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Are Large-Scale Land Investments only for Food Production? An Investigation of the Determining Factors and Sectoral Allocation of the Investments

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Abstract

The economic potentials of countries in part depend on their natural resources endowment and productive utilization. Land remains invaluable natural resource that is precious to man, but it is non-renewable. The non-renewability of land and the scarcity of fertile, arable and productive land led to its increasing demand. A lot of people in developing countries, particularly in Africa, depend on land for their economic activities and/or livelihood. This is due to the fact that, it is from it that food is provided, shelters are constructed, infrastructures are laid and other valuable minerals are found. Recent economic events, particularly the commodity crisis of 2007-2008, have shown that there had been increasing demand for land in the global south, especially in Africa, which affected the availability of fertile and arable land. It is on this basis that this study investigates whether the motivation for the global land rush in Africa is mainly for food production purposes or otherwise. This study adopts a selection bias model with firms' heterogeneity using a negative binomial estimator to find that the acquisition of large-land is not solely for agricultural food production but also for forestry, conservation, renewable energy and tourism. The findings also indicate that the propensity to acquire land is determined by the availability of arable land, economic size of the investors' countries, institution capacity, governance and security and safety in the destination countries. However, at the intensive margin, economic size does not stimulate land investment, so also trade, population density, institutions and security of life and property. The availability of arable land, good governance and adequate precipitation are the land investment-enhancing factors.

Introduction

Evidence has shown that the demand for global land as increased over time and the trend is expected to continue in the future, especially for Africa. Anseeuw et al. (2012) report shows that about 4.8% of total Africa's agricultural area has been invested, which is like the territory of Kenya. Many of these land investments are directed towards poorest countries and less globally integrated. However, the limited access to fertile land necessitated frequent struggle for the acquisition of land and conflicts over the best usage. Thus, access to land has become more competitive among large – scale investors in Africa. Recent years had witnessed influx of large-scale land investors in Africa, particularly for agricultural production and exporting. Although, the Comprehensive Africa Agricultural Development Programme of the African Union Commission specifically enjoined national agricultural investment as part of its programme, this cannot be the main reason for the volume of investments in land, especially large – scale land investments. Other factors could have contributed exogenously to the investments, in which foreign investors are deeply involved. It is on

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this basis that this study is situated, which is to investigate whether large –scale land investment in Africa is solely for agricultural purpose or not. A critical review of the literature indicates that only scanty empirical studies exist in this area of research. Majority of these scanty studies either apply normative, qualitative or descriptive analysis (see Brüntrup, 2011; Cotula et al., 2009; Molua and Thiombiano, 2015). The closest studies to this present one are Arezki, et al. (2015) and Schreur (2012). Both studies investigate the determinants of foreign investment in land with use of gravity models However, this present study uses the selection bias model by Helpman, Melitz and Robenstain (HMR) (2008) by considering firm heterogeneity in a trade gravity model with negative binomial estimator.

Material and Methods
In order to investigate whether large –scale land investment in Africa is solely for agricultural purpose or not, a standard count model represented in a general form of a conditional probability function is specified as:

$$Pr(Y_{ijpt} = y_{ijt} \mid x_i) = \frac{\exp(-\exp(x_{ijt}'\beta))\exp(y_{itj}x_{ijt}'\beta)}{y_{ijt}!} \qquad (1)$$

where subscripts i, j, p and t denote investor, target country, intention/sectoral allocation and time respectively; y is the count variable, in this case, the total contract size of the large-scale land investment in Africa; x is the vector of independent variables of the model and β is the vector of the associated parameters. A negative binomial estimator (NBE) is employed in this study for the count model given the fact that the assumption of equi-dispersion of the Poisson estimator is unlikely to hold (Martinez-Zarzoso, 2013; Santos Silva and Tenreyro, 2006) because it does not fully account for the presence of unobserved heterogeneity, which makes the conditional variance greater than the conditional mean. Thus, the negative binomial model, a modified Poisson model is alternatively employed to deal appropriately with the occurrence of the overdispersion in the dependence variables. In line with Winkelmann (2008) and Kareem et al. (2015), the NBE estimator is specified as follows:

$$Pr\big[y_{ijt} \mid x_{ijt}, \alpha\big] = \frac{\Gamma(\alpha + y_{ijt})}{\Gamma(\alpha)\Gamma(y_{ijt}+1)}\left(\frac{\alpha}{\alpha + \exp(x_{ijt}\beta)}\right)^{\alpha}\left(\frac{\exp(x_{ijt}\beta)}{\alpha + \exp(x_{ijt}\beta)}\right)^{y_{ijt}} \qquad (2)$$

Where Γ is the gamma function, α is the dispersion term that indicates the extent to which the variance of the dependent variable disperses from the mean, which is assumed to be greater than one. Based on the estimator's overdispersion assumption, its variance function is specified as:

$$Var[y_{ijt} \mid x] = (1 + \alpha^{-1})\exp(x_{ijt}\beta) \qquad (3)$$

In equation 3, the model's expected value is given as that of Poisson model. However, the variance is specified to include the mean $\exp(x_{ijt}\beta)$ and an unobserved heterogeneity given as a dispersion parameter α that allows unobserved heterogeneity to be incorporated into the model. Also, the dispersion parameter [1] takes on values greater than 1, thereby explicitly taking care of overdispersion. The larger the α, the larger the degree of overdispersion in the dependent variable. The data point is 2000 to 2014 for 49 Africa countries. The Land Matrix database provided the contract size of the investments. Other data sources are; World Development Indicators of the World Bank. the World Integrated Trade Solution database of the World Bank.

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[1] This dispersion parