

THE IMPACT OF ECONOMIC FREEDOM ON MARKET PRICES IN THE VISEGRAD GROUP COUNTRIES

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Abstract

The aim of the paper is to present the empirical analysis of impact of economic freedom on market prices of basic food products in the Visegrad Group countries. The relationship between the variables has been tested via correlation and panel analysis. The results indicate that economic freedom is not one-dimensional, so that its elements have a different impact on various food products. Although the concept of economic freedom is not new in economic theory, its indicators are, so it is important to have more studies on this topic in order to determine the influence of different aspects of economic freedom to various (micro)economic categories.

Keywords: *Economic freedom, Market prices, Visegrad Group, Panel Data*

Introduction

The Visegrad Group countries - Czech Republic, Hungary, Poland and Slovakia, so-called V4, are former socialist countries that transited from centrally planned economies to market economies. They are all full European Union (EU) members since 2004. All these processes have caused several changes in the field of agriculture. In this paper I want to investigate, did it (if it did), and in what extent, economic freedom had influence to prices of some basic food products.

Economic freedom is innovative indicator of the level of economic liberalization, attempt to quantify what is qualitatively expressed in purpose of measuring its impact. Several studies, which have included V4 group, have examined the impacts of economic freedom in different transition counties (Pääkkönen, 2009; Próchniak, 2011; Piątek, Szarzec and Pilc, 2013; Kovačević and Borović, 2014). However, all these studies were mostly focused

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on impact or causality of economic freedom on macroeconomic indicators - economic growth, the level of GDP, productivity, etc. The examination of the impact of economic freedom on the microeconomic indicators was not the subject matter, so this paper has a scientific contribution to that topic.

Economic freedom in the Visegrad Group countries

The Heritage Foundation (HF) annually publishes report about state of economic freedom in the world in form of Index of Economic Freedom (IEF). This is a numerical indicator that ranges between 0 (the lowest degree of economic freedom) and 100 (the highest degree of economic freedom). Index of Economic Freedom is composed from 10 sub-indexes grouped in four pillars: Rule of law, Government size, Regulatory efficiency and Open markets.

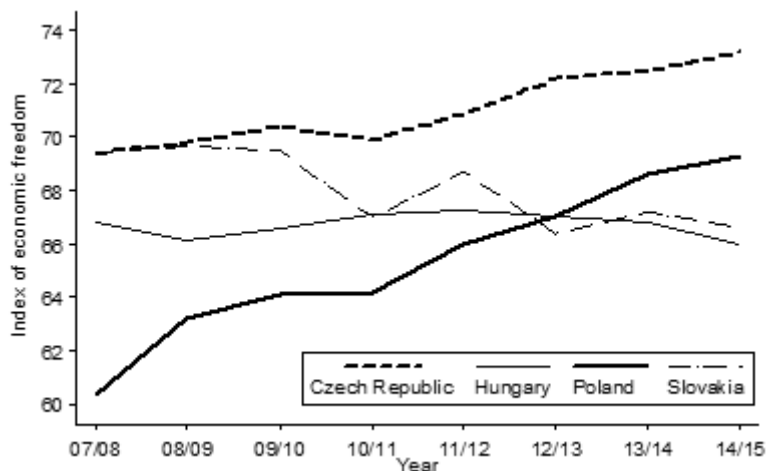
The world average of the economic freedom index over the period from middle 2007 to middle 2015 was 59.89. The average level of freedom during this period in V4 countries was 67.78, which was about European score average (66.7). This result puts V4 countries in the group of “moderately free countries”. The highest degree of economic freedom of 73.2 points was assigned Czech Republic in 2014/2015, and lowest country in the region was Poland in 2007/2008 with the score of 60.3. By criterion of elements of IEF, the highest score of 87,32 points has achieved trade freedom in V4 countries, and the worst situation is in the field of government spending (42.2). This is also characteristic of the European countries average – the highest position has trade freedom (85.62) while the lowest score has government spending (42.62). The weakest aspects of economic freedom for all members of V4 group are: property rights, freedom from corruption, government spending and labor freedom, while notable successes countries was accomplished in aspects of open market, (especially trade freedom, but also investment and financial freedom) and monetary freedom.

As shown in *Figure 1*, Poland has started on the lowest level, but then has achieved the largest improvement in the region, since its economic freedom score was advanced by 9 points (from 60.3 to 69.3). On the other hand, Slovakia’s economic freedom peaked in 2006/2007 and has been on a downward trend ever since (from 70 in 2006/2007 to 66.6 in 2014/2015), mostly due to declines in freedom from corruption, business freedom, labor freedom, and the management of public finance. Czech Republic is the only V4 county that is “mostly free” (69.4 in 2007/2008 to 73.2 in the report

from 2016 which covers period from middle 2014 to middle 2015 year). This trend was led by improvements in investment freedom and property rights, but also because of better fiscal discipline. Although “moderately free” status was driven by good improvement in trade freedom, financial freedom, monetary freedom, fiscal freedom Hungarian government has been struggling with budget deficits that continuously raise public debt.

The analysis also covers the period from 2008 to 2009, which are the years of the beginning and the most expressed effects of world economic crisis. Poland was the only country in Europe to escape recession in 2009, while other V4 countries experience some downturn in economy. According to Miller, Holmes and Feulner (2012), a period of stable and robust economic expansion came to a stop in 2009 in Czech Republic. The global financial crisis mostly hurt economic growth and increased public debt in Hungary while Slovakia has rebounded relatively quickly from the global economic slowdown, but its economic freedom begins downward trend ever since.

