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Drivers of agricultural foreign divestment

This paper has used multilateral foreign divestment (FD) data covering 1991 to 2017 for 50 countries, fitted to an optimised model based on microeconomic theory, to estimate the drivers of FD out of agriculture. Identifying the factors that determine FD would offer an opportunity for policymakers to know what kind of policies can discourage FD. Furthermore, knowledge of the directional effect would offer a way to use the policy variables to appropriately influence FD. Market size, exchange rate, political regime characteristics and transitions as well as the level of development drive FD out of agriculture globally. Trade openness and access to land resources have not been found to determine FD. Consequently, agricultural economy managers should work towards increasing the size of the agricultural economy; they should also liaise with their respective country's Central Banks with a view to ensure exchange rate stability, and with their governments in order to promote better political regime characteristics and smoother political transitions.

Keywords: Foreign direct investment, foreign divestment, foreign exchange, agriculture, market size
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Introduction

Agriculture is a source of food and nutrition, and raw materials for industry. The sector accounts for 4 per cent of global gross domestic product (GDP) and in some developing countries, contributes more than 25% of GDP (World Bank, 2020). Growth in the sector is between two and four times more effective in increasing wealth among the poorest compared to other sectors. It is understood that in 2016, 65% of poor working adults made a living through agriculture (World Bank, 2020). Therefore, developing agriculture is one of the most potent tools to terminate extreme poverty, enhance shared prosperity and feed a projected 9.7 billion people by 2050 (World Bank, 2020). Global investment needs (domestic and foreign direct investment) are in the range of $5 trillion to $7 trillion per year. Estimates for investment needs in developing countries alone range from $3.3 trillion to $4.5 trillion per year, mainly for basic infrastructure, and food security, among others (United Nations, 2014). Thus, investments including foreign direct investment are required to support the agricultural sector.

Therefore, governments globally have pursued macroeconomic policies to attract foreign direct investment (FDI). This is an investment made by an enterprise dwelling in one economy in order to attract lasting attention to an enterprise that is dwelling in another economy (Punthakey, 2020; UNCTAD, 2020; United Nations, 2015). "Lasting attention" in this regard suggests the presence of a long-term association between the direct investor and the direct investment enterprise that exerts a substantial influence on the leadership of the enterprise. This substantial influence is evidenced by domestic investors typically possessing 10% or more of the voting power of a direct investment enterprise (UNCTAD, 2020). Inward FDI is important for a range of reasons. Firstly, inward FDI enhances local investment by increasing domestic investment via connections in the production value-chain; this occurs when foreign firms buy locally made inputs or when foreign firms supply transitional inputs to local firms. Secondly, the FDI supplements the supply of funds for investment, a situation that fosters capital formation. Thirdly, inward FDI increases the host countries' ability to export, initiating a rise in foreign exchange earnings. Finally, new job openings, and improved technology transfer are both related to FDI, thereby augmenting overall economic growth (de Mello Jr., 1997; Gallova, 2011; Kim and Seo, 2003; Mileva, 2008; Oualy, 2019; Romer, 1992).

These benefits notwithstanding, there is evidence that foreign divestment (FD) does occur after FDI. Foreign divestment is a strategic decision of foreign firms in a host country that results in changes in their business portfolio, ultimately leading to a reduction in the level of assets. The divestment could be downsizing, relocation of operations or termination (Benito, 2005; Belderbos and Zou, 2006; Boddewyn, 1983a; Chung *et al.*, 2010; Nyuur and Debrah, 2014). Nyuur and Debrah (2014) explained downsizing as partial sale or disposal of physical and organisational assets and the reduction of workforces of the organisation. Relocation entails the complete shutdown of facilities and moving these facilities and the foreign firms' operations to another country (Belderbos and Zou, 2006; McDermott, 2010; Nyuur and Debrah, 2014). Finally, termination involves the complete sale or disposal of physical and organisational assets, shutdown of facilities, and foreign firms' operations in a country without relocating to another country (Nyuur and Debrah, 2014). The assets of the subsidiary are usually repatriated back to the headquarters (Nyuur and Debrah, 2014). Irrespective of the form, FD does reduce the stock of FDI and total domestic investment in the host country, leading to loss of jobs, tax revenue, and foreign exchange and depriving the host economy of other benefits accruing from FDI. Taking all this into consideration, it is important to identify the causal factors of FD in agriculture and the direction of the effects.

