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FOREIGN DIVESTMENT RISK FACTORS IN POLAND DURING THE COVID-19 PANDEMIC

The article is aimed at putting in order factors decisive for the risk of foreign divestment in Poland during the COVID-19 pandemic. The research covered factors regarding market, cost, industry, law, and political factors that can be important for the assessment of the risk of divestment and was based on a conjoint analysis. Such an analysis allowed for estimating the partial utilities of the surveyed companies and the subsequent calculation of the importance level of variables which represent the determinants of divestment risk. In addition, estimated partial utilities enabled the preliminary segmentation of foreign investors according to their similar preferences as to the evaluation of investment risk factors during the pandemic. Research was based on the results of a survey conducted among investors engaged in FDI in Poland with the assumption of two hypothetical scenarios of the development of the COVID-19 pandemic: optimistic and pessimistic. Based on the obtained results, it can be concluded that, irrespective of how the pandemic develops, divestment in services bears the greatest risk. The number of factors which are considered to be important determinants of foreign divestment increases along with the pessimistic scenario of the pandemic's development including, for example, cost factors and FDI in various economic sectors.

Keywords: conjoint analysis, survey, FDI, divestment, COVID-19

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1. INTRODUCTION

Poland has been perceived as an attractive region for foreign direct investments (FDIs) for a long time. However, the COVID-19 pandemic has led to considerable restrictions on operations in certain industries or economic sectors in Poland and in many other countries. This has obviously also affected FDIs in Poland. It should be remembered that the corona crisis triggered by the COVID-19 pandemic affects not only the investor's country but also the host country of FDI. The deterioration of the general investment climate forced many foreign investors to restrict even more or suspend investments in industries which are more sensitive to the effects of the

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pandemic. The restrictions imposed on business inclined many investors to their recalculate investment risk. Divestment is one of the possible methods of reducing losses in investment activities. It usually involves abandoning part or all of an enterprise's operations or a complete transfer of an enterprise by its investor (Borga et al., 2019; Martins and Esteves, 2008; Shin, 2000). Most frequently, divestment takes the form of a change of ownership (co-ownership) of a business as total liquidation is rare. The research carried out so far suggests that the risk of divestment generally increases during global or local economic crises. Therefore, the analysis of this phenomenon in the corona crisis era is definitely justified. The article is aimed at presenting the hierarchy of factors that influence the risk of foreign divestment in Poland during the COVID-19 pandemic. The research includes factors regarding market, cost, industry, law, as well as political factors.

The conjoint analysis is the research tool used in this paper, and its application allows for estimating the partial utilities of the surveyed investors and the subsequent calculation of the importance level of variables which represent the determinants of divestment risk. In addition, the estimated partial utilities enabled the preliminary segmentation of foreign investors according to their similar preferences as to the evaluation of investment risk factors during the pandemic. Data for calculations came from a questionnaire administered in September and October of 2020 among foreign businesses which invest in Poland.

2. LITERATURE REVIEW

There is a relatively extensive literature on the determinants of foreign direct investment (Dunning, 2004; Fry, 1993; Jun and Singh, 1996, Mottaleb, 2007), whereas research on divestment is less elaborate. Researchers mostly diagnose the causes of divestment and assess their scale and consequences. The determinants of foreign direct investments are most frequently sought and their contribution is evaluated (Norbäck et al., 2015; Berry, 2010; Sembenelli and Vannoni, 2003; Shimizu and Hitt, 2005; Bergh, 1997; Hamilton and Chow, 1993). In many cases, researchers proved that divestment factors are the same as determinants of FDI, but the direction of the change of these factors opposite to the direction in the case of increased chances of the inflow of FDI is decisive for an increased risk of divestment (Borga et al., 2019; Martins and Esteves, 2008; Shin, 2000). For example, Boddewyn (1983) used Dunning's eclectic paradigm in the analysis of divestment factors. The divestment process is also explained using the product lifecycle. According to Harrigan (1982), maturing industries are characterised by a greater production capacity but a slow increase in demand, which provides ideal conditions for divestment. Divestment factors are often considered in literature at the level of company, industry and the entire economy. The research mostly uses econometric modelling which helps analyse the odds of divestment. Borga et al. (2019) applied linear regression models with binary dependent variables. More advanced probit models were used, for example,

by Norbäck et al. (2015), whereas Georgopoulos and Sogiakas (2019) applied the survival analysis and logit regression models.

In various studies, the importance of determinants characteristic of the parent company and its affiliates are emphasised (Norbäck et al., 2015; Berry, 2010; Sembenelli and Vannoni, 2003; Shimizu and Hitt, 2005). Researchers proved that the size of the affiliate or the parent is closely associated with divestment. Studies also confirmed that poor results of the mother company (investor) in host countries of FDIs may also be conducive to divestment (Norbäck et al., 2015; Berry, 2010; Sembenelli and Vannoni, 2003; Shimizu and Hitt, 2005; Berry, 2013; Markides, 1992). Higher salaries and wages, and increased employee skills (requiring the appropriate financial reward) may reduce product competitiveness and incline investors to divest (Berry, 2010; Norbäck et al., 2015). Divestment factors are considered at industry level. They include, for example, the dynamics of economic growth, the degree of industry concentration, technological and institutional changes, and the level of internationalisation. The effect of changes in GDP on divestment by sectors is not clearly proven (Berry, 2010; Sembenelli and Vannoni, 2000). Jovanovic and MacDonald (1994) proved that technological changes increase the odds of divestment, while Norbäck et al. (2015) and Chatterjee et al. (2003) argued that institutional changes at sector level increase the chances of divestment. Divestment factors at macroeconomic level include GDP, level of economic openness, level of salaries and wages, currency exchange rates, inflation, political stability, membership of a country in economic associations, free trade zones and others. A negative relation between economic growth and divestment was proved by various researchers, together with the fact that a greater openness of an economy encourages divestment (Norbäck et al., 2015; Blake and Moschieri, 2017; Berry, 2010).

