

TRADE OPENNESS, INVESTMENT FREEDOM- SELECTED COUNTRY RISK INDICATORS, IMPACT ON FOREIGN DIRECT INVESTMENTS, A PANEL VECTOR AUTOREGRESSION MODEL APPROACH

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Abstract: *We employ a panel vector autoregression model (PVAR) selecting as endogenous variables Foreign Direct Investments percent of GDP, Trade Openness and Investment Freedom for a database comprised of European Countries. The data are collected from the Global Economy database. We compare different PVAR models changing the input of desired lags. We test the Hansen test for over-identifying restrictions and we generate the Generalised impulse response functions. The article uses a Hahn Kuehrsteiner Panel Var estimation estimating a stationarity PVAR with fixed effects. Econometric analysis shows a significant impact of trade openness and investment freedom indicators on foreign direct investment in Europe.*

Keywords: *trade openness; investment freedom; foreign direct investments, panel vector autoregression model*

JEL Classification: *F63, E02, F00, F23*

1. Introduction and literature review, country risk

Thinking about the conflicts in the Middle East, recurring coups in the Arab Spring, the ongoing conflict in Ukraine, asset seizures by local governments and disputes over natural resources between nations, these may pose unique political risks to international business, but may still affect the local business of firms and may not be imaginable in the future. "When it comes to political risk, we say that it could be defined to some extent by its unpredictability" (Lamourelle, 2021). Rodriguez (2016) defines political risk from the definition given by the World Bank as "the risk associated with government acts that I) reduce an investor's or owner's right to use or profit from its assets and II) reduce the value of the firm.

Country risk refers to the country's governance and changes in political stability over time, as well as its level of militarization, population heterogeneity and demographic stress. Country risk can also be distinguished by the extent of a country's history of human development. The environmental footprint also serves as an indicator of country performance. Finally, the extent to which a country has

fostered both positive and negative international linkages and its location in hostile regions are useful indicators of country risk (Carment, 2001). Country risk synthetically reflects a country's risk status, which in international business refers to risks arising from national differences in economic structures, policies, natural environment, and social culture, risks that can alter the return prospects of a particular investment or transaction (Feng et al., 2018a, 2018b).

Geopolitical risk is defined by Caldara and Iacoviello (2022) as the risk associated with wars, acts of terrorism and tension between states that affect the normal course of international relations. Geopolitical risks encompass both categories of risks, the first category being the risks of these events materializing and the second category - the risks associated with the escalation of existing events. These risks include various conflict situations, disruptions, terrorism, etc. Howell (2016) argues that it is important to distinguish 'political risk' from 'country risk'. Country risk includes, in varying proportions, financial risk and economic risk. Other authors, such as Cheng et al (2018), equate geopolitical risk with political risk. Political risk, he argues, is the risk that an investment's return might suffer as a result of political change or instability in a country. Instability affecting investment returns could result from a change in government, legislative bodies, other external decision-makers or military control. Political risk is also known as 'geopolitical risk' and manifests itself as the time horizon of investments becomes longer.

2. Research methodology

The general objective of the paper is to analyse the impact of country risk on foreign direct investment in Europe on the basis of Global Economy statistical database- while the specific objectives are derived from the general objective and concern, on the one hand, the identification of the main components of country risk from the point of view of the literature, economic, political, social, environmental, operational, etc. components with an impact on foreign investment and, on the other hand, to conduct econometric research on the impact of country risk on foreign direct investments (FDI), substantiating and statistically validating the impact of the country risk components, identified, defined and mapped under the first partial objective, on FDI. The period of analysis is 2000-2020, and the countries analysed are 27 EU Countries.

3. Econometric analysis

To investigate situations of complete endogeneity, where there is a two-way causality between the variables considered in the specification of the model, the estimation of the effects of country risk on FDI is carried out using panel VAR (Vector Autoregressive Model) models. The panel VAR models analysed are also useful because they generate so-called generalised impulse functions, which are simulations of the dynamic impact, over a ten-year analysis period, of a shock to one variable (FDI or trade openness or investment freedom) on the evolution of the other variable (the effect of FDI on trade openness, the effect of trade openness on investment freedom or the effect of increased FDI inflows on

themselves, how the FDI stock will evolve in one year, in two years, ... , in 10 years, i.e. the autoregressive component, etc).

Modelling the impact of political risk indicators on the stock of FDI (from inflows) on the basis of VAR (Vector Autoregressive Models):

Vector autoregressive models (VARs) are simultaneous equation models in which there are situations of complete endogeneity, i.e. there is two-way causality between all variables considered in the model specification. Estimation is done using the Generalised Method of Moments (GMM) estimator, in Panel VAR (Dynamic Panel VAR estimation), the two-step GMM estimator, these effects occur with a certain lag and we consider this lag to be 1. We consider FDI, trade openness and investment freedom index as endogenous variables in the construction of a Panel VAR model resulting in a system of 3 simultaneous equations. In the equation with FDI as the endogenous variable, its value this year depends on its own value last year and the value of trade openness (TradOpen) and trade freedom (InvestFreed) last year. In the equation for trade openness, we have this year's trade openness depends on last year's FDI value, its own lagged value and last year's value of the investment freedom index. In the equation for InvestFreed, this year's InvestFreed depends on last year's FDI value, plus it depends on last year's trade freedom value and its own lagged value.

Table 1: Modelling the impact of political risk indicators on the stock of FDI (from inflows) based on VAR vector Autoregressive Models

	"First difference GMM estimator" Dynamic Panel VAR estimation, two-step GMM		"Collapsed first difference GMM moment conditions and forward orthogonal transformation" Transformation: Forward orthogonal deviations			
	FDIGD P	TradeOpe n	InvestFree d	FDIGD P	TradeOpe n	InvestFree d
lag1_FDIGDP	0.7697 *** 0.0664	0.0505 (0.0352)	0.0455 (0.0510)	0.7809 *** 0.0608)	0.0836 ** 0.0323	0.0649 0.0377
lag1_TradeOpe n	0.3169 * 0.1450	0.6974 *** 0.0963	0.1050 0.1938	0.3102 0.1814	0.6601 *** 0.1083	-0.0213 0.1418
lag1_InvestFree d	-0.0128 0.263	0.0440 0.1903	0.7215 ** 0.2770	0.1138 0.1646	-0.0560 0.0794	0.7940 *** 0.1119

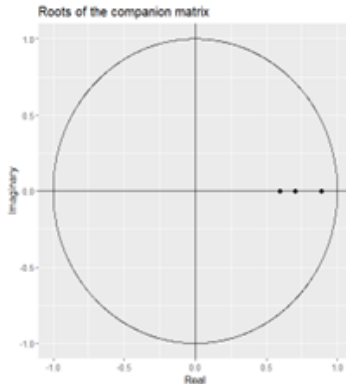
t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Source: data processed in R language by the author

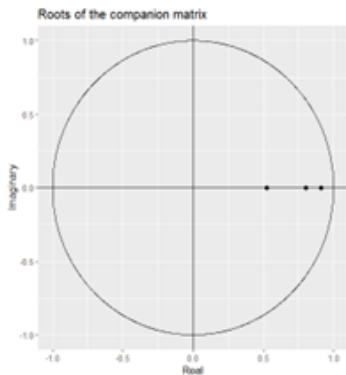
It is possible to estimate the model either with the data as reported by the indicators, as in the model above, or by first applying an orthogonal transformation to the model to remove some of the extreme effects. In reporting this estimation of the VAR model, the model reports the Hansen test, and also reports the stability conditions of the VAR , i.e. it shows that the unit root roots for the VAR are in this circle of -1, 1, showing that there are no problems with the presence of unit root effects in the panel data.

Figure 1: Conditions of VAR stability



Source: VAR stability estimation in R language by the author

Figure 2: Conditions of VAR stability (orthogonal transformation of data)



Source: VAR stability estimation in R language by the author

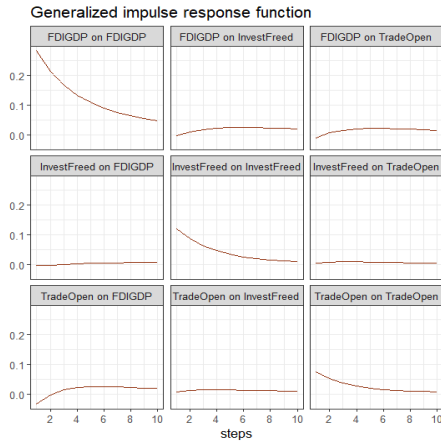
Even with this orthogonal transformation, it is observed that there are no unit root problems, the points are positioned in the unit root circle.

The VAR model also generates so-called Generalised Impulse Functions, which are simulations of the dynamic impact of a shock to one variable on the evolution of the other variable, i.e. a ten-period estimate. If we analyse the Generalised Impulse Function (GIRF) graphs, we see that even with the orthogonal transformation the impact of the variables is approximately the same as in the previous estimation without orthogonal transformation. And these plots are estimated under ceteribus paribus conditions.

These Generalised impulse functions exemplify in the situation of increasing FDI stock inflows in year-2020, how the FDI stock will evolve in one year, in two years etc... in 10 years-2030, how exactly the effects induced by a shock to the FDI stock at this year's level for the following periods will propagate to itself, i.e. the autoregressive component. It can be seen that there is, according to the estimates of this model, a short-term shock, i.e. there is an increase, if this year's FDI has

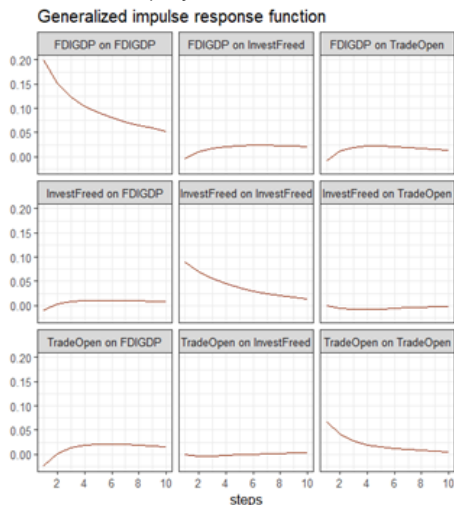
increased there is immediately a significant impact on next year's FDI, but in the medium and long term it tends to decrease, exemplifying the fact that an investment in FDI does not translate for example immediately into production, some time has to elapse from FDI and the realisation of production.

Figure 3: Generalised impulse response functions (GIRF)



Source: VAR estimation of generalised impulse functions in R

Figure 4: Generalised impulse response functions (GIRF) (with orthogonal transformation of data) by author



Source: VAR estimation of generalised impulse functions in R by author

The effect of the increase in the stock of FDI on the investment freedom index tends to be absorbed, so that in the medium and long term the market mechanisms have allowed a shock to be "swallowed" and return to equilibrium levels, i.e. the transmission of the shock is not necessarily persistent in the

medium and long term, the amplitude is not large, it is stabilised around 0. The effect of trade openness on FDI induces in the short term a slight decrease, followed by a slight increase which is then absorbed by the market mechanisms, causing the evolution to stabilise at equilibrium levels in the medium to long term. The model also estimates PVAR stationarity with the Hahn Kuehrsteiner estimator, in which the variables are demanded- i.e. the mean is also extracted from the FDI stock, and the mean is also extracted from the trade openness variable, and the mean is also extracted from the value of the investment freedom index. The effects obtained are shown in the table below, stationarizing the data by extracting the mean.

Table 2: Hahn Kuehrsteiner Estimator for VAR stability

[1] "stationary PVAR with fixed effects-Hahn Kuehrsteiner Estimator"			
Hahn Kuehrsteiner Panel VAR estimation			
Transformation: demean			
	demeaned_FDI	demeaned_TradeOpen	demeaned_InvestFreed
demeaned_lag1_FDI	0.8943 *** (0.0174)	0.0296 (0.0484)	0.0350
demeaned_lag1_TradeOpen	0.2508 *** (0.0054)	0.8673 *** (0.0149)	0.0071
demeaned_lag1_InvestFreed	0.0379 *** (0.0076)	0.0069 (0.0211)	0.8393 ***

*** p < 0.001; ** p < 0.01; * p < 0.05

Source: Hahn Kuehrsteiner Estimator for VAR stability in R by author

4. Conclusions

From the wide range of econometric models in the literature, we have selected those models that best capture the complex nature of the impact of country risk on foreign direct investment, analysing also the dynamic evolution of the phenomena, performing 10-year simulations of the effect of the dynamic impact of the country risk components on FDI, analysing situations of complete endogeneity, when there is two-way causality between the variables considered in the model specification.

Econometric analysis shows a significant impact of trade openness and investment freedom indicators on foreign direct investment in Europe. The article suggests that FDI flows are going to countries with institutions that support the trade openness and investment freedom. Second, multinationals are found to be attracted to countries with low restrictions on international trade, a thesis consistent with vertical FDI models. The results of the study contribute to the literature that points out that business and business-friendly institutions attract multinational investment.

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