Figure 1 Index of economic freedom in V4 countries in the period from middle 2007 to middle 2015

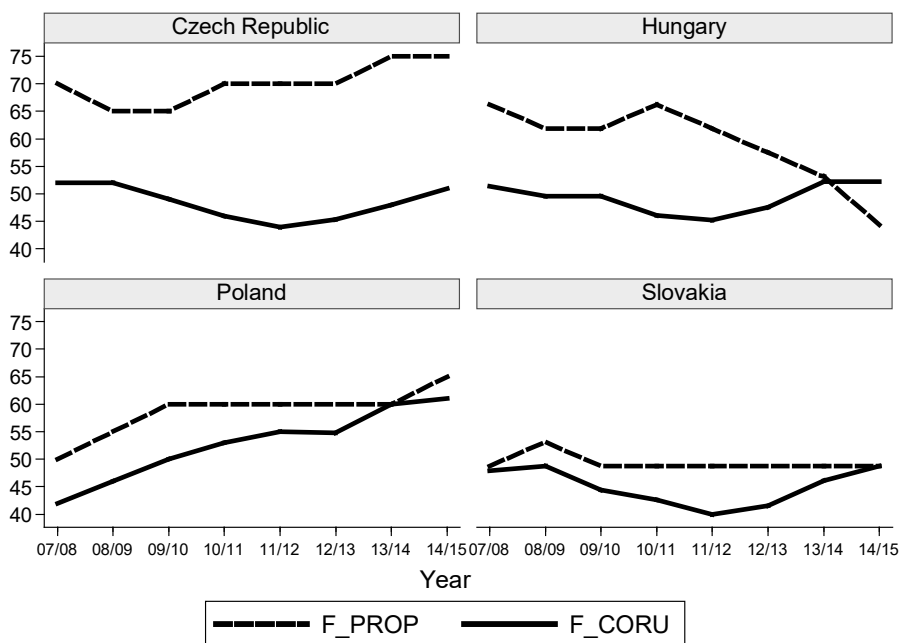


Source: Autor, adjusted according to data from www.heritage.org

The pillar of economic freedom named Rule of law consists of subindexes property rights and freedom from corruption. This segment of economic freedom troubles V4 countries the most, and shows little improvement over time (Figure 2). Corruption especially affects health care, the judiciary, and education in Slovakia, while intimidation of judges, a significant backlog of cases, political interference and years that takes to make court decisions

hurts property rights in this country that is the lowest-ranking country among V4 to criteria of pillar Rule of law. Although Czech Republic has the highest level of property rights, corruption is its weakness that adds to the cost of conducting business. *Fight against corruption* has increasing trend in Poland while the judiciary is independent in this V4 country but slow. Corruption is a serious problem in Hungary. According to the HF report (Miller and Kim, 2016), it was estimated that firms routinely pay bribes of up to 20 percent of a project's value and the judicial independence is increasingly threatened. Since this pillar of index of economic freedom has a lot room for improvement, it continues to be a concern.

Figure 2 Pillar Rule of law, composed of property rights (*F_PROP*) and freedom from corruption (*F_CORU*) in V4 countries in the period from middle 2007 to middle 2015 year

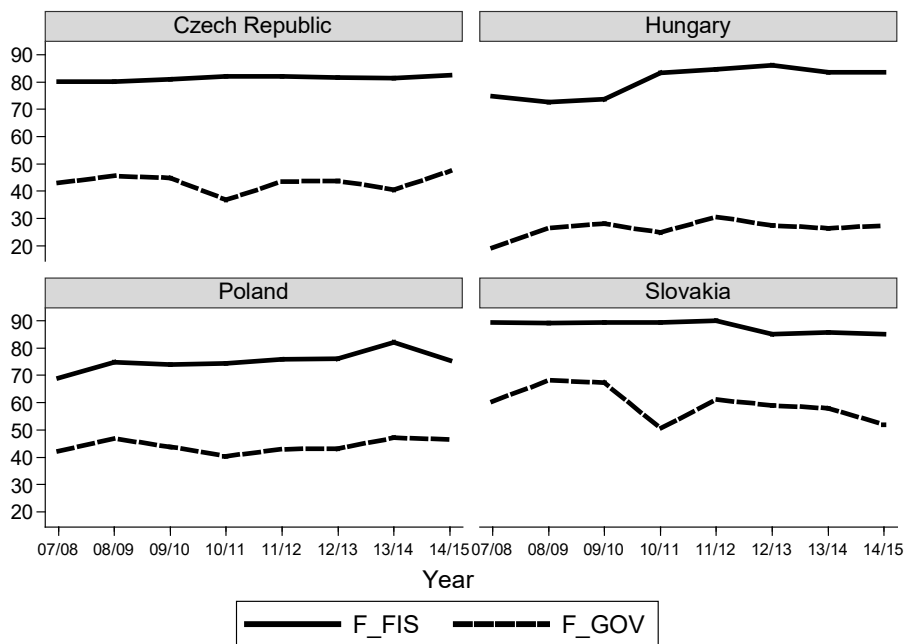


Source: Author, adjusted according to data from www.heritage.org

The second pillar of IEF - Government size, expresses the limitation of the state on the side of government revenue and government expenditure. In many years, and for all countries of the V4, the government budget has been in deficit, driving public debt to an unallowed zone. Fiscal consolidation and better management of public finance are needed to curb a growing debt burden caused by excessive spending (Miller and Holmes, 2011).

Fiscal discipline and budgetary balance so are priority to V4 countries in future period in order to foster economic stability and growth.

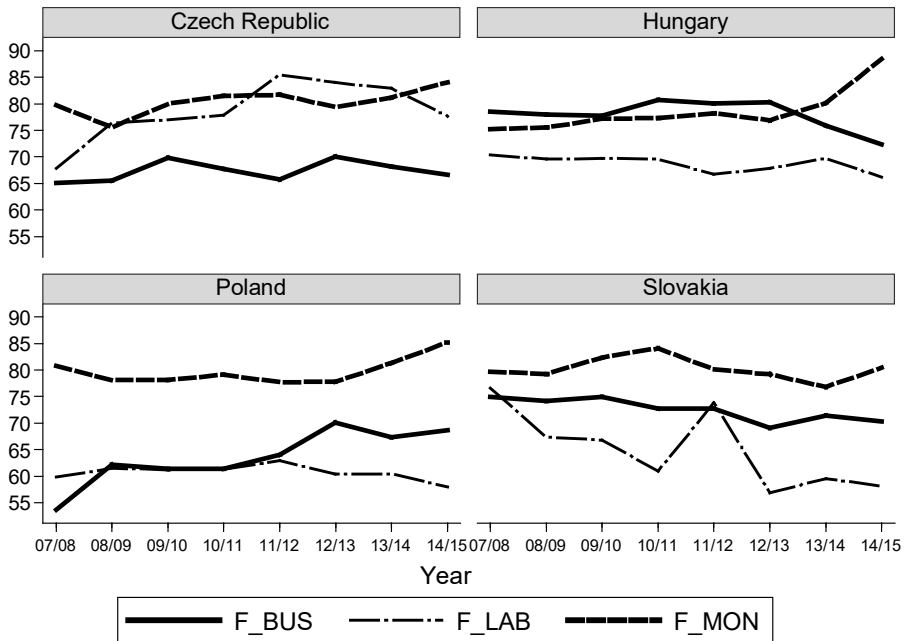
Figure 3 Pillar Government size, composed of fiscal freedom (F_FIS) and government spending (F_GOV) in V4 countries in the period from middle 2007 to middle 2015 year