Some studies have addressed the drivers of FDI into agriculture (Djokoto, 2012a; Farr, 2017; Husman and Kubik, 2019; Kassem and Awad, 2012; Lv *et al.*, 2010; Rashid and Razak, 2017) but not FD. This paper uses multilateral FD data covering 1991 to 2017 for 50 countries. The paper focuses on agriculture globally. Identifying the factors that

determine FD would afford an opportunity for policymakers to understand what kind of policies can discourage FD. Also, knowledge of the directional effect would offer a way for policymakers to use policy to appropriately influence FD. This is relevant as FD reduces not only FDI stock, but it also reduces the total investment stock, which is key to economic growth in the agricultural sector as well as the wider economy.

This paper is organised in five sections. A review of the literature follows next. Section three presents the model and data. The results of the analysis and discussion of same are captured in section four. Concluding remarks constitute the last section.

Literature review

Theoretical review

In the literature, theories of FD have been conceptualised as barriers to exit within the industrial-organisation perspective (Boddewyn, 1983b; Porter, 1976; Wilson, 1980) and as a managerial dimension with a specific focus on what factors cause FD (Boddewyn, 1983a,b ; Spanhel and Johnson, 1982; Spanhel and Boddewyn, 1983). Boddewyn (1983b, p346) succinctly notes "These managerial studies have generally focussed on the deliberate and voluntary reduction or elimination of actively controlled foreign subsidiaries and branches through sale or liquidation, thereby excluding nationalizations, expropriations, spin-offs, 'fade-out' and 'harvest' cases as well as passive subsidiaries". Viewing FD theory as the reverse of Dunning's eclectic theory, Boddewyn (1983b) notes three preconditions for FD. The firm:

1. ceases to possess net competitive advantages over firms of other nationalities.
2. no longer finds it beneficial to use them itself rather than sell or rent them to foreign firms - that is, the firm no longer considers it profitable to 'internalise' these advantages.
3. no longer finds it profitable to utilise its internalised net competitive advantage outside its home country – that is, it is now more advantageous to serve foreign markets by home production, and/or to abandon foreign markets altogether.

The internationalisation theory of Hymer (1976) notes that firms often prefer FDI to licence as a strategy for entering a foreign market. The oligopolistic industries theory of Knickerbocker (1973) posits that firms follow others in entering foreign markets. Firms undertake FDI at stages in the life cycle of the product they pioneered (Vernon, 1966). Foreign markets are accessed when local demand in those countries grows sufficiently to support local production. These theories of FDI can work in the reverse for FD.

Empirical review

As studies on the drivers of FD from agriculture are non-existent, the empirical review addresses the drivers of FDI. The existing literature focused on an individual country (Ghana - Djokoto, 2012a; Egypt - Kassem and Awad, 2012; China - Lv *et al.*, 2010) and country groups (Africa - Husmann and Kubik, 2019; Latin America - Farr, 2017; Organisation of Islamic Countries (OIC) - Rashid and Razak, 2017). The size of the agricultural economy (market size) influences FDI into agriculture (Farr, 2017; Husmann and Kubik, 2019; Kassem and Awad, 2012; Lv *et al.*, 2010; Rashid and Razak, 2017). However, while Kassem and Awad (2012) found that the exchange rate determined FDI, Djokoto (2012a) and Rashid and Razak (2017) found a neutral effect. Openness to trade determines FDI overall (Farr, 2017) although Djokoto (2012a) found a positive but statistically insignificant effect of trade openness on FDI into agriculture. Some have concluded that access to land resources significantly determines FDI into agriculture (Farr, 2017; Husmann and Kubik, 2019; Rashid and Razak, 2017). However, Djokoto (2012a) found the contrary. The effect of inflationary pressures on FDI into agriculture has been mixed. Whilst Djokoto (2012a) found a positive effect, Kassem and Awad (2012) reported a negative effect. Lastly, Djokoto (2012a) found that political openness promoted FDI into agriculture. Combining theory and empirical evidence, market size, exchange rate, inflation, land, and political openness can be said to determine FDI.