The above review of research results concerns divestment risk factors during the period before the COVID-19 pandemic, but the corona crisis is of a different nature and does not resemble previous financial crises. In this case, weights attributed by investors to divestment factors may be different, but there also appear new corona factors which have not been noted in classic economic crises.

For this reason, an assessment of divestment risk factors during the pandemic and placing them in a hierarchical order are necessary. This study is an attempt to do so with the use of a conjoint analysis. The research may be considered preliminary as it opens the way to further and deeper analyses of divestment factors during the corona crisis era.

3. RESEARCH METHODOLOGY

The conjoint procedure which, in principle, is a method for the classification and analysis of data, and uses a decompositional approach to the measurement of preferences of respondents was applied in research (Walesiak and Bąk, 2000). The respondents evaluated the set of profiles described with the use of selected explanatory variables (attributes). Profiles were built for actual or hypothetical products and

services, assessed by the respondents. The information obtained regarding their total preferences as to the distinguished profiles formed a set of values of the dependent variable. The next stage of the conjoint analysis involved a calculation of partial utilities of attribute levels based on the decomposition of total utilities carried out in response to the results of preference evaluations. The research also used other variants of data decomposition, such as the self-explanatory data method or a hybrid approach which combined the decompositional and compositional approaches (Green and Wind, 1975). The values of a dependent variable resulted from the direct assessment by the respondents and their preferences, and represent the attribution levels used to describe objects. A conjoint analysis was adopted in this research for the purpose of analysing the risk of foreign divestment. The assessed categories were selected divestment determinants, while three levels of divestment risk were attributes for each of these: low [A], medium [B] and high [C]. The dependence between the variable (Y_k) which is an expression of preferences of *k*-th respondent and divestment risk resulting from each of these factors (X_p) was described using the model of main effects (additive model):

$$Y_k = b_{0k} + \sum_{p=1}^{n} b_{pk} X_{pk} + e_k \,. \tag{1}$$

The respondents of the surveyed companies allocated ranks to individual profiles, so the values of variable Y were measured on an ordinal level.

Explanatory variables in the research were of a qualitative nature and assumed three states (divestment risk levels). That is why dummy variables were implemented in model (1), and express the influence of each level of variable on the assessment attributed to profiles by respondents. The assessments of the parameters of model (1) enabled the calculation of the partial utilities which represent the main effects of a specific level of each variable. The construction of dummy variables with the use of quasi-experimental coding and the method for calculating partial utility of respondents are presented in Table 1.

Table 1

Quasi-experimental coding of the explanatory variable of three states

Explanatory variable	**Dummy variable X_p**	**Dummy variable X_r**	**Partial utilities**
Level I	1	0	$U_{j1}^k = b_{pk}$
Level II	0	1	$U_{j2}^k = b_{qk}$
Level III	–1	–1	$U_{j3}^k = -\left(b_{pk} + b_{qk}\right)$

Source: Walesiak and Bąk, 2000.

The partial utilities calculated based on the estimated model for each of the respondents also allowed for determining the total utility of the assessed profiles which contain risk levels of various factors (for each respondent and for all of them), establishing the relative importance of each risk factor of foreign divestment, and separating segments of the analysed respondents, taking into consideration their assessment of the risk of foreign divestment.

The total utility of *i*-th profile is function of partial utility of *l*-th level of *j*-th variable of *i*-th profile of *k*-th respondent ($U^k_{jl^i_j}$) and can be calculated using the following formula:

$$U_i = \frac{1}{K}\sum_{k=1}^{K}\left(\sum_{j=1}^{m} U^k_{jl^i_j} + b_{0k}\right). \tag{2}$$

The partial utilities also enabled the calculation of the relative importance of each explanatory variable for the *k*-th respondent as follows (Walesiak and Bąk, 2000):

$$W^k_j = \frac{\max\limits_{l_j}\left\{U^k_{jl^i_j}\right\} - \min\limits_{l_j}\left\{U^k_{jl^i_j}\right\}}{\sum_{j=1}^{m}\left(\max\limits_{l_j}\left\{U^k_{jl^i_j}\right\} - \min\limits_{l_j}\left\{U^k_{jl^i_j}\right\}\right)} \cdot 100\%. \tag{3}$$

The following formula was used to determine the average value of the *j*-th variable:

$$W_j = \frac{1}{K}\sum_{k=1}^{K} W^k_j. \tag{4}$$

The respondents were segmented by their assessment of the risk of the analysed factors using the *k*-means method, whereas the conjoint analysis was repeated separately for each segment. As a result, it was possible to characterise each segment in terms of the importance of profiles. The strength of diversification of the created segments by the assessment of divestment risk of individual profiles was examined using analysis of variance (ANOVA). The separated segments were also characterised using the structure of foreign capital by the country of origin and industry in which FDI is made.

4. EMPIRICAL RESULTS OF THE CONJOINT ANALYSIS

The research subjects represented foreign companies which made foreign direct investments in Poland. The survey was carried out in September and October 2020, and addressed approximately 600 persons; approximately 70% of the questionnaires were returned. Following the final selection of the responses sent in the survey, 410 correctly completed questionnaires were taken into account in the research. The respondents assessed the factors decisive for the risk of foreign direct divestment

in Poland according to their preferences. Ten factors were finally selected: X_1 – decrease in GDP in the host country of FDI, X_2 – increase in the costs of production factors, X_3 – decrease in the economic openness ratio, X_4 – increase in the level of instability in the legal and fiscal system, X_5 – increase in the level of political instability, X_6 – decrease in R&D expenditures, X_7 – investments in the industry, X_8 – investments in the construction sector, X_9 – investments in the services sector and X_{10} – investments in the IT industry. These risk determinants represented groups of factors related to cost, market, sector, law, and political factors. The choice of these factors is not accidental. As long-term investments, foreign direct investments result in the fact that, apart from purely economic factors, an investor must also consider the stability of political and legal conditions in the final destinations of FDI, as potential future social and political turbulences in the country of FDI destination may result in considerable losses on the part of the investing company. Furthermore, some industries have been more resistant to the corona crisis than others, hence an introduction of industry destinations for FDI to the assessment seems appropriate. The methodology of the conjoint analysis recommends that the number of assessed attributes should not exceed six, as an excessive number may make the evaluation of profiles difficult for the respondent. In order to facilitate the evaluation of profiles built with a greater number of attributes, only three different levels of each attribute, identical for each, were used, namely: low [A], medium [B], and high [C]. These were chosen by experimenting, using the appropriate statistical procedure, on the one hand, and a limited perception of respondents, on the other hand (for those, the ordering of a large number of profiles would be difficult and would decrease the number of completed questionnaires). Ten profiles were selected from all the profiles possible for the respondents' assessment (Table 2).

Table 2

Factorial design and profiles assessed by the respondents

Profiles	Divestment risk factor level									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	A	C	B	B	B	A	B	A	B	A
2	C	A	A	A	C	C	C	A	C	A
3	B	A	C	C	C	C	B	A	C	B
4	C	B	B	B	C	C	C	B	C	B
5	B	B	C	C	C	A	C	B	A	B
6	B	B	C	A	B	C	A	B	B	B
7	B	C	A	C	B	C	C	B	C	B
8	B	A	A	A	C	B	A	A	B	C
9	A	B	C	A	A	A	A	C	A	B
10	A	C	A	A	B	B	C	A	C	C

Source: author's study based on the results of the questionnaire administered in 2020.

The respondents ranked the profiles according to their decreasing aversion to the risk of foreign divestment (a profile ranked as first by the respondent suggests the greatest inclination to divestment in Poland, while a profile ranked last causes the least inclination to divest). The dependent variable Y_k expresses the preferences of *k*-th respondent. Based on the evaluation of the profiles by the respondents, the parameters of model (1) were estimated with the least squares method – first under conditions of the optimistic variant of the pandemic's development, and then under conditions of the pessimistic variant. The attributes of factors (risk levels) were implemented in the model with the use of dummy variables in accordance with the quasi-experimental coding procedure described earlier. An estimation of the parameters of model (1) for each respondent allowed for calculating partial utilities in accordance with the formulas in Table 1.

The conjoint analysis was carried out with the assumption of two different scenarios of the pandemic's development:

- optimistic variant of the pandemic's development where it is under control, with low infections and coronavirus-related death rates, without the need to impose strict restrictions on the economy to stop the spread of the pandemic,
- pessimistic variant of the pandemic's development which leads to a growing number of deaths and infections, and forces authorities to close subsequent industries or introduce a total long-term lockdown.

4.1. The results of the conjoint analysis with the assumption of the optimistic scenario of the COVID-19 pandemic's development

The results of the partial utility of the respondents who assessed the profiles of foreign divestment risk with the assumption of the optimistic variant of the corona crisis are presented in Table 3.

The estimated models are fairly well adjusted to the empirical data as their coefficients of determination are generally not lower than 80%. Based on the results of the average values of partial utility in Table 3, it can be concluded that investment in the services sector was at a particularly high risk of divestment in conditions of the optimistic scenario of the pandemic's development. A distinct increase in the average level of divestment risk was, in turn, visible with reference to a decrease in the economic openness ratio, increased instability in the legal and tax system, increased political stability, and an increase in R&D expenditure. Other factors, such as a decrease in GDP in Poland, an increase in production costs, investment in the industry, services and the IT sectors, were characterised by the low risk of divestment.

Table 4 presents the results of the relative importance of divestment risk factors for individual respondents and the average relative importance of variables calculated in accordance with formulas (2) and (3).