Source: Author, adjusted according to data from www.heritage.org

As Figure 3 illustrates the fiscal freedom has high position for all V4 countries due to competitive and relatively low tax rates. Corporate tax rates are flat 19 percent in all V4 countries in the most years. From a relatively high income tax in Hungary, it has been cut in half to a flat 16 percent which we see as a grow in fiscal freedom in this country in 2010/11 year. The overall tax burden in this country is around 40 percent of total domestic income. The top individual income tax rate has risen from 19 to 25 percent in Slovakia in 2012/13, while in Poland it remains relatively high - 32 percent; the lowest is in Czech Republic and it amounts 15 percent. Other taxes include a value-added tax (VAT), a property tax, a gift tax, but also the an inheritance tax in Poland and a real estate transfer tax in Czech Republic.

Figure 4 Pillar Regulatory efficiency, composed of business freedom (F_BUS), labor freedom (F_LAB) and monetary freedom (F_MON) in V4 countries in the period from middle 2007 to middle 2015 year

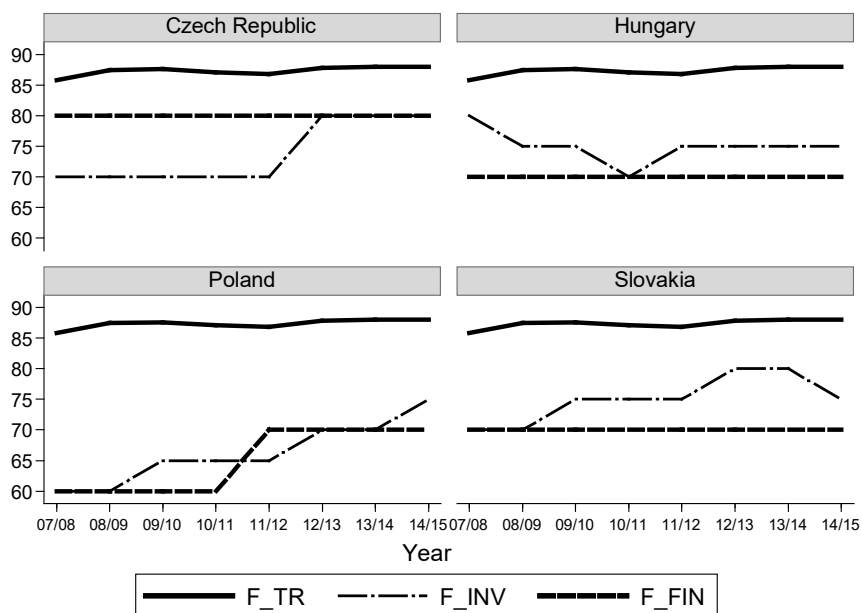


Source: Author, adjusted according to data from www.heritage.org

The biggest interest for our analysis is fact that all countries are participants in the EU's Common Agricultural Policy, so the government subsidizes agricultural production. This distorting the prices of agricultural products. We see that as a lack of monetary freedom, although it is just one component that this element of freedom measures. The other one is price stability, and it could be said that in all V4 countries the inflation has been under control. In many countries it is also present regulation of prices for energy, telecommunications services and subsidies for pharmaceutical products, among others. Poland is the largest recipient of EU subsidies, although the government's transformation of Poland's coal mining sector into a commercially viable industry was pronounced "a textbook case of success in reducing politically sensitive subsidies" (Miller, Kim and Holmes, 2014, p.358). But "...in 2015, due to losses from Russia's food import ban, the government asked the EU to loosen rules on state subsidies for inefficient coal mines and to reinstate export subsidies to Polish pork and milk producers" (Miller and Kim, 2016, p.345).

The labor market lacks flexibility, resulting in an unemployment rate in Slovakia, while Unions exercise considerable influence in Poland. Hungary's restrictions on work hours are rigid and all countries including Czech Republic have high non-salary cost of employees.

Figure 5 Pillar Open markets, composed of trade freedom (F_TR), investment freedom (F_INV) and financial freedom (F_FIN) in V4 countries in the period from middle 2007 to middle 2015 year



Source: Author, adjusted according to data from www.heritage.org

The last one, fourth pillar - Open markets, is the best ranked aspects of economic freedom for the V4 countries (Figure 5). The common for all V4 countries is low trade-weighted average tariff rate with other members of the European Union, but also the layers of non-tariff barriers that increase the cost of trade. Poland's financial sector is one of the region's more advanced, and Slovakia is one of the most popular destinations for foreign direct investment in Europe. The competitive banking sector offers a wider range of financial products in all countries, and foreign and domestic investors are generally treated equally. Nevertheless, in 2012, the Hungarian government amended the constitution to prohibit people from selling their agricultural land to foreigners and since 2010, commercial banks have suffered from higher taxes in this V4 country. All these segments of economic freedom may affect the changes of market prices in the V4 countries, so in the next part of the paper it will be examined their relationship.

