, in Norway and Switzerland that were the most generous to their farmers if %PSE is considered, variation in producer support in 1986-2009 was lowest. A large difference in the average level of support as measured by the % PSE existed between the EU and the USA. The evolution over time since 1986 shows that the US significantly reduced total (by 20%) and percentage (by 59%) PSE, whereas for the EU, the percentage PSE decreased only moderately (by 38%) while the total PSE series is affected by EU enlarge-

ment. Therefore, the PSE in the EU was more stable than the US one. Over the period 1986-2009, the coefficient of variation of the %PSE and PSE per 1 ha was respectively 29.7% and 24.2% for the US compared with 14.7% and 16.5% for the EU, showing a lower exposure of European farmers to the volatility of agricultural policy and prices.

3.2. Determinants of the Producer Support Estimate

In this subsection we compare the influence of domestic macroeconomic variables and fiscal policy variables on the evolution of the PSE measures.

Empirical evidence on agricultural protection from numerous studies suggests the positive correlation between agricultural protection and average country incomes across countries. Swinnen and others (2001) who conducted their empirical study covering 100 years of history of agricultural protection in Belgium show that the impact of economic development on some agricultural policies is conditional on the level of development. They found that support to farmers was positively determined by share of agricultural commodities in total output of the economy.

ESPON empirical study[2] reveals, with 1999 data, that the value of MPS under the Pillar 1[3], expressed per hectare of agricultural land was correlated positively with GDP per capita and negatively with the unemployment rate in the NUTS3 region. Direct income transfers tended to be higher in regions with a low GDP per head and high unemployment rates. As concerns new Member States, the results varied between them. For example, in Poland the MPS per 1 ha UAA was adversely related to unemployment rate but no statistically significant correlation with GDP per capita across the regions was found. In contrast, in the Czech Republic, MPS tended to be higher in the regions with a low GDP per capita whereas its correlation with unemployment rate was not significant (Shucksmith et al. 2005). Anders and others (2004), who computed PSE for selected German regions, show that CAP producer support flows more to poorer regions when the PSE per hectare is utilised but this is not the case when the relative PSE is considered.

In our study we found a significant statistical relationship between PSE measures and many, although not all and not in all countries, macroeconomic and fiscal performance variables over the studied period (for detailed results see Table A1 and Table A2 in Appendix). In order to make results of our analysis easier to read, we also summarized them in Table 3.

Absolute and per capita GDP was significantly and negatively related to the percentage PSE in all, except New Zealand, countries with the strongest correlation (values ≤ -0.75) in Australia, Korea and the EU (Table A1). The regression results suggest that when countries become richer, the producer support share of farm revenues decreases. The whole economy GVA was also significantly and negatively related to the %PSE in all countries, where data were available.

There was also an interesting negative strong correlation between the %PSE and unemployment rate in the OECD as a whole (r= -0.85), and moderate one in Korea (r=-0.43). On the contrary, positive moderate correlation between %PSE and an unemployment was recorded for Australia and the EU as a whole, while in other countries our analysis found no statistically significant relationship between those variables. Only in a few countries, the PSE per hectare agricultural land was significantly (positively) correlated with GVA, GDP and per capita GDP (Korea and the EU) as well as with the rate of unemployment (Switzerland and Norway). Regression of the absolute

[2] The study was carried out over the period 1990 to 2000 at the NUTS-3 level and covered the EU-15 as well as neighbouring and accession states (see Espon 2004).

[3] EU expenditure on the CAP (costs for taxpayers) excludes the major component of the PSE arising from the effects of non-expenditure instruments (ex. import barriers) in rising domestic EU prices above their levels outside the EU.

PSE on unemployment rate shows its negative effect on total value of support to farmers in Island and the USA only.

Our results indicate a significant positive relationship between the percentage PSE and rural population (as % of total population) in all individual countries as well as in the EU (r=0.77) and OECD (r=0.85) as a whole. However, if absolute PSE is considered, the coefficients are mostly not significant, except for New Zealand (r=0.57) and Korea (r=-0.56). The estimated coefficients measuring the impact of employment in agriculture (% of total employment) on the percentage PSE are mostly significant and always display the positive sign.

The PSE measures were differently related to fiscal performance of the countries (Table A2). In New Zealand and the USA fiscal balance to GDP ratios were significantly and positively correlated with absolute level of the PSE (r=0.82 and r=0.60 respectively), while in Switzerland and the OECD as a whole there was moderate inverse correlation between those two measures. No significant results were obtained for other countries. Fiscal balance also explains the variation of percentage PSE in some countries. In Norway and Canada higher surpluses reduced the share of PSE in producer revenues (r=-0.88 and r=-0.52) as opposed to Iceland and the USA. Furthermore, fiscal balance had effects on PSE per hectare, but merely in three countries: positive in New Zealand and the USA and negative in Switzerland. Additionally, the regression results indicate that increases in central government debt had a negative effect on the absolute level of PSE in such countries as Australia, Island, Korea and the USA but positive in Norway. In the EU and OECD the percentage PSE was positively and moderately correlated with debt, while in the USA there was strong but negative correlation. Also producer support per hectare was affected by debt in the USA, Korea and Australia (negatively) and in Norway (positively).

Cutting government expenses and transfers and/or increasing taxes is often an effective way to contribute to fiscal stabilization but may harm farm producers. Government expense (% of GDP) appeared to have a significant impact on the absolute PSE only in the USA (with negative sign). As the expense raised the %PSE tended to increase in Norway, Canada and Switzerland and to decrease in Island, Korea and the USA. In all countries, excluding the USA, the PSE per hectare was not affected by government expense. Subsidies and other transfers (as % of expense) determined absolute value of PSE in Norway (negative sign) and in Canada (positive sign). Generally, no significant relationship of subsidies and transfers with the %PSE was observed in individual countries, but it was high and negative for aggregate data for the EU and OECD. Producer support per hectare was significantly related to subsidies and transfers in Norway (r=-0.96). The strong correlation between total PSE and tax revenue (% of GDP) was recorded in Iceland (positive) and in Japan (negative). Also in Switzerland PSE value was decreasing with rising tax revenue but relationship was weaker. In OECD as a whole, Korea and Japan, the %PSE was moderately-to-strongly negatively correlated to tax receipts. Tax revenue, other things being equal, had a positive effect on PSE per hectare in the USA and New Zealand but negative one in Japan.

Additionally, we found evidence that nominal exchange rates (local currency unit per US$) had impact mainly on monetary value of producer support. Negative regression signs (not presented in tables) indicate that, as expected, depreciation of national currencies against the US dollar was associated with decrease in the absolute PSE; with significant effects for Canada, Iceland, Norway and Switzerland. The depreciation (appreciation) of national currency, *ceteris paribus*, leads to narrowing (widening) the gap between domestic and border prices having impact on MPS. Effect of inflation on value of the PSE was statistically significant only in New Zealand (r=0.94). Moderate to very strong positive correlation (0.42-0.92) existed between inflation and %PSE in

Canada, Iceland, Korea and New Zealand, as well in the OECD as a whole (Table 3).

Table 3 Statistically significant relationships between PSE measures and selected economic indicators in the OECD countries, 1986-2009

Variables	*PSE (Mill. $)*		*%PSE (%)*		*PSE/ha ($)*	
	Direction of the relationship					
	Positive	Negative	Positive	Negative	Positive	Negative
GVA	EU			AUS, EU, JPN, KOR,	EU, KOR	
GDP	EU, KOR			AUS, CAN, EU, ISL, JPN, KOR, NOR, OECD, CHE, USA,	EU, KOR	
GDP.PCAP	EU, KOR	AUS		AUS, CAN, EU, ISL, JPN, KOR, NOR, OECD, CHE, USA	EU, KOR	
UEM.TOTL		ISL, USA	AUS, EU	KOR, OECD	NOR, CHE	
AGR.EMPL		ISL, KOR	AUS, CAN, EU, JPN, KOR, NOR, OECD, CHE, USA			KOR, CHE
RUR.TOT	NZL	KOR	AUS, CAN, EU, ISL, JPN, KOR, NZL, NOR, OECD, CHE, USA		NZL	EU, KOR, CHE
BAL.CASH	NZL, USA	CHE, OECD	ISL, USA	CAN, NOR	NZL, USA	CHE
DOD.TOTL	NOR	AUS, ISL, KOR, USA	EU, OECD	USA	CAN	CAN
XPN.TOTL		USA	CAN, NOR, CHE	ISL, KOR, USA		USA
XPN.TRFT	CAN	NOR		EU, OECD		NOR
TAX.TOTL	ISL	JPN, CHE		JPN, KOR, OECD	NZL, USA	JPN
TAX.GSRV	EU	NOR	CAN, ISL, KOR, NOR, USA, OECD		EU	NZL
GDP.DEFL		NZL		CAN, ISL, KOR, NZL, OECD	CAN, NZL	CHE
OXR		CAN, ISL, NOR, CHE	CHE	ISL, KOR		JPN, NOR, CHE

Notes: See Table 1 for definition of variables; AUS – Australia, CAN – Canada, CHE – Switzerland, ISL – Iceland; JPN – Japan, KOR – South Korea, NOR – Norway, NZL – New Zealand, USA – the United States.
Source: Own calculations.