Table 3

The results of the partial utility in the conjoint analysis based on the assumption of the optimistic variant of the corona crisis pandemic's development

Divestment risk factor	Factor level	Respondent number					Average
		1	2	....	409	410	
X_1 – decrease in GDP in the host country of FDI	low [A]	0.954	1.245	....	0.586	1.871	1.015
	medium [B]	–0.058	–0.068	....	1.384	0.713	0.813
	high[C]	–0.896	–1.177	....	–1.970	–2.584	–1.828
X_2 – increase in the costs of production factors	low [A]	0.857	0.749	....	0.483	1.418	1.568
	medium [B]	0.068	0.168	....	1.753	0.923	1.246
	high[C]	–0.925	–0.916	....	–2.235	–2.341	–2.814
X_3 – decrease in the economic openness ratio	low [A]	0.720	0.579	....	0.298	1.413	–0.514
	medium [B]	0.518	0.252	....	2.238	1.051	0.857
	high[C]	–1.238	–0.831	....	–2.536	–2.464	–0.343
X_4 – increase in the level of instability in the legal and fiscal system	low [A]	0.551	–0.312	....	–0.197	0.986	–1.321
	medium [B]	0.311	0.219	....	2.053	0.568	1.625
	high[C]	–0.863	0.094	....	–1.856	–1.553	–0.304
X_5 – increase in the level of political instability	low [A]	–0.629	0.568	....	–0.085	1.346	0.454
	medium [B]	–0.316	0.714	....	2.179	0.602	1.364
	high[C]	0.945	–1.282	....	–2.095	–1.949	–1.818
X_6 – decrease in R&D expenditure	low [A]	0.395	0.506	....	–0.332	1.115	0.292
	medium [B]	0.585	0.981	....	2.480	0.740	1.676
	high[C]	–0.979	–1.488	....	–2.148	–1.855	–1.968
X_7 – investment in the industry	low [A]	0.610	0.972	....	–0.257	1.387	1.520
	medium [B]	0.601	1.102	....	2.749	1.188	1.127
	high[C]	–1.211	–2.074	....	–2.492	–2.574	–2.647
X_8 – investment in the construction sector	low [A]	0.635	1.183	....	–0.235	1.855	1.680
	medium [B]	1.019	1.472	....	2.927	1.555	1.423
	high[C]	–1.654	–2.654	....	–2.692	–3.411	–3.103
X_9 – investment in the services sector	low [A]	0.711	–1.595	....	0.227	2.128	–2.014
	medium [B]	–0.681	–1.199	....	–2.595	–1.295	–1.069
	high[C]	–0.030	2.794	....	2.369	–0.833	3.083
X_{10} – investment in the IT industry	low [A]	0.433	1.509	....	0.205	1.694	1.713
	medium [B]	0.911	1.420	....	2.692	1.693	0.314
	high[C]	–1.344	–2.930	....	–2.897	–3.387	–2.027
Intercept		43.658	40.721	....	38.052	49.844	44.860
R^2		0.924	0.951		0.844	0.942	0.922

Source: author's study based on the results of the questionnaire administered in 2020.

Table 4

The relative importance of divestment risk factors (in percentage value) in the conjoint analysis with the assumption of the optimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Respondent number					Average
	1	2	....	409	410	
X_1 – decrease in GDP in the host country of FDI	10.12	9.10	....	7.24	11.53	7.86
X_2 – increase in the costs of production factors	9.75	6.25	....	8.61	9.73	12.12
X_3 – decrease in the economic openness ratio	10.71	5.29	....	10.30	10.04	3.79
X_4 – increase in the level of instability in the legal and fiscal system	7.73	1.99	....	8.43	6.57	8.15
X_5 – increase in the level of political instability	8.61	7.50	....	9.22	8.53	8.80
X_6 – decrease in R&D expenditure	8.55	9.27	....	9.99	7.69	10.08
X_7 – investment in the industry	9.96	11.93	....	11.31	10.26	11.53
X_8 – investment in the construction sector	14.62	15.50	....	12.13	13.63	13.23
X_9 – investment in the services sector	7.62	16.48	....	10.71	8.86	14.10
X_{10} – investment in the IT industry	12.33	16.67	....	12.06	13.15	10.35

Source: author's study based on the results of the questionnaire administered in 2020.

The results shown in the last column of Table 4 indicate that FDI in services and in the construction industry, and an increase in the costs of production factors, were most important to foreign enterprises. The decrease in Poland's GDP and the decrease in the economic openness ratio were relatively unimportant for decisions on foreign divestment.

The partial utility of the respondents given in Table 3 reflects their responses to individually assessed profiles, which allowed to use these utilities to segment the surveyed enterprises by a similar evaluation of the factors for foreign divestment in Poland. The method of *k*-means was used where four homogeneous clusters of enterprises were distinguished. The optimal number of clusters was determined based on the hierarchical method of cluster analysis (Ward's method), following the criterion of the first clear increase in the linkage distance on the dendrograms.

The created segments contained the following numbers of companies (as per the order of concentration): 98, 120, 75, 117. The conjoint analysis was carried out separately in each of the separated segments. In order to specify the capacity of factor levels to segment companies, the univariate ANOVA was used. The average values of the respondents' partial utilities in individual segments and the results of the variance analysis are presented in Table 5.

Table 5 shows that all the variants of statistically significant factors (at the significance level of 0.001) differentiated the created segments of the surveyed companies. The average importance of variables as per separated segments is presented in Table 6.