Data and methodology

To conduct panel model it was used economic freedom scores from the Heritage Foundation's (HF) Index of Economic Freedom (IEF) and price data for a set of consumer products from a Detailed average prices reports published by Eurostat for Visegrad Group countries (V4). Since actual HF reports from current year, e.g 2017, covers period from the middle of 2015 to the middle of 2016 year, I choose to put IEF in a relationship with the prices from Detailed average prices reports from 2016 year. Following this analogy, the IEF covers period from middle 2007 to middle 2015 (based on the HF reports of economic freedom from 2009 to 2016), while the price data are collected for specific year from 2008 to 2015. The period has been chosen because of the availability of data. All examined prices of goods were presented in a single currency - euro, while IEF is in range from 0 to 100 where the larger number represent the higher level of economic freedom. In the present study, panel data analysis approach was adopted for testing the effect of economic freedom on market prices of basic food products in V4 countries. Analysis included 10 independent and 10 dependent variables, presented and described in Table 1. Before performing panel analysis, it was calculated correlation coefficient in order to provide a priori (but not definite) information concerning the direction of the relationship between variables.

Panel data has two dimensions, combining cross-section and time-series form. Panel data in this research are strongly-balanced that consists of time-series observations ($T=8$) pertaining to countries ($N=4$). For the purpose of making a selection among three basic estimators (pooled ordinary least squares method – OLS, fixed effects model – FE and random effects model – RE) F test, Breusch and Pagan's LM test and Hausman test were used. A Hausman specification test was used in order to verify the choice of FE or RE model, while Breusch and Pagan Lagrangian multiplier test was employed in order to decide between RE or OLS model.

Table 1: Presentation and description of dependent and independent variables

Dependent variables		Independent variables	
Name/Label	Description	Name/Label	Description
Wheat flour Flour	Type: plain, white, all-purpose flour; Q: 750 - 1000g R.Q.: 1000 g	Property rights F_PROP	Ability of individuals to accumulate private property, secured by laws fully enforced by the state.
Loaf of white bread Bread	Type: Made with min. 90 % wheat (white flour) Q: 400 - 800 g R.Q.: 1000 g	Freedom from corruption F_CORU	Assessment of the presence of corruption in business. Included corruption governmental, legal, judicial and administrative corruption.
Pork, cutlet ('escalope') Pork	Type: without bones, fresh (not frozen) R.Q.: 1000 g	Fiscal freedom F_FIS	Fiscal burden on economic activity through heavy taxation.
Whole chicken Chicken	Type: without head and feet, fresh (not frozen) R.Q.: 1 kg	Government spending F_GOV	Level of consumption by the state and all transfer payments related to various entitlement programs as a proportion of GDP.
Fresh milk, unskimmmed Milk	Type: fresh (pasteurized); Fat content: - 2.8 - 4.0; Q: 0.8 - 1.5 l R.Q.: 1 l	Business freedom F_BUS	Individual's right and ability to freely conduct entrepreneurial activities.
Chicken eggs Eggs	Type: Class A; Size - L (large) Q: 6 - 12 eggs R.Q.: 10 eggs	Labour freedom F_LAB	Ability of workers and businesses to interact without restriction by the state.
Butter Butter	Type: not salted Q: 200 - 250 g R.Q.: 250 g	Monetary freedom F_MON	Stable inflation and market-determined prices.
Vegetable oil Oil	Type: for cooking; in bottle Q: 0.5 - 1 l R.Q.: 1 l	Trade freedom F_TR	The absence of tariff and non-tariff barriers that affect international trade in goods and services.
White sugar Sugar	Type: fine, granulated Q: approx. 1000 g R.Q.: 1000 g	Investment freedom F_INV	Free flow of capital in both domestic and international investment.
Coffee Coffee	Type: roasted, blend Q: 200 - 300g R.Q.: 1000 g	Financial freedom F_FIN	Ability of diversified savings, credit, payment and investment services to individuals and efficient financial intermediation.

Source: Eurostat's Detailed average prices reports for dependent variables and Chang, Kim and Kim (2015), according to Cebula (2011), Gassebner, Gaston and Lamla (2011) and Peláez (2009) for independent variables; Q – Quantity; R.Q. - Reference quantity;

Empirical results

Summary statistics of dependent variables was presented in Table 2, namely: number of observation, mean, standard deviation, minimum and maximum values.

Table 2: *Descriptive statistics for dependent variables*

Variable	Obs	Mean	Std. Dev.	Min	Max
Flour	32	.4915625	.0860648	.32	.69
Bread	32	1.014375	.1722702	.71	1.27
Pork	32	4.141875	.61894	2.89	5.15
Chicken	32	2.344063	.3892247	1.64	2.97
Milk	32	.7596875	.1058143	.57	.96
Eggs	32	1.289063	.2976072	.92	2.14
Butter	32	1.58	.4000081	.86	2.25
Oil	32	1.599063	.2045666	1.3	2.06
Sugar	32	.8490625	.1744366	.53	1.21
Coffee	32	9.528125	1.571142	5.27	12.22

Source: *Authors' calculations*

Table 3 reports Pearson correlation coefficients among all independent variables. The correlation analysis is performed in order to identify the variables that are highly related to each other. Since there is no correlation that exceeds 0.80, it could be said that there is no multicollinearity. The correlation analysis between dependent and independent variables is presented in Table 4. Positive and significant correlations is found between fiscal freedom and dependent variables pork, oil and sugar (0.3900, 0.4682, 0.4014, respectively), as well as between business freedom and pork (0.4920), chicken (0.6694) and butter (0.6393). Highly positively correlated are investment freedom and pork (0.6247), chicken (0.7242), butter (0.6424) and coffee (0.4336). Pork, chicken and coffee also have positive correlation with financial freedom (0.4341, 0.4509, 0.3923 respectively). Negative correlation coefficients are found between independent variable property right and dependent variables bread (-0.6166) and eggs (-0.5004). Freedom from corruption also accomplish negative correlation with pork, chicken, milk, eggs, oil and sugar (-0.5111, -0.3753, -0.5272, -0.3766, -0.456, -0.6129, respectively). Government spending correlates negatively with flour (-0.3503) and labor freedom with bread (-0.5412), which also have negative correlation with financial freedom (-0.3835). Flour (-0.3750) and sugar (-0.3804) are in negative correlation with trade freedom.