4. SUMMARY AND CONCLUSIONS

Our main findings and conclusions are summarized as follows:

1. Besides the fact that all analyzed countries belong to the group of the most developed world's economies, they differ widely both with respect to size and time variability in agricultural producer support as well as with respect to macroeconomic and fiscal performance.
2. Over the 1986-2009 period, there was a wide gap between the most and the least supporting countries in terms of average percentage PSE (ratio as 11 to 1) and PSE per hectare (ratio as 3149 to 1). There were also substantial differences in inter-temporal variation in all three measures of support, with the highest degree of variation revealed for New Zealand and Australia, i.e. countries with the lowest relative level of the PSE (% and per hectare), and the lowest degree in Norway and Switzerland being the most generous to their farmers in terms of percentage PSE. Those results suggest (although need further proof) that higher levels of

support minimize risks and uncertainty faced by farmers.

3. It was not easy to capture important similarities between countries with respect to examined relationships. We did not find proof for the proposition that higher development level of any country under investigation implies higher support level. The regression results suggest that when countries become richer, the producer support share of farm revenues falls. Conflicting results were obtained for relationship between the percentage PSE and unemployment as in some countries it was negative, while in the others positive. Also expansionary fiscal policy exerted opposite effects on the PSE in different countries. For example, in the USA higher deficits were associated with higher producer support in terms of all its measures, whereas in the whole OECD, the monetary value of the PSE was negatively related to fiscal balance.
4. From the political economy point of view, it seems important that in all individual countries as well as in the EU and OECD as a whole, the level of producer support, at least when percentage PSE is considered, was significantly positively influenced by rural population share of total population. It can suggest that more (less) political power in shaping agricultural policies is connected rather with higher (smaller) size of whole population in rural areas (i.e. number of voters) than with the power of the farmers' interest groups. Some evidence of it is given by significant positive correlation between percentage PSE and share of agricultural employment in total employment obtained for almost all countries and for the whole OECD, which denotes that when relative employment in agriculture was shrinking, the percentage PSE was also declining.

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APPENDIX

Table A1 Macroeconomic determinants of Producer Support Estimate, 1986-2009 (simple linear regression results)

Countries	Dependent Variables	Independent Variables							
		GVA		*GDP*		*GDP.PCAP*		*UEM.TOTL*	
		r	b	r	b	r	b	r	b
Australia	*PSE* ($)	-0.33	-1.39E-09	-0.37	-1.33E-09	-0.41*	-0.044*	0.26	43.08
	%PSE	-0.83**	-2.83E-11**	-0.84**	-2.46E-11**	-0.86**	-0.001**	0.61**	0.80**
	PSE/ha	-0.29	0.00	-0.28	0.00	-0.32	0.000	0.19	0.06
Canada	*PSE* ($)	na	na	0.23	2.39E-09	0.24	0.119	-0.25	-203.39
	%PSE	na	na	-0.63**	-3.64E-11**	-0.59*	-0.002*	0.35	1.67
	PSE/ha	na	na	0.02	0.0000	0.05	0.001	-0.06	-1.17
Iceland	*PSE* ($)	na	na	0.32	6.35E-09	0.40	0.004	-0.50*	-19.44*
	%PSE	na	na	-0.62**	-2.51E-09**	-0.53*	-0.001*	-0.24	-1.34
	PSE/ha	na	na	0.04	0.00	0.04	0.000	-0.32	-0.73
Japan	*PSE* ($)	-0.27	-4.94E-09	-0.28	-5.02E-09	-0.27	-0.700	-0.26	-2203.30
	%PSE	-0.71**	-7.12E-12**	-0.71**	-7.51E-12**	-0.73**	-0.001**	-0.13	-0.59
	PSE/ha	0.15	0.00	0.15	0.00	0.15	0.069	0.12	171.53
Korea	*PSE* ($)	0.40	1.06E-08	0.41*	9.54E-09 *	0.43*	0.530*	-0.39	-1327.69
	%PSE	-0.77**	-3.63E-11**	-0.76**	-3.19E-11**	-0.75**	-0.002**	-0.43*	-2.45*
	PSE/ha	0.68**	1.15E-12**	0.68**	1.01E-12**	0.70**	0.549**	-0.27	-503.79
New Zealand	*PSE* ($)	na	na	-0.33	-5.55E-09	-0.25	-0.027	-0.31	-24.21
	%PSE	na	na	-0.39	-1.69E-10	-0.31	-0.001	-0.23	-0.47
	PSE/ha	na	na	-0.28	0.00	-0.19	0.001	-0.37	-1.78
Norway	*PSE* ($)	0.03	5.43E-10	0.05	7.12E-10	0.00	-0.0001	0.37	121.17
	%PSE	-0.48*	-7.40E-11*	-0.51*	-6.36E-11*	-0.48*	-0.0003*	0.24	0.81
	PSE/ha	-0.39	0.00	-0.38	0.00	-0.41	0.030	0.44*	145.86*
Switzerland	*PSE* ($)	-0.11	-3.07E-09	-0.02	-4.82E-10	-0.07	-0.020	0.15	108.67
	%PSE	-0.69**	-1.72E-10**	-0.72**	-1.50E-10**	-0.73**	-0.002**	-0.19	-1.31
	PSE/ha	-0.13	0.00	0.32	0.00	0.18	0.040	0.69**	303.89**
United States	*PSE* ($)	na	na	0.17	8.05E-10	0.21	0.433	-0.48*	-4497.60*
	%PSE	na	na	-0.47*	-1.26E-12*	-0.43*	-0.001*	-0.06	-0.30
	PSE/ha	na	na	0.18	0.00	0.19	0.001	-0.15	-4.77
EU	*PSE* ($)	0.50*	7.28E-09*	0.50*	6.51E-09*	0.48*	3.443*	-0.30	-3768.33
	%PSE	-0.76**	-3.36E-12**	-0.76**	-3.01E-12 **	-0.75**	-0.002**	0.73**	2.55**
	PSE/ha	0.56**	0.00**	0.56**	0.0000**	0.54**	0.022**	-0.27	-19.55
OECD	*PSE* ($)	na	na	0.18	7.37E-10	0.18	1.161	0.17	0.87
	%PSE	na	na	-0.86**	0.0000**	-0.84**	-0.002**	-0.85**	-0.00**
	PSE/ha	na	na	-0.18	0.00	0.17	8713.59	-0.17	0.00

Notes: See Table 1 for definition of variables; na- data are not available; r – correlation coefficient; b – regression coefficient; (**) and (*) denotes significance at the 0.01 and 0.05 level, respectively. Source: Authors' computations.

Table A2 Fiscal determinants of Producer Support Estimate, 1986-2009 (simple linear regression results)