Modelling and Data

Owing to the non-existent literature on the drivers of FD in agriculture, the starting point of the model building is the drivers of FDI derived from theoretical and optimisation procedures. This is further justified as the work of Boddewyn (1979a,b, 1983a,b, 1985) have shown that the theories of foreign divestment are the reverse of the theories of FDI.

For example, consider a multinational enterprise (MNE) faced with a cost function for both domestic and foreign production plants. The MNE would decide whether to expand production domestically and export to a foreign market or instead to invest directly in a foreign market (Hymer, 1976; Vernon, 1966). The MNE would thus seek to minimise the cost of production for the two plants. Let C denote the total cost, ω_d and ω_f the unit costs in domestic plants and foreign plants, respectively, and Q_d and Q_f to be the respective quantities produced in each plant. Then,

$$C = \omega_d(Q_d)Q_d + \omega_f(Q_f)Q_f \tag{1}$$

Unit costs in both plants are therefore a function of the quantity produced. The production of the two plants should not exceed $\overline{D}$ given by:

$$\overline{D} = Q_d + Q_f \tag{2}$$

In line with production theory, cost should be minimised, hence the setup of the Lagrangian.

$$\begin{aligned}\mathcal{L} &= \omega_d(Q_d)Q_d + \omega_f(Q_f)Q_f + \\ &+ \lambda(\overline{D} - Q_d - Q_f)\end{aligned} \tag{3}$$

Taking first-order partial derivative of 3 with respect to Q_d, Q_f and λ and equating them to zero, then:

$$\frac{\partial \mathcal{L}}{\partial Q_d} = \frac{d\omega_d}{dQ_d}(Q_d) + \frac{d\omega_d}{dQ_d}(Q_d) - \lambda = 0 \tag{4}$$

$$\frac{\partial \mathcal{L}}{\partial Q_f} = \frac{d\omega_f}{dQ_f}(Q_f) + \frac{d\omega_f}{dQ_f}(Q_f) - \lambda = 0 \tag{5}$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = \overline{D} - Q_d - Q_f = 0 \tag{6}$$

To attain the objective decision of locating the foreign plant,

$$Q_f = \left(\frac{\frac{d\omega_d}{dQ_d}}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right) \overline{D} + \left(\frac{1}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right) (\omega_d - \omega_f) \tag{7}$$

where:

$\left(\frac{\frac{d\omega_d}{dQ_d}}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right)$ and $\left(\frac{1}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right)$ are assumed to be positive.

From the above, output in the foreign firm is positively related to the total demand $\overline{D}$ and differences in unit costs. Consequently, the foreign plant increases its production provided $\omega_d > \omega_f$. On the other hand, the firm will expand production in its domestic plant, resulting in a reduction in the output produced in its foreign plant provided $\omega_d < \omega_f$. Thus far, the desired output is established. The next thing to do is decide on the levels of inputs to be used for the production in the foreign firm. For the sake of brevity, two inputs are assumed: labour, *L* and capital, *K*. Let *w* and *k* be wage rate and cost of capital, respectively. Then, the cost of producing the Q_f denoted as C_f is:

$$C_f = wL + kK \tag{8}$$

As the subsequent derivation relates to the foreign firm (production), the subscript, $_f$ is dropped. Assuming a Cobb-Douglas production function:

$$Q = L^{\alpha} K^{\beta} \tag{9}$$

the Lagrangian is set up as in equation 10. Unlike in equation 4, the constraint here is the production function.

$$\mathcal{L} = wL + kK + \lambda(Q - L^{\alpha} K^{\beta}) \tag{10}$$

Taking first-order partial derivatives with respect to *w*, *k* and λ, and equating to zero:

$$\frac{\partial \mathcal{L}}{\partial L} = w - \lambda\alpha\left(\frac{Q}{L}\right) = 0 \tag{11}$$

$$\frac{\partial \mathcal{L}}{\partial K} = k - \lambda\beta\left(\frac{Q}{K}\right) = 0 \tag{12}$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = Q - L^{\alpha} K^{\beta} = 0 \tag{13}$$