Table 3: Correlation coefficient between sub-indexes of Index of economic freedom²

	F_PROP	F_CORU	F_FIS	F_GOV	F_BUS	F_LAB	F_MON	F_TR	F_INV	F_FIN
F_PROP	1.0000	0.2486	0.5216	0.0195	0.5172	0.0001	0.4391	0.8127	0.4053	0.0005
F_CORU	0.2100	1.0000	0.1345	0.1462	0.8167	0.3252	0.5969	0.1650	0.7986	0.9471
F_FIS	-0.1176	-0.2704	1.0000	0.0009	0.4300	0.1023	0.0489	0.3397	0.0997	0.0037
F_GOV	-0.4109	-0.2628	0.5578	1.0000	0.0287	0.5447	0.2080	0.6917	0.6739	0.9470
F_BUS	0.1188	0.0426	0.1445	-0.3868	1.0000	0.5654	0.0620	0.5349	0.0007	0.2855
F_LAB	0.6235	-0.1796	0.2941	-0.1112	0.1055	1.0000	0.7426	0.4940	0.3630	0.0000
F_MON	-0.1417	0.0971	0.3510	0.2287	-0.3337	0.0604	1.0000	0.2554	0.8902	0.3595
F_TR	-0.0436	0.2515	0.1744	0.0729	0.1139	-0.1254	0.2071	1.0000	0.0445	0.5970
F_INV	0.1523	-0.0470	0.2963	-0.0774	0.5679	0.1663	0.0254	0.3576	1.0000	0.0056
F_FIN	0.5768	-0.0122	0.4983	0.0122	0.1947	0.7220	0.1675	0.0971	0.4784	1.0000

Source: Authors' calculations

²In Table 3, p-values are represented by the upper triangular matrix while the correlation coefficients are presented in the lower triangular matrix.

Table 4: Correlation coefficient between independent and dependent variables ³

	F_PROP	F_CORU	F_FIS	F_GOV	F_BUS	F_LAB	F_MON	F_TR	F_INV	F_FIN
Flour	0.1670	0.0995	-0.2467	-0.3503	-0.0495	-0.2466	-0.0946	-0.3750	-0.1540	-0.2685
	0.3611	0.5878	0.1735	0.0494	0.7881	0.1737	0.6066	0.0345	0.3999	0.1374
Bread	-0.6166	-0.2506	0.2837	0.5392	0.0635	-0.5412	-0.0170	-0.1642	0.0913	-0.3835
	0.0002	0.1666	0.1155	0.0015	0.7297	0.0014	0.9265	0.3693	0.6191	0.0302
Pork	-0.0143	-0.5111	0.3900	-0.0499	0.4920	0.3366	-0.1765	-0.2845	0.6247	0.4341
	0.9379	0.0028	0.0273	0.7863	0.0042	0.0596	0.3338	0.1146	0.0001	0.0131
Chicken	0.1493	-0.3753	0.242	-0.3191	0.6694	0.3366	-0.2167	-0.1109	0.7242	0.4509
	0.4147	0.0343	0.1821	0.075	0	0.0596	0.2336	0.5458	0	0.0096
Milk	-0.0973	-0.5272	0.1795	-0.1018	0.1913	-0.026	-0.0525	-0.1556	0.5411	0.1308
	0.5963	0.0019	0.3257	0.5795	0.2943	0.8875	0.7754	0.3952	0.0014	0.4756
Eggs	-0.5004	-0.3766	0.2098	0.3499	-0.0066	-0.4277	-0.0939	0.0945	0.3177	-0.172
	0.0035	0.0336	0.2491	0.0496	0.9715	0.0146	0.6093	0.6071	0.0764	0.3467
Butter	-0.3359	-0.2748	0.1193	-0.2188	0.6393	-0.2293	-0.1635	0.0511	0.6424	-0.0715
	0.0602	0.128	0.5154	0.2288	0.0001	0.2068	0.3713	0.7813	0.0001	0.6974
Oil	-0.3003	-0.456	0.4682	0.3438	0.2817	-0.1517	-0.1145	-0.0185	0.2357	-0.056
	0.095	0.0087	0.0069	0.054	0.1183	0.4072	0.5326	0.9199	0.194	0.7609
Sugar	-0.06	-0.6129	0.2945	0.0446	0.2221	0.0473	-0.2805	-0.3804	0.061	0.0042
	0.7445	0.0002	0.1018	0.8083	0.2218	0.797	0.12	0.0317	0.7403	0.9819
Coffee	0.1947	-0.2765	0.4014	0.1813	-0.0731	0.1698	0.221	0.093	0.4336	0.3923
	0.2856	0.1255	0.0228	0.3207	0.6911	0.3529	0.2242	0.6129	0.0132	0.0264

Source: Authors' calculations

³In Table 4, correlation coefficients between variables are in upper row while p-values are placed in second row for each variable.

In next section data will be analysed by using an econometric panel data model. *An appropriate way of carrying out evaluation of price determinants for Flour, Milk, Eggs, Butter, Oil and Sugar was pooled ordinary least squares method (OLS) according to LM test, while Hausman specification test results have indicated fixed effects model (FE) for the variable Bread, Pork, Chicken and Coffee (Table 5).*

Table 5: Hausman test and LM test

Model	Dependent Variable	Hausman test		Models for the panel analysis	LM test		Models for the panel analysis
		chi2 (10)	Prob > chi2		chibar2 (01)	Prob > chibar2	
Model 1	Flour	15.97	0.1005	Random	0.00	1.0000	OLS
Model 2	Bread	26.77	0.0028	Fixed	/	/	Fixed
Model 3	Pork	19.24	0.0373	Fixed	/	/	Fixed
Model 4	Chicken	56.83	0.0000	Fixed	/	/	Fixed
Model 5	Milk	3.19	0.9765	Random	0.00	1.0000	OLS
Model 6	Eggs	12.94	0.2271	Random	0.00	1.0000	OLS
Model 7	Butter	15.85	0.1039	Random	0.00	1.0000	OLS
Model 8	Oil	11.34	0.3319	Random	0.00	1.0000	OLS
Model 9	Sugar	7.66	0.6624	Random	0.00	1.0000	OLS
Model 10	Coffee	23.27	0.0098	Fixed	/	/	Fixed

Source: Authors' calculations

The panel data models for analyzing the effect of economic freedom on price of chosen basic food products in V4 countries are presented in following tables (from Table 6 to Table 15). Regressions are computed using the OLS and FE techniques. For all models, the coefficients F-statistics indicating (in)significance of the coefficient at 5%.

Table 6: Model 1 (OLS) – dependent variable Flour

Flour	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.0067503	.002343	2.88	0.009	.0018776	.0116229
F_CORU	.0006281	.002981	0.21	0.835	-.0055713	.0068274
F_FIS	.0134391	.0049838	2.70	0.014	.0030748	.0238033
F_GOV	-.0045295	.0017083	-2.65	0.015	-.0080821	-.0009769
F_BUS	-.0058498	.003501	-1.67	0.110	-.0131305	.0014309
F_LAB	-.0058185	.0024136	-2.41	0.025	-.0108378	-.0007992
F_MON	-.0004888	.0048607	-0.10	0.921	-.0105972	.0096196
F_TR	-.0603535	.0192095	-3.14	0.005	-.1003019	-.0204052
F_INV	.0041416	.0033831	1.22	0.234	-.002894	.0111772
F_FIN	-.0083369	.0041114	-2.03	0.055	-.016887	.0002131
cons	5.587407	1.586109	3.52	0.002	2.288912	8.885902
F (10, 21) = 3.46		Prob > F = 0.0079			R ² = 0.6224 AdjR ² =0.4426	

Source: Authors' calculations

According to the F test, Model 1 (Table 6) fits the data ($F=3.46$ and $p<0.0079$). R^2 is 0.4426, which means that this model covers 44.26% of the variance of the dependent variable Flour. The variables F_PROP, F_FIS, F_GOV, F_LAB and F_TR contribute significantly to this model ($p = 0.009, 0.014, 0.015, 0.025, 0.005$ respectively), although F_GOV, F_LAB and F_TR have negative impact.

Table 7 presents regression computed by OLS technique, where dependent variable is Bread. Model 2 covers 69.88% of the variance of the dependent variable Bread (R^2 between = 0.6988).⁴ Only F_PROP ($p=0.047$) positively and F_TR ($p=0.037$) negatively influence the dependent variable Bread.

Table 7: Model 2 (FE) – dependent variable Bread

Bread	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.00769	.0036134	2.13	0.047	-.0000986	.0152814
F_CORU	-.0029501	.0035675	-0.83	0.419	-.0104452	.004545
F_FIS	.0096733	.0050839	1.90	0.073	-.0010075	.0203541
F_GOV	-.0051429	.0034614	-1.49	0.155	-.0124151	.0021293
F_BUS	-.0059361	.0071437	-0.83	0.417	-.0209444	.0090722
F_LAB	-.001907	.0027878	-0.68	0.503	-.0077639	.0039499
F_MON	.0024577	.0048695	0.50	0.620	-.0077727	.012688
F_TR	-.0491725	.0218706	-2.25	0.037	-.0951209	-.0032242
F_INV	.0026051	.0040451	0.64	0.528	-.0058934	.0111036
F_FIN	.0081836	.0074139	1.10	0.284	-.0073924	.0237596
_cons	4.020764	1.856103	2.17	0.044	.1212356	7.920293
F (3, 18) = 8.35		Prob > F = 0.0011			R ² (within) = 0.5862 R ² (between) = 0.6988	

Source: Authors' calculations

Examination of the impact to price of pork is presented in Model 3 (Table 8). The explanatory power of the Model 3 is 84.30% (R^2 within). Variable Pork depends positively and statistical significantly from independents F_FIS ($p=0.018$) and F_INV ($p=0.000$), and have strong negative effects from F_TR ($p=0.000$) but also from F_GOV ($p=0.007$) and F_MON ($p=0.010$).

Fixed effect Model 4 has much larger part of the variation in prices within countries, so the value of R^2 (within) is 0.8248 meaning that model covers 82.48% of the variance of the dependent variable Chicken (Table 9).

⁴Since the regression model explains a much larger part of the variation in prices between countries, it is presented the value of R^2 (between).

Table 8: Model 3 (FE) – dependent variable Pork

Pork	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	-.0150151	.0086707	-1.73	0.100	-.0332316	.0032014
F_CORU	-.0113215	.0085607	-1.32	0.203	-.029307	.0066639
F_FIS	.0317603	.0121994	2.60	0.018	.0061302	.0573903
F_GOV	-.02534	.0083062	-3.05	0.007	-.0427906	-.0078894
F_BUS	-.017519	.0171422	-1.02	0.320	-.0535334	.0184953
F_LAB	.0095093	.0066896	1.42	0.172	-.004545	.0235637
F_MON	-.0334391	.0116849	-2.86	0.010	-.0579882	-.00889
F_TR	-.3266842	.0524812	-6.22	0.000	-.4369431	-.2164253
F_INV	.0524479	.0097068	5.40	0.000	.0320546	.0728411
F_FIN	.0005337	.0177905	0.03	0.976	-.0368428	.0379103
_cons	32.09683	4.453955	7.21	0.000	22.73942	41.45424
F (3, 18) = 5.74		Prob > F = 0.0061			R ² (within) = 0.8430 R ² (between) = 0.7526	

Source: Authors' calculations

Dependent variables F_FIS (p=0.018), and F_INV (p=0.000) are found to have a significantly positive effect on Chicken, while F_CORU, F_GOV, F_BUS, F_MON and F_TR (p= 0.012, 0.017, 0.011, 0.046, 0.005, respectively) is showing negative relationship with dependant variable (Table 9).