Table 5

Results of investors' segmentation based on the assumption of the optimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Factor level	Segment number				F	*p*
		I	II	III	IV		
		Average partial utility					
X_1 – decrease in GDP in the host country of FDI	low [A]	1.288	0.763	0.699	1.247	17.861	0.001
	medium [B]	0.792	0.650	0.883	0.953	17.861	0.001
	high[C]	–2.079	–1.413	–1.583	–2.200	17.861	0.001
X_2 – increase in the costs of production factors	low [A]	–1.865	–1.078	1.082	7.469	203.846	0.000
	medium [B]	–1.259	5.411	1.888	–1.340	203.846	0.000
	high[C]	3.124	–4.334	–2.971	–6.129	203.846	0.000
X_3 – decrease in the economic openness ratio	low [A]	–0.487	–1.361	–0.531	0.343	153.495	0.000
	medium [B]	0.732	3.022	0.643	–1.120	153.495	0.000
	high[C]	–0.245	–1.661	–0.112	0.777	153.495	0.000
X_4 – increase in the level of instability in the legal and fiscal system	low [A]	–0.549	–0.351	–1.731	–2.700	46.472	0.000
	medium [B]	3.357	0.839	1.172	1.269	46.472	0.000
	high[C]	–2.808	–0.488	0.559	1.430	46.472	0.000
X_5 – increase in the level of political instability	low [A]	0.069	–0.632	0.425	1.908	27.703	0.000
	medium [B]	1.592	3.147	1.788	–0.928	27.703	0.000
	high[C]	–1.661	–2.515	–2.213	–0.980	27.703	0.000
X_6 – decrease in R&D expenditure	low [A]	–0.121	0.069	–1.667	2.122	56.789	0.000
	medium [B]	2.932	2.904	–1.836	1.617	56.789	0.000
	high[C]	–2.810	–2.973	3.503	–3.739	56.789	0.000
X_7 – investment in the industry	low [A]	–1.722	1.863	1.853	3.671	124.981	0.000
	medium [B]	4.233	0.645	0.673	–0.690	124.981	0.000
	high[C]	–2.511	–2.508	–2.526	–2.981	124.981	0.000
X_8 – investment in the construction sector	low [A]	1.753	–1.003	1.722	4.344	103.946	0.000
	medium [B]	–1.824	4.419	1.024	1.325	103.946	0.000
	high[C]	0.071	–3.416	–2.746	–5.669	103.946	0.000
X_9 – investment in the services sector	low [A]	–2.023	–1.548	–1.968	–2.514	140.958	0.000
	medium [B]	0.483	–1.275	3.099	–4.828	140.958	0.000
	high[C]	1.541	2.823	–1.131	7.343	140.958	0.000
X_{10} – investment in the IT industry	low [A]	1.200	2.180	–1.505	3.727	94.922	0.000
	medium [B]	0.392	0.693	4.398	–2.759	94.922	0.000
	high[C]	–1.593	–2.873	–2.893	–0.968	94.922	0.000

Source: author's study based on the results of the questionnaire administered in 2020.

Table 6

The average importance of variables as per segments of respondents with the assumption of the optimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Segment number			
	I	II	III	IV
	Mean value of the variables (%)			
X_1 – decrease in GDP in the host country of FDI	8.13	4.26	5.88	5.13
X_2 – increase in the costs of production factors	12.05	19.07	11.58	20.25
X_3 – decrease in the economic openness ratio	2.94	9.16	2.80	2.82
X_4 – increase in the level of instability in the legal and fiscal system	14.89	2.60	6.92	6.15
X_5 – increase in the level of political instability	7.86	11.08	9.54	4.30
X_6 – decrease in R&D expenditure	13.87	11.50	12.73	8.73
X_7 – investment in the industry	16.28	8.55	10.44	9.91
X_8 – investment in the construction sector	8.64	15.33	10.65	14.91
X_9 – investment in the services sector	8.61	8.55	12.08	18.13
X_{10} – investment in the IT industry	6.74	9.89	17.38	9.66

Source: author's study based on the results of the questionnaire administered in 2020.

In the first group of foreign businesses, investment in the industry and an increase in instability in the legal and tax system were the most important to the assessment of the risk of foreign divestment. In the second segment, the respondents attached particular importance to the increase in the costs of production factors and investment in the construction sector. In the third group of the surveyed companies, in turn, the decrease in R&D expenditure and investment in the IT industry were the most important. The fourth segment of the respondents shows the greatest importance of the increase in production costs and investment in services.

The linking of the distinguished segments of enterprises exporting FDI with the structure of foreign capital (which is needed for FDI) by country of origin and with the industry segment of investments was the quintessence of this part of the research. Table 7 shows the structure of foreign capital by country of origin and separated segments of investors.

Table 7 shows that Germany and France were the main suppliers of capital in the first segment of enterprises, whereas Germany and the Netherlands were the main suppliers of capital in the second segment. In the third segment of the respondents, the capital mainly came from Luxembourg and the Netherlands. Segment 4 is characterised by the greatest capital contribution from other countries (not mentioned in the table), followed by capital from Germany.

Table 7

The structure of foreign capital which supplies FDI by country of origin and separated segments of investors with the assumption of the optimistic scenario of the coronavirus pandemic's development (in percentages)

Country of origin of capital	Segment number			
	I	II	III	IV
The Netherlands	15.49	21.12	23.16	12.52
Germany	32.30	25.04	16.14	17.31
France	24.52	16.80	19.80	14.69
Luxembourg	8.74	13.81	27.00	13.28
Great Britain	9.68	4.63	3.58	14.63
Austria	4.41	3.51	1.60	4.32
Other	4.86	15.09	8.72	23.25
Total	100	100	100	100

Source: author's study based on the results of the questionnaire administered in 2020.

Table 8 shows the structure of foreign capital supplying FDI by sectors and separated segments of investors.