Solving for *K* and substituting *Q* from equation (7):

$$K = \left[\left(\frac{\beta}{\alpha} \right) \left(\frac{w}{k} \right) \right]^{\alpha/(\alpha+\beta)} \left[\left(\frac{\frac{d\omega_d}{dQ_d}}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right) \overline{D} + \left(\frac{1}{\frac{d\omega_d}{dQ_d} + \frac{d\omega_f}{dQ_f}} \right) (\omega_d - \omega_f) \right]^{1/(\alpha+\beta)} \tag{14}$$

Therefore, *K* is positively related to total demand (sum of domestic and foreign demand) and negatively related to the unit costs of foreign costs relative to domestic costs. As the focus is on the foreign firm of the *MNE*, the capital is largely or entirely, *FDI*. Thus, *K* can be replaced with *FDI* in equation (14). Based on the theories of *FDI* (Dunning, 1977, 1988, 1993, 2001; Hymer, 1976; Knickerbocker, 1973; Vernon, 1966) and the empirical evidence for agriculture (Djokoto, 2012a; Farr, 2017; Husman and Kubik, 2019; Kassem and Awad, 2012; Lv, *et al.*, 2010; Rashid and Razak, 2017) and the total economy (Harding and Javorcik, 2007; Morisset, 2003; Barthel *et al.,* 2008; Djokoto, 2012b; Dah and Khadijah, 2010; Nyarko *et al.*, 2011), the function for the drivers of *FDI* is:

$$AGFDI = f(AGGDPC, EXRATE, AGTO, AGLAND, INF, POLITY2) \tag{15}$$

The variables, their definitions and data source are reported in Table 1.

As Boddewyn (1979a,b, 1983a,b, 1985) has amply demonstrated that the theories that explain *FDI* are the reverse of those for *FD*, equation (15) is underpinned by the theories of *FD*. As will soon be shown, the data employed in this study has two important distinguishing characteristics; it is made up of countries at different levels of development, and there are repeated observations for some countries but different years, yet the structure of the data is not such as to qualify as a panel. As such, it is necessary to control for these. Thus, additional variables are introduced into equation (15) and defined in Table 1. According to UNCTAD (2020), negative *FDI* is *FD*. As the focus of the study is *FD*, the *AGFDI* can be replaced with *AGFD*. Consequently, equation 15 can be augmented as:

$$AGFD = f(AGGDPC, EXRATE, AGTO, AGLAND, INF, POLITY2, DVP, TRS, YEAR) \tag{16}$$

Table 1: Variable definitions, measures, and sources of data.

Variable	Definition and measure	Measurement	Source
LNAGFD	Foreign divestment	Negative of foreign direct investment into agriculture	FAOSTAT
LNAGGDPPC	Agricultural Gross domestic per capita	Agricultural Gross domestic product in current prices divided by population	FAOSTAT
LNEXRATE	Nominal Exchange rate	Local currency to 1 US dollar	UNCTADSTAT, WDI
LNAGTO	Agricultural trade openness	Sum of agricultural exports and exports to agricultural GDP	FAOSTAT
LNAGLAND	Proportion of agricultural land in country land area	Ratio of agricultural land to total country land area	FAOSTAT
INF	Inflation	Annual growth rate of consumer price index	UNCTADSTAT, WDI
POLITY2	Political Regime Characteristics and Transitions	-10 to +10	Centre for Systematic Peace
DVP	Developing countries	DVP=1, 0 otherwise	-
TRS	Transition economies	TRS=1, 0 otherwise	-
DVD	Developed countries	DVD=0	-
LNYEAR	Year of data	Four-digit year	-

Notes: 1. The prefix *LN* denotes natural logarithm. 2. FAOSTAT- Food and Agricultural Organisation statistics centre: http://www.fao.org/faostat/en/. 3. UNCTADSTAT – United Nations Conference of Trade and Development Data centre: https://unctadstat.unctad.org/EN/. 4. WDI – World Development Indicators of the World Bank: https://databank.worldbank.org/home.aspx. 5. Centre for Systematic Peace: https://www.systemicpeace.org/inscrdata.html
Source: own composition

Table 2: Descriptive statistics.

Variable	Mean	Standard deviation	Minimum	Maximum
		Explained variable(s)		
FD	0.0071	0.0259	4.50e-06	0.3000
LNFD	-6.631	1.8617	-12.3113	-1.2038
		Explanatory variables		
Theoretical variables				
GDPPC	665.2623	1,261.6060	15.2965	10,252.8200
LNGDPPC	6.0505	0.8186	2.7276	9.2353
EXRATE	339.9892	1,233.2330	0.0568	10,389.9400
LNEXRATE	1.9037	2.6770	-2.8678	9.2486
AGTO	7.6797	26.1065	0.0317	247.5623
LNAGTO	1.0715	1.2773	-3.4510	5.5117
AGLAND	0.4047	0.1729	0.0109	0.8491
LNAGLAND	-1.0450	0.6357	-4.5215	-0.1636
Economic and political controls				
INF	4.6757	8.1377	-0.9222	74.3000
POLITY2	8.4220	3.2638	-6	10
Data controls				
DVP	0.2775	0.4490	0	1
TRS	0.0405	0.1976	0	1
DVD	0.6821	0.4670	0	1
YEAR	2004.751	6.4350	1991	2017
LNYEAR	7.6033	0.0032	7.5964	7.6094

Note: The prefix *LN* denotes natural logarithm.
Source: own composition

The subsequent model specification is:

$$LNAGFD = \alpha_0 + \alpha_1 LNAGGDPC + \alpha_2 LNEXRATE + \\ + \alpha_3 LNAGTO + \alpha_4 LNAGLAND + \alpha_5 INF + \\ + \alpha_6 POLITY2 + \alpha_7 DVP + \alpha_8 TRS + \alpha_9 YEAR + \varepsilon_i \quad (17)$$

Where the prefix *LN* stands for natural logarithm. The data used in this study is made up of 50 countries across all three levels of development according to the United Nations (2020) (Appendix). As the data is not strictly a panel, equation (16) is estimated by Ordinary Least Squares (OLS) having controlled for the repeated observations using the year of observation. Violations of the OLS namely, heteroscedasticity, multicollinearity and misspecifications were tested.

Results and discussion

Background of data

The data ranged from 1991 to 2017 (*YEAR*) and represented observations of countries for which FDI is negative (Table 2). This is the singular driver of the number of countries and years of the data. The FD ranged from 4.50e-06 (Republic of Korea in 2000) to 30% (Belgium in 2005). The maximum is appreciable; indeed, the penultimate highest is 12% (Singapore in 2004), less than half of the maximum. The mean of 0.71% coincides with the value for Lithuania in 2015. The least *AGGPPC* of $15.29/person was for Singapore in 2004 and the maximum of $10,252/person relates to Panama in 2009. Thus, distributing agricultural production by the national population, Singapore gets the least whilst Panama gets the highest. Regarding local currency relative to the US dollar, it was least expensive to acquire $1 using Venezuela's Bolívar in 1991 (Bs 0.0568) and most expensive to acquire $1 in Indonesian Rupiah (Rp 10,390) in 2009. *INF* and *POLITY2* both recorded negative values. The latter shows a low level of democracy and political tolerance (Morocco - 2005, 2008 and Kazakhstan - 2004, 2007). The negative values in the two series prevented their natural logarithm transformation. Regarding the other data controls, most of the countries that experienced FD in agriculture over the study period are developed countries, 68% (28 countries) and the least is economies in transition, 4% (3 countries).