Countries	Dependent Variables	Independent Variables											
		BAL.CASH		*DOD.TOTL*		*XPN.TOTL*		*XPN.TRFT*		*TAX.TOTL*		*TAX.GSRV*	
		r	b	r	b	r	b	r	b	r	b	r	b
Australia	*PSE* ($)	0.54	295.56	-0.84**	-75.45**	-0.19	-74.84	0.41	97.21	0.30	113.64	0.22	31.31
	%PSE	-0.16	-0.17	-0.33	-0.06	0.03	0.03	0.15	0.07	-0.17	-0.12	0.24	0.07
	PSE/ha	0.54	0.59	-0.71*	0.14*	-0.07	0.06	0.29	0.13	0.10	0.03	0.40	0.28
Canada	*PSE* ($)	0.06	27.16	na	na	-0.17	-72.79	0.58*	223.06*	-0.29	-537.48	-0.20	-211.69
	%PSE	-0.52*	-0.99*	na	na	0.54*	0.95*	-0.24	-0.36	0.14	1.05	0.54*	2.28*
	PSE/ha	-0.16	-1.83	na	na	0.06	0.59	0.18	1.73	-0.43	-20.82	-0.01	0.37
Iceland	*PSE* ($)	0.43	3.36	-0.70**	-2.35**	-0.16	-1.46	0.33	3.76	0.86**	20.50**	-0.05	-0.61
	%PSE	0.59*	0.64*	-0.33	-0.15	-0.68*	-0.90*	0.08	0.13	0.14	0.46	0.95**	1.74**
	PSE/ha	0.10	0.12	0.17	0.05	-0.05	0.14	-0.51	-0.58	0.15	0.28	0.48	0.64
Japan	*PSE* ($)	na	na	-0.54	-520.85	na	na	na	na	-0.94**	-6804.88**	-0.49	-1771.76
	%PSE	na	na	-0.43	-0.18	na	na	na	na	-0.99**	-3.22**	-0.33	-0.54
	PSE/ha	na	na	-0.53	-96.68	na	na	na	na	-0.93**	-1281.97**	-0.48	-329.63
Korea	*PSE* ($)	-0.05	-149.16	-0.63*	-1177.76*	-0.04	-56.58	0.39	315.15	0.12	478.36	0.01	7.98
	%PSE	-0.08	-0.56	0.19	0.54	-0.78**	-2.31**	0.22	0.38	-0.69**	-5.89**	0.76**	1.77**
	PSE/ha	-0.03	-57.09	-0.62**	-668.65**	0.28	226.68	0.28	125.11	0.43	1086.80	-0.31	-204.66
New Zealand	*PSE* ($)	0.82*	24.47*	0.44	2.87	0.26	17.88	-0.08	-2.09	0.73	19.00	-0.75	-19.32
	%PSE	0.54	0.17	0.79	0.06	0.40	0.28	-0.15	-0.04	0.51	0.14	-0.39	-0.10
	PSE/ha	0.83*	2.05*	0.46	0.25	0.31	1.71	-0.10	0.20	0.76*	1.64*	-0.77*	-1.65*
Norway	*PSE* ($)	0.29	33.74	0.85**	39.39**	-0.17	-32.05	-0.89**	-142.51**	0.42	187.17	-0.79*	-148.30*
	%PSE	-0.88**	-1.08**	-0.52	-0.25	0.88**	1.70**	0.14	0.24	-0.51	-2.38	0.72*	1.42*
	PSE/ha	0.01	0.83	0.88**	33.52**	0.12	19.02	-0.96**	-122.97**	0.51	175.45	-0.66	-133.69
Switzerland	*PSE* ($)	-0.63**	-357.70**	-0.30	-37.43	0.29	44.38	-0.38	-45.00	-0.59**	-403.55**	-0.31	-29.51
	%PSE	-0.24	-1.13	0.06	0.07	0.49*	0.64*	-0.43	-0.43	-0.14	-0.79	-0.40	-0.32
	PSE/ha	-0.60*	-204.36*	0.14	10.64	0.26	24.16	-0.17	-12.16	-0.22	-92.08	-0.13	-7.49
USA	*PSE* ($)	0.60**	1522.66**	-0.84**	-1071.08**	-0.65**	-2766.70**	-0.08	-224.96	0.43	2464.84	0.55	9960.70
	%PSE	0.59**	0.90**	-0.85**	-0.65**	-0.66**	-1.68**	-0.02	-0.04	0.38	1.32	0.67*	7.19*
	PSE/ha	0.86**	22.49**	-0.98**	-7.18**	-0.89**	-63.70**	0.15	6.31	0.64*	22.95*	0.00	0.44
EU	*PSE ($)*	-0.39	-3938.59	-0.28	-524.31	0.11	1250.69	0.44	2963.35	-0.50	-12889.70	0.63*	13047.80*
	%PSE	-0.24	-0.62	0.68**	0.32**	0.44	1.22	-0.81**	-1.35**	-0.02	-0.11	-0.25	-1.31
	PSE/ha	-0.34	-17.54	-0.33	-3.23	0.05	2.95	0.43	17.41	-0.46	-60.74	0.78**	82.61**
OECD	*PSE* ($)	-0.62**	-11934.10**	-0.04	-80.63	0.48	20786.10	0.34	2641.69	-0.13	-3958.72	0.16	2393.76
	%PSE	0.12	0.39	0.60*	0.27*	-0.39	-2.90	-0.74**	-1.22**	-0.60*	-3.25*	0.58*	1.78*
	PSE/ha	-0.12	0.45	-0.17	0.06	-0.05	-0.61	0.05	0.06	-0.45	-2.37	-0.12	0.32

Notes: See Table 1 for definition of variables; na- data are not available; r – correlation coefficient; b – regression coefficient; (**) and (*) denotes significance at the 0.01 and 0.05 level, respectively.

Source: Authors' computations.