Table 8

The structure of foreign capital used in FDI by selected sectors of the Polish economy and separated segments of investors with the assumption of the optimistic scenario of the coronavirus pandemic's development (in percentages)

Economic sector	Segment number			
	I	II	III	IV
Processing industry	30.61	15.63	5.43	26.04
Construction industry	10.37	18.19	14.36	14.45
Commerce	10.89	22.45	30.15	26.24
Financial and insurance services	15.21	10.42	25.17	16.22
IT sector	10.16	4.31	8.22	5.63
Other	22.76	29.00	16.67	11.42
Total	100	100	100	100

Source: author's study based on the results of the questionnaire administered in 2020.

Table 8 shows that enterprises from the first segment engage in FDI mainly in the processing industry in Poland. Companies from the third segment located FDI in industries not mentioned in the table, while companies from sectors II and III mainly invested in commerce.

4.2. The results of the conjoint analysis with the assumption of the pessimistic scenario of the COVID-19 pandemic's development

The results of the partial utility of the respondents who assessed the profiles of foreign divestment risk based on the assumption of the pessimistic variant of the corona crisis are presented in Table 9.

Table 9

The results of the partial utility in the conjoint analysis based on the assumption of the pessimistic variant of the coronacrisis pandemic's development

Divestment risk factor	Factor level	Divestment risk factor					Average
		1	2	....	409	410	
1	2	3	4	5	6	7	8
X_1 – decrease in GDP in the host country of FDI	low [A]	0.890	0.818	....	0.128	1.865	0.523
	medium [B]	–0.538	–0.406	....	1.317	0.621	1.357
	high[C]	–0.352	–0.412	....	–1.445	–2.486	–1.880
X_2 – increase in the costs of production factors	low [A]	1.336	–0.916	....	0.822	–1.898	–1.825
	medium [B]	–0.305	–0.092	....	1.695	0.862	0.203
	high[C]	–1.031	1.008	....	–2.517	1.036	1.622
X_3 – decrease in the economic openness ratio	low [A]	0.592	0.309	....	–0.165	0.920	–0.566
	medium [B]	0.542	0.655	....	2.385	1.333	0.961
	high[C]	–1.133	–0.964	....	–2.220	–2.252	–0.394
X_4 – increase in the level of instability in the legal and fiscal system	low [A]	0.508	–0.600	....	–0.394	0.724	–1.326
	medium [B]	0.258	–0.021	....	–1.983	0.558	–1.046
	high[C]	–0.766	0.621	....	2.378	–1.282	2.372
X_5 – increase in the level of political instability	low [A]	–0.323	–1.042	....	0.320	1.553	–0.853
	medium [B]	–0.450	0.482	....	–1.929	0.180	–1.201
	high[C]	0.774	0.560	....	1.608	–1.733	2.054
X_6 – decrease in R&D expenditure	low [A]	–0.882	–0.807	....	–0.208	1.572	–0.381
	medium [B]	–0.569	–0.742	....	2.031	–0.615	–1.068
	high[C]	1.452	1.549	....	–1.823	–0.957	1.449
X_7 – investment in the industry	low [A]	0.835	1.095	....	0.065	1.742	2.052
	medium [B]	0.988	1.487	....	3.156	1.602	1.989
	high[C]	–1.823	–2.582	....	–3.221	–3.344	–4.042
X_8 – investment in the construction sector	low [A]	0.396	0.940	....	–0.360	1.668	1.577
	medium [B]	0.889	1.302	....	2.704	1.429	1.749
	high[C]	–1.286	–2.241	....	–2.344	–3.096	–3.326

Tabela 9, cont.

1	2	3	4	5	6	7	8
X_9 – investment in the services sector	low [A]	1.167	–1.540	....	0.666	–2.216	–1.833
	medium [B]	–0.792	–1.398	....	–3.017	–1.453	–1.183
	high[C]	–0.375	2.938	....	2.351	3.668	3.016
X_{10} – investment in the IT industry	low [A]	–0.846	1.566	....	–0.279	1.713	–1.776
	medium [B]	0.999	1.710	....	3.128	–1.972	1.811
	high[C]	–0.153	–3.276	....	–2.849	0.259	–0.035
Intercept		49.403	56.263	....	52.717	47.696	50.271
R^2		0.724	0.940		0.932	0.875	0,909

Source: author's study based on the results of the questionnaire administered in 2020.

The determination coefficient in the estimated models oscillated around 65%–95%, therefore an adjustment of these models to empirical data should be considered satisfactory. Considering the average values of partial utilities, it can be concluded that a particularly high risk of divestment in conditions of the pessimistic scenario of the pandemic's development was associated with investment in the services sector and the increase in costs of production factors, increased instability of the legal and tax system, increased political instability, and the decrease in R&D expenditure. The distinct increase in the average level of divestment risk was noticeable in respect of the decrease in Poland's GDP, the decrease in the economic openness ratio and in investment in the construction and services sectors. Investment in the industry was the factor distinguished by the low risk of divestment. When comparing these results (Table 9) with the results for the optimistic scenario of the pandemic's development, attention should be paid to the definitely higher number of factors characterised by the high risk of divestment and their greater variability. The pessimistic variant of the pandemic's development increased investment uncertainty on the part of businesses, which was reflected in the obtained results.

Table 10 presents the results of the relative validity of divestment risk factors for the individual respondents and the average relative importance of the variables calculated based on the partial utilities given in Table 9.

Based on the analysis of results given in Table 10, it can be concluded that the following factors for divestment in the conditions of the pessimistic variant of the COVID-19 pandemic's development were the most important to foreign businesses: FDI in services, in the industry and in the construction sector. The decreases in the economic openness ratio and in R&D expenditure in Poland were relatively less important when making decisions on foreign divestment.

Similarly to the optimistic variant of the pandemic's development, the surveyed enterprises were segmented using the *k*-means method based on the partial utilities of the respondents given in Table 9. This time, four groups of enterprises homogeneous in terms of the assessment of the risk of divestment were distinguished.

Table 10

The relative importance of attributes (in percentage value) in the conjoint analysis with the assumption of the pessimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Respondent number					Average
	1	2	…	409	410	
X_1 – decrease in GDP in the host country of FDI	7.46	4.55	…	5.99	11.42	8.68
X_2 – increase in the costs of production factors	12.37	7.12	…	9.14	7.70	9.24
X_3 – decrease in the economic openness ratio	9.01	5.99	…	9.99	9.41	4.10
X_4 – increase in the level of instability in the legal and fiscal system	6.65	4.52	…	9.46	5.26	9.92
X_5 – increase in the level of political instability	6.40	5.93	…	7.67	8.62	8.73
X_6 – decrease in R&D expenditure	12.19	8.71	…	8.36	6.63	6.75
X_7 – investment in the industry	14.68	15.05	…	13.83	13.35	16.34
X_8 – investment in the construction sector	11.36	13.11	…	10.95	12.50	13.61
X_9 – investment in the services sector	10.24	16.57	…	11.64	15.44	13.01
X_{10} – investment in the IT industry	9.64	18.45	…	12.97	9.67	9.62

Source: author's study based on the results of the questionnaire administered in 2020.

The created segments contain the following numbers of companies (as per the order of concentration): 107, 73, 102, 128. The conjoint analysis was carried out separately in each of the distinguished segments. The average values of the partial utilities of the respondents in individual segments, along with the results of the univariate analysis of variance are shown in Table 11.

Table 11 shows that all the variants of the analysed factors differentiated the created segments of the surveyed companies in a statistically significant manner (at a significance level of 0.001). In accordance with the analysis carried out for the optimistic variant of the COVID-19 pandemic's development, the average value of the variables (Table 12) was also calculated in this case for the separated segments, and then the ownership and industry structure of the foreign capital was analysed.

In the first and the fourth group of foreign businesses, investment in the industry and in the construction sector were most important in terms of the assessment of the risk of foreign divestment with the assumption of the pessimistic course of the corona crisis. Increased political instability and investment in services were, in turn, the most important in the second segment of the investors. In the third group of the surveyed companies, the decrease in R&D expenditure and investment in the construction sector were the most important.

Table 13 shows the structure of foreign capital by country of origin and separated segments of investors.

Table 11

The results of the segmentation of investors with the assumption of the pessimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Factor level	Segment number				F	*p*
		I	II	III	IV		
		Average partial utility					
X_1 – decrease in GDP in the host country of FDI	low [A]	0.098	–0.180	–0.411	2.024	29.320	0.000
	medium [B]	1.767	–3.095	2.842	2.371	29.320	0.000
	high[C]	–1.865	3.275	–2.430	–4.395	29.320	0.000
X_2 – increase in the costs of production factors	low [A]	–3.299	0.033	–1.306	–2.065	211.756	0.000
	medium [B]	–1.299	–0.664	–2.635	4.215	211.756	0.000
	high[C]	4.598	0.631	3.941	–2.150	211.756	0.000
X_3 – decrease in the economic openness ratio	low [A]	–0.815	–0.484	–0.615	–0.366	166.483	0.000
	medium [B]	0.593	–0.300	–0.335	3.020	166.483	0.000
	high[C]	0.222	0.784	0.950	–2.653	166.483	0.000
X_4 – increase in the level of instability in the legal and fiscal system	low [A]	–2.755	–1.558	–0.103	–0.974	72.930	0.000
	medium [B]	–2.831	–2.419	0.262	0.188	72.930	0.000
	high[C]	5.586	3.977	–0.159	0.786	72.930	0.000
X_5 – increase in the level of political instability	low [A]	–0.243	–2.286	0.681	–1.767	37.584	0.000
	medium [B]	–1.111	–2.372	0.552	–2.004	37.584	0.000
	high[C]	1.354	4.658	–1.233	3.772	37.584	0.000
X_6 – decrease in R&D expenditures	low [A]	–0.697	–0.073	–2.309	1.244	60.501	0.000
	medium [B]	–0.877	0.067	–3.509	0.070	60.501	0.000
	high[C]	1.574	0.006	5.818	–1.314	60.501	0.000
X_7 – investments in the industry	low [A]	–1.519	2.116	0.887	5.929	123.368	0.000
	medium [B]	6.480	0.865	2.012	–1.141	123.368	0.000
	high[C]	–4.961	–2.982	–2.899	–4.788	123.368	0.000
X_8 – investments in the construction sector	low [A]	–1.201	–0.570	–0.270	6.597	161.460	0.000
	medium [B]	5.544	–0.292	4.064	–2.105	161.460	0.000
	high[C]	–4.344	0.862	–3.794	–4.492	161.460	0.000
X_9 – investments in the services sector	low [A]	–1.256	–1.577	–2.112	–2.239	122.746	0.000
	medium [B]	–1.218	–2.617	–0.081	–1.214	122.746	0.000
	high[C]	2.474	4.194	2.192	3.454	122.746	0.000
X_{10} – investments in the IT industry	low [A]	–1.640	–1.680	0.061	–3.409	113.350	0.000
	medium [B]	1.376	–2.109	–0.237	6.043	113.350	0.000
	high[C]	0.264	3.789	0.176	–2.634	113.350	0.000

Source: author's study based on the results of the questionnaire administered in 2020.

Table 12

The average importance of variables as per segments of respondents with the assumption of the pessimistic scenario of the coronavirus pandemic's development

Divestment risk factor	Segment number			
	I	II	I	IV
	Mean value of the variables (%)			
X_1 – decrease in GDP in the host country of FDI	6.68	15.26	12.39	10.27
X_2 – increase in the costs of production factors	14.53	3.10	15.45	9.67
X_3 – decrease in the economic openness ratio	2.59	3.04	3.68	8.62
X_4 – increase in the level of instability in the legal and fiscal system	15.49	15.32	0.99	2.67
X_5 – increase in the level of political instability	4.54	16.84	4.50	8.77
X_6 – decrease in R&D expenditure	4.51	0.34	21.91	3.88
X_7 – investment in the industry	21.05	12.21	11.54	16.28
X_8 – investment in the construction sector	18.20	3.43	18.46	16.84
X_9 – investment in the services sector	6.86	16.32	10.11	8.65
X_{10} – investment in the IT industry	5.55	14.13	0.97	14.35

Source: author's study based on the results of the questionnaire administered in 2020.

Table 13

The structure of foreign capital by country of origin and separated segments of investors with the assumption of the pessimistic scenario of the coronavirus pandemic's development (in percentages)

Country of origin of capital	Segment number			
	I	II	III	IV
The Netherlands	24.16	18.60	9.46	20.06
Germany	22.01	29.62	26.96	12.20
France	18.67	15.38	16.89	24.87
Luxembourg	3.26	20.84	25.24	13.48
Great Britain	3.75	3.91	3.79	21.07
Austria	8.04	2.59	1.70	1.51
Other	20.12	9.06	15.95	6.8
Total	100	100	100	100

Source: author's study based on the results of the questionnaire administered in 2020.

According to Table 13, the main suppliers of capital in the first sector of enterprises investing in Poland were the Netherlands and Germany. In the second and third segments, the capital predominantly came from Germany and Luxembourg. Segment 4 was characterised by the greatest contribution of French and British capital. Table 14 shows the structure of foreign capital in FDI by industries and separated investor segments.

Table 14

The structure of foreign capital by selected sectors of the Polish economy and separated segments of investors with the assumption of the pessimistic scenario of the coronavirus pandemic's development (in percentages)

Economic sector	Segment number			
	I	II	III	IV
Processing industry	30.16	11.73	8.32	27.50
Construction industry	8.92	12.42	25.16	10.87
Commerce	13.86	24.31	32.84	18.72
Financial and insurance services	14.33	21.11	18.06	13.53
IT sector	4.49	10.19	3.30	10.34
Other	28.24	20.24	12.32	19.05
Total	100	100	100	100

Source: author's study based on the results of the questionnaire administered in 2020.

In accordance with Table 14, enterprises from the first and fourth segments made FDI in Poland mainly in the processing industry, whereas companies from segments II and III mainly invested in commerce. The pessimistic scenario of the COVID-19 pandemic's development in the presented segmentation of companies did not considerably change the major directions of FDI in Poland in comparison to the optimistic variant of the coronavirus pandemic.

CONCLUSION

Combining the results of the conjoint analysis with the *k*-means method enabled the separation of homogeneous segments of exporters of FDI to Poland, and a detailed presentation of the preferred factors significant for foreign divestment. Based on the research results, it can be concluded that, irrespective of the scenario of the COVID-19 pandemic's development, divestment in services is the factor bearing the greatest risk. The number of factors considered to be important determinants of foreign divestment increased along with the pessimistic scenario of the coronavirus pandemic's development; these include cost factors and FDI in other economic sectors. Furthermore, the pessimistic scenario of the pandemic's development caused an increase in the variability of risk assessment for all the analysed factors. The sectors in which FDI was made were particularly important to businesses which assess the risk of divestment, while the remaining factors were less important. The following variables are characterised by a relatively low level of importance: the decrease in GDP in the host country of FDI, the decrease in the economic openness ratio, and the reduction of R&D expenditure.

Regarding the separated segments of suppliers of FDI, companies from Germany, the Netherlands and France predominated. Companies investing mainly in commerce and the processing industry in Poland predominated, whereas a relatively small percentage invested in the construction industry and the IT sector. Detailed results obtained in this study concerning the assessment of the risk of divestment during the period of the pandemic generally comply with the results of other authors who analysed divestment during previous economic crises (Berry, 2010; Sembenelli and Vannoni, 2000; Norbäck et al., 2015; Blake and Moschieri, 2017; Berry, 2010). However, it should be taken into consideration that this article also covers industry--related factors which turned out to be important during the corona crisis and were not necessarily considered as risk factors by researchers interested in this phenomenon in terms of other crises.

Naturally, the restrictions of the conjoint methodology did not allow for considering an excessively large number of potential divestment risk factors. Therefore, it seems justified to develop such research using other models as well, e.g. logit models used in risk analyses. A full analysis of divestment and losses suffered by investors as a result of the corona crisis will not be possible until the pandemic has come to an end. The rapidly changing pandemic conditions in Europe and globally, will probably generate further changes in the assessment of the determinants of the risk of foreign divestment – this is why such research should be repeated.

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