Results from the estimations

The estimations, model 1 to 8, are reported in Table 3. Model 1 is the outcome of estimation with the theoretical variables only. The model appeared to be incorrectly specified with the statistical significance of the Ramsey RESET test (Ramsey, 1969) measured at 1%. Upon correcting for the misspecification by including a square term of the prediction of *LNFD* (*LNFD1SQ*), the adjusted R squared doubled but the highest VIF exceeded the threshold of 10, a result that is indicative of multicollinearity. Furthermore, the variance of model 2 became heteroscedastic (Breusch and Pagan 1979;

Table 3: Estimation results.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LNGDPPC	-0.5914***	-8.3519***	-0.6252***	-9.3453***	-0.6268***	-9.6426***	-0.5375**	-0.5230**
	(0.1953)	(1.9695)	(0.2097)	(2.1453)	(0.2103)	(2.1853)	(0.2106)	(0.2209)
LNEXRATE	-0.1297**	-1.7976***	-0.1273**	-1.8412***	-0.1323**	-1.9753***	-0.1946***	-0.1943***
	(0.0640)	(0.4258)	(0.0644)	(0.4243)	(0.0659)	(0.4493)	(0.0713)	(0.0716)
LNAGTO	0.0331	0.5494***	0.0273	0.4936***	0.0324	0.5931***	0.2091	0.2209
	(0.1425)	(0.1889)	(0.1434)	(0.1785)	(0.1444)	(0.1932)	(0.1607)	(0.1694)
LNAGLAND	0.1066	2.0277***	0.0989	1.9609***	0.0875	1.8223***	0.0579	0.0568
	(0.2221)	(0.5300)	(0.2233)	(0.5036)	(0.2259)	(0.4710)	(0.2276)	(0.2283)
LNFD1SQ		0.9719***						
		(0.2455)						
POLITY2			0.0209	0.3434***	0.0295	0.4904***	0.1353**	0.1347**
			(0.0465)	(0.0906)	(0.0520)	(0.1218)	(0.0658)	(0.0660)
LNFD2SQ				1.0224***				
				(0.2504)				
INF					0.0077	0.1233***	0.0113	0.0109
					(0.0204)	(0.0340)	(0.0223)	(0.0224)
LNFD3SQ						1.0535***		
						(0.2543)		
DVP							1.1188**	1.1317**
							(0.5034)	(0.5081)
TRS							2.1595**	2.1987**
							(0.9708)	(0.9891)
LNYEAR								-10.3939
								(46.1164)
Constant	-2.7298**	5.8056**	-2.7074**	6.7523**	-2.8140**	5.3604**	-4.7618***	74.1650
	(1.3433)	(2.5119)	(1.3474)	(2.6512)	(1.3802)	(2.3724)	(1.5643)	(350.1924)
				Model diagnostics				
Observations	173	173	173	173	173	173	173	173
R-squared	0.0959	0.1735	0.0970	0.1794	0.0978	0.1828	0.1334	0.1336
R-squared Adjusted	0.0744	0.1487	0.07	0.1498	0.0652	0.1482	0.0911	0.0858
F- statistic	4.46***	7.01***	3.59***	6.05***	3.00***	5.27***	3.15***	2.79***
Highest VIF	1.78	216.55	1.79	229.98	1.81	239.13	2.79	2.83
Breusch-Pagan test	2.46	5.16**	2.29	3.55*	2.03	3.76*	0.03	0.01
Ramsey RESET test	5.4***	-	6.15***	-	6.34***	-	2.25*	2.20*

Notes: 1. Dependent variable is LNFD. 2. Standard errors in parentheses. 3. *** is p<0.01, ** is p<0.05, and * is p<0.10.
Source: own composition

Cook and Weisberg, 1983). In model 3, with the inclusion of *POLITY2*, there was misspecification and the subsequent correction created a new multicollinearity problem (VIF = 229.98) (Model 4) (Cuthbert and Wood, 1980). On adding *INF,* model 5 is also incorrectly specified and correcting for this also led to above 10 threshold VIF of 239.13. It is instructive to note that the corrections for the misspecification always created a multicollinearity problem. The misspecification correction variable then gives rise to another problem whose most appropriate resolution would require dropping the correction variable.

To get out of the dilemma, the data controls were added. First, the levels of development (Model 7). Second, is the year control variable (LNYEAR) as in model 8. Whilst producing statistically significant F statistics, the VIFs are below 3.00 and no evidence of heteroscedasticity. Based on a cut-off of 5%, models 7 and 8 are not incorrectly specified. Thus, they do not violate the assumptions of the OLS hence appropriate for discussion. The difference between model 7 and 8 is the introduction of *LNYEAR* that drove the statistical significance of the constant (model 7) to statistical insignificance (model 8).