Table 9: Model 4 (FE) – dependent variable Chicken

Chicken	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.0068494	.0044193	1.55	0.139	-.0024353	.016134
F_CORU	-.0121786	.0043633	-2.79	0.012	-.0213455	-.0030118
F_FIS	.0161901	.0062178	2.60	0.018	.0031269	.0292533
F_GOV	-.011112	.0042335	-2.62	0.017	-.0200063	-.0022177
F_BUS	-.0247519	.0087371	-2.83	0.011	-.0431078	-.006396
F_LAB	.0039534	.0034096	1.16	0.261	-.0032099	.0111166
F_MON	-.0127403	.0059556	-2.14	0.046	-.0252526	-.0002281
F_TR	-.0844432	.0267488	-3.16	0.005	-.1406402	-.0282461
F_INV	.0255508	.0049474	5.16	0.000	.0151568	.0359449
F_FIN	.0161043	.0090675	1.78	0.093	-.0029459	.0351545
_cons	8.569364	2.270104	3.77	0.001	3.800052	13.33868
F (3, 18) = 13.81		Prob > F = 0.0001			R ² (within) = 0.8248 R ² (between) = 0.3125	

Source: Authors' calculations

Model 5 (Table 10) fits the data ($F=9.36$ and $p<0.0000$) and it covers 81.68% of the variance of the dependent variable Milk. As in previous model (4), only F_FIS ($p=0.021$) and F_INV ($p=0.000$) are found to have a significantly positive impact on dependent variable Milk, while F_CORU , F_GOV , F_BUS , F_TR and this time F_LAB is showing negative relationship with dependant variable ($p=0.001$, 0.001 , 0.004 , 0.006 , 0.040 , respectively).

Table 10: *Model 5 (OLS) – dependent variable Milk*

Milk	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	-.0004236	.0020064	-0.21	0.835	-.0045962	.003749
F_CORU	-.0099716	.0025527	-3.91	0.001	-.0152803	-.0046628
F_FIS	.0106605	.0042678	2.50	0.021	.0017852	.0195358
F_GOV	-.0056318	.0014629	-3.85	0.001	-.008674	-.0025896
F_BUS	-.0096266	.002998	-3.21	0.004	-.0158614	-.0033919
F_LAB	-.0045234	.0020668	-2.19	0.040	-.0088216	-.0002252
F_MON	-.0043118	.0041624	-1.04	0.312	-.012968	.0043444
F_TR	-.049857	.0164498	-3.03	0.006	-.0840664	-.0156477
F_INV	.016383	.0028971	5.65	0.000	.0103581	.0224079
F_FIN	-.0011603	.0035207	-0.33	0.745	-.008482	.0061615
_cons	5.240542	1.358248	3.86	0.001	2.415912	8.065173
F (10, 21) = 9.36		Prob > F = 0.0000			R ² = 0.8168 Adj R ² = 0.7296	

Source: *Authors' calculations*

The explanatory power of the Model 6 (Table 11) is 72.96%, and it fits the data ($F=4.17$ and $p<0.0028$). In model 6, F_INV have positive and statistically significant coefficients ($p=0.010$), F_LAB has negative effect on dependent variable Eggs ($p=0.049$), while other variables are not significant throughout specification.

Table 11: Model 6 (OLS) – dependent variable Eggs

Eggs	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	-.0086634	.0076279	-1.14	0.269	-.0245266	.0071997
F_CORU	-.0160512	.0097048	-1.65	0.113	-.0362335	.004131
F_FIS	.017477	.0162249	1.08	0.294	-.0162645	.0512186
F_GOV	-.0017675	.0055614	-0.32	0.754	-.0133331	.0097982
F_BUS	-.0209177	.0113977	-1.84	0.081	-.0446204	.0027851
F_LAB	-.0164407	.0078575	-2.09	0.049	-.0327814	-.0001001
F_MON	-.0279989	.0158243	-1.77	0.091	-.0609074	.0049096
F_TR	-.0221287	.0625377	-0.35	0.727	-.1521829	.1079255
F_INV	.0311984	.011014	2.83	0.010	.0082935	.0541032
F_FIN	.0017209	.0133848	0.13	0.899	-.0261142	.0295561
_cons	5.628304	5.163674	1.09	0.288	-5.110145	16.36675
F (10, 21) = 4.17		Prob > F = 0.0028			R ² = 0.6653 Adj R ² = 0.5060	

Source: Authors' calculations

Four sub-indexes have shown significant impact on dependent variable Butter (Table 12). That are F_PROP (p= 0.006), F_CORU (p=0.034), F_GOV (p=0.003) and F_INV (p=0.000), but just last one has positive influence. Model 7 fits the data (F=17.0 and p<0.0000) and the explanatory power of the model is high 83.77%.

Table 12: Model 7 (OLS) – dependent variable Butter

Butter	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	-.0178518	.0058765	-3.04	0.006	-.0300726	-.005631
F_CORU	-.0169048	.0074765	-2.26	0.034	-.0324529	-.0013566
F_FIS	.018222	.0124995	1.46	0.160	-.0077721	.0442161
F_GOV	-.0144229	.0042845	-3.37	0.003	-.023333	-.0055129
F_BUS	.0114567	.0087806	1.30	0.206	-.0068037	.029717
F_LAB	-.0080958	.0060534	-1.34	0.195	-.0206844	.0044928
F_MON	-.0081127	.0121909	-0.67	0.513	-.033465	.0172396
F_TR	-.0954486	.0481783	-1.98	0.061	-.195641	.0047438
F_INV	.0479047	.0084851	5.65	0.000	.0302591	.0655503
F_FIN	-.0098287	.0103115	-0.95	0.351	-.0312726	.0116152
_cons	8.617843	3.978039	2.17	0.042	.3450578	16.89063
F (10,21) = 17.00		Prob > F = 0.0000			R ² = 0.8900 Adj R ² = 0.8377	

Source: Authors' calculations

Just two sub-indexes have statistically significant coefficients: F_CORU ($p=0.073$) and F_FIS ($p=0.062$) in relationship with the dependent variable Oil. Model 8 (Table 13) fits the data ($F=2.87$ and $p<0.0200$), but the explanatory power of the model is rather small 37.66%.

Table 13: Model 8 (OLS) – dependent variable Oil

Oil	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.0044764	.0058898	0.76	0.456	-.007772	.0167249
F_CORU	-.0141199	.0074934	-1.88	0.073	-.0297034	.0014635
F_FIS	.0247471	.0125278	1.98	0.062	-.0013059	.0508001
F_GOV	.00207	.0042942	0.48	0.635	-.0068602	.0110002
F_BUS	.0076803	.0088005	0.87	0.393	-.0106215	.025982
F_LAB	-.0074306	.0060671	-1.22	0.234	-.0200478	.0051865
F_MON	-.0076034	.0122185	-0.62	0.540	-.0330132	.0178064
F_TR	-.0265725	.0482875	-0.55	0.588	-.1269919	.073847
F_INV	.0053113	.0085043	0.62	0.539	-.0123744	.0229969
F_FIN	-.0103213	.0103348	-1.00	0.329	-.0318138	.0111711
_cons	3.225921	3.987054	0.81	0.428	-5.065612	11.51745
F (10, 21) = 2.87		Prob > F = 0.0200			R ² = 0.5777 Adj R ² = 0.3766	

Source: Authors' calculations

In Table 14 is presented Model 9 that examines impact of 10 sub-indexes on the dependent variable Sugar. While F test shows that model fits the data ($F = 4.31$ and $p<0.0023$), the model covers 51.60% of the variance of the dependent variable Sugar. Variables F_CORU and F_TR have negative sign, while F_FIS positively impact on dependent variable.

Table 14: Model 9 (OLS) – dependent variable Sugar

Sugar	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.0056758	.0044251	1.28	0.214	-.0035268	.0148784
F_CORU	-.0185983	.00563	-3.30	0.003	-.0303065	-.0068901
F_FIS	.0265049	.0094125	2.82	0.010	.0069306	.0460792
F_GOV	-.0048851	.0032263	-1.51	0.145	-.0115946	.0018244
F_BUS	-.0002884	.0066121	-0.04	0.966	-.0140389	.0134622
F_LAB	-.0071041	.0045583	-1.56	0.134	-.0165837	.0023755
F_MON	-.0132496	.0091801	-1.44	0.164	-.0323406	.0058414
F_TR	-.0792955	.0362796	-2.19	0.040	-.1547431	-.003848
F_INV	.0013419	.0063895	0.21	0.836	-.0119458	.0146295
F_FIN	-.0058605	.0077648	-0.75	0.459	-.0220083	.0102874
_cons	8.335299	2.995572	2.78	0.011	2.105667	14.56493
F (10, 21) = 4.31		Prob > F = 0.0023			R ² = 0.6721 Adj R ² = 0.5160	

Source: Authors' calculations

The last one, Model 10, shows positive and significant effect of four elements of economic freedom on dependent variable Coffee (F_PROP, F_FIS, F_INV and F_FIN), and three sub-indexes (F_CORU, F_GOV and F_BUS) affect it negatively (Table 15). The model with the greater R-squared value is „within“, so it covers 75.65% of the variance of the dependent variable Coffee.

Table 15: *Model 10 (FE) – dependent variable Coffee*

Coffee	Coef.	Std. Err.	t	P> t	95% Conf. Interval	
F_PROP	.1511996	.052992	2.85	0.011	.0398676	.2625315
F_CORU	-.1759892	.0523198	-3.36	0.003	-.2859089	-.0660694
F_FIS	.204833	.074558	2.75	0.013	.0481926	.3614735
F_GOV	-.1308874	.0507639	-2.58	0.019	-.2375383	-.0242364
F_BUS	-.311204	.1047661	-2.97	0.008	-.5313094	-.0910987
F_LAB	.0259248	.0408842	0.63	0.534	-.0599698	.1118193
F_MON	.0003736	.0714135	0.01	0.996	-.1496605	.1504077
F_TR	.2089335	.3207441	0.65	0.523	-.4649248	.8827918
F_INV	.1274308	.0593241	2.15	0.046	.0027955	.2520661
F_FIN	.3432781	.1087287	3.16	0.005	.1148476	.5717085
_cons	-33.53672	27.22079	-1.23	0.234	-90.72548	23.65203
F (3, 18) = 7.16		Prob > F = 0.0023			R ² (within) = 0.7565 R ² (between) = 0.3429	

Source: *Authors' calculations*

Discussion and conclusion

In this study, the effect of economic freedom on market prices of basic food products was tested for four *Visegrad Group countries* over the period from middle 2007 to middle 2015 by utilizing panel data. Carried out based on index of economic freedom by Heritage foundation, the fixed effects model and *pooled ordinary least squares* estimation coefficients exhibit different signs and the variables are not significant in all models regressions.

While protection of property rights showed different effects, the increase of freedom from corruption would lower the price of food products (and vice versa), what already has been indicated from the correlation analysis. Confirming the results of the correlation analysis, fiscal freedom has shown to has a significant positive effect on most food products. This result was expected, considering that lower taxes burden means lower prices of goods. The second element of the pillar government size, government spending,

was found to have negative impact on prices of six products. The high level of government spending, that is characteristic of all V4 countries, means a lower level of economic freedom, that is shown to affect negatively on prices of basic food products. In both analysis, correlative and panel, elements of the pillar regulatory efficiency, did not show statistically significant results. One sub-index of that pillar – monetary freedom, has indicate to have negative and statistical significant effects on prices of meat, meaning that rise of monetary freedom affect prices of meat to go down. This is not surprise at all, considering that lack of monetary freedom means price control by the state including subsidies that lower prices. Trade freedom has negative sign in regressions with prices of six food products. This means that openness of market and absence of tariff and non-tariff barriers are foundation of Visegrad and European union are manifested in drop of the prices of most of food products in grouped counties. On the other hand, investment freedom accomplish positive effect on prices of six food products, meaning that rise of investment freedom leads to higher prices in V4 countries. To conclude, most susceptible to different (positive and negative) impact of economic freedom are chicken, milk and coffee (seven elements of economic freedom affects them).

In the scientific community, it is (still) a big dilemma whether economic freedom is positive or negative category. This requires more research in order to prove and provide relevant evidence of impact of economic freedom especially on the microeconomic indicators.

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