Using model 8, the statistical significance and sign of the coefficients of *LNGDPPC* and *LNEXTRATE* are consistent across all eight models. The magnitude and sign of the coefficients of *LNAGTO* and *LAGLAND* are consistent across the models not corrected for misspecification. The sign and statistical significance of the magnitude of *POLITY 2* are consistent for four out of six models. That for inflation is consistent for three out of the four models containing *INF*. The sign and statistical significance of the magnitude of the development controls are also consistent in model 7 and 8.

It is worth noting that the F statistics are statistically significant. These imply that the explanatory variables jointly explain the variability in the explained variable. However, the adjusted R squared values of model 7 and 8 are small, about 10%. As the R-squared represents the scatter around the regression line, the low R squared shows a wide variation around the trend line. This does not, however, vitiate the relationship between the explanatory variables and the explained variable which is the focus of the paper.

Discussion of drivers of foreign divestment

The statistically significant coefficient of -0.5230 for *LNGDPPC* suggests a 1% decrease in *LNGDPPC* would increase FD by 0.5230%. It would be observed that the magnitude of 0.5230 is the largest among the coefficients of the theoretical, macroeconomic and political controls. Thus, not only is market size a driver of FD, but it is also the single most important theoretical driver of FD. This finding is synonymous with those for FDI. Just as market size increased with FDI (Djokoto, 2012a; Farr, 2017; Husmann and Kubik, 2019; Kassem and Awad, 2012; Lv *et al.*, 2010; Rashid and Razak, 2017), market size increased with the decline in FD. Increase in market size affords the sector's economic agents to purchase the products of the sector. This is further enhanced by households from other sectors as agriculture remains the most important provider of food. Increase in the size of the sector is also associated with the increased availability of resources. Thus, the decrease in market size would discourage FDI and invariably encourage FD.

The negative and statistically significant coefficient of *LNEXRATE* means that depreciation of the country local currency by 1% would induce 0.19% decrease in FD. Owing to concessions for imports for MNEs, they tend to import materials including raw materials. Depreciation of the country's currency would make the imports more expensive. Also, this could lead to an increase in other imported goods, leading to an increased cost of living. This could drive up wages. Generally, the increased cost of production could diminish profits and encourage FD out of agriculture. This finding is consistent with Kassem and Awad (2012) with regard to the significance of the coefficient. Whilst the exchange rate promoted FDI, the price of the currency discouraged FD. Djokoto (2012a) and Rashid and Razak (2017) however, found no effect of exchange rate on FDI.

Openness to trade is positive but statistically insignificant. This is consistent with the findings of Djokoto (2012b) but at variance with the conclusions of Farr (2017) and Kassem and Awad (2012). As the exchange rate depreciates, although exports become cheaper, imports become more expensive. MNEs in agriculture that depend on imported raw materials would face high costs. They would thus, fail to reap the benefits of cheaper exports. The interaction of the exports and imports would, therefore, have no discernible effect on FD.

In theory, location resources should determine FDI and for that matter FD. The findings of this study, however, show that access to land resources does not have a discernible effect of FD. Although consistent with Djokoto (2012a), the finding disagrees with Farr (2017), Husmann and Kubik, (2019) and Rashid and Razak (2017). The measure of land used in this study is agricultural land use as a proportion of total country land. Not only does this reflect agricultural land use in the country, but it also captures land grab influences on agriculture (Byerlee *et al.*, 2015; Deming, 2012; Escresa, 2014; Fraser, 2019). Divestments that involve transfers of capital leaving control of land resources or transfer of land to domestic or other MNEs could account for the statistically insignificant effect.

Increase in *POLITY2* variable by 1% would induce 0.1347% rise in FD. Although this is not an encouraging outcome, it is to be expected. Improvements in political regime characteristics and transitions promote FDI into agriculture (Djokoto, 2012a). This is often associated with investment laws that guarantee the security of investment. Just as these attract FDI into the sector, the same window offers an opportunity to MNE's affiliates in host countries to divest if or when it becomes necessary. The consolation, however, is that the agricultural sector of the host economy would have attracted FDI and reaped the benefits therefrom before the FD. Moreover, between the period of 1991 to 2017, the FAOSTAT reported 984 instances of FDI (positive) whilst the occurrences of FD number 173 (less than 20% of the FDI). Further, the instances of FD did not mean there was no FDI, rather the FD was more than the FDI.

The positive sign of the coefficient of *INF* suggests as inflation worsens FD increases. This is not surprising as Kassem and Awad (2012) reported worsening inflation drove

down FDI. Djokoto (2012a) however, reported a positive effect of inflation on FDI in Ghana and explained that the generally high inflationary environment was accommodated by FDI. Moreover, other drivers are known to have stronger effects on FDI than inflation. In the case of the current study, the magnitude of the coefficient of the *INF* is statistically insignificant.

The development controls show statistically significant coefficients. The magnitude of *TRS* is more elastic than that of *DVP*. Whilst these suggest *TRS* experienced more FD than *DVP*, the sum of the outcome is that developing countries and transition economies experienced FD more than developed countries. This seemed to depart from the univariate position that most developing countries experienced FD because other variables have now been accounted for. Indeed, developed countries tended to be more stable politically than developing and transition economies. Moreover, although agriculture becomes less and less important as its shares to total GDP decline, the size of the sector continues to be large. A combination of the transition process and some instability within the three transition countries could have accounted for the higher elasticity.

Although not statistically significant, the coefficient of *LNYEAR* is negative. This presents a situation of decline in FD over time, which is encouraging. This is to be expected as the size of the agricultural economies of countries tends to increase over time.

Concluding remarks

This paper used multilateral FD data covering 1991 to 2017 for 50 countries to estimate the drivers of agricultural FD. Identifying the factors that determine FD would offer an opportunity for policymakers to know the policies that can discourage FD. Also, knowledge of its directional effect would suggest ways to use policy to appropriately influence FD. It has been found that market size, exchange rate, political regime characteristics and transitions as well as a country's level of development drive FD out of agriculture globally. However, a country's openness to trade and access to land resources have not been found to determine FD.

As market size was measured as GDP per person, agricultural economic managers acting together with Central Government should formulate policies to control their country's population as increased technology adoption is leading to increased unemployment in the agricultural sector. A declining population would increase the size of GDP per capita *ceteris paribus*. Agricultural GDP should be increased through increasing domestic and foreign investment. The use of such policy tools should increase the size of the economy and decrease FD from the sector.

There is also a need to manage foreign currency exchange rates in order to reduce the cost of acquiring the US dollar within bounds that would not unduly discourage essential imports whilst simultaneously facilitating exports from the sector. Policymakers need to balance consideration of the effects of exchange rate movements on the agricultural sector with those of the wider economy as the exchange rate affects all other sectors.

Notwithstanding the positive effects political regime characteristics and political transitions have been shown to have in relation to FD, political regime characteristics should be enhanced as the benefits to the sector in terms of FDI outweigh the effects of FD. As developed countries have tended to experience less FD than developing and transition economies, these less advanced countries must redouble their efforts as they push on towards becoming developed countries themselves. This would require, among other things, increasing efficiency in the agricultural sector through appropriate and improved technology, as well as measures such as expanding the non-agricultural sector to absorb the resultant excess labour. Generally, increasing the share of the non-agricultural sector feeds into the structural transformation narrative of economic development. Although the model discussed fits the data despite the low adjusted R squared, future studies could usefully employ machine learning; this could improve the model fit.

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Appendix 1: List of countries in the sample.

Developing			Developed		
Bolivia	Madagascar	Uruguay	Australia	France	Netherlands
Cambodia	Malaysia	Venezuela	Austria	Germany	Poland
Chile	Morocco	Transition	Belgium	Greece	Romania
Colombia	Mozambique	Albania	Bulgaria	Iceland	Slovakia
Costa Rica	Panama	Kazakhstan	Croatia	Italy	Slovenia
El Salvador	Paraguay	North Macedonia	Cyprus	Japan	Spain
Honduras	Rep. of Korea		Czechia	Latvia	Sweden
Indonesia	Singapore		Denmark	Lithuania	UK
Israel	Thailand		Estonia	Malta	USA

Source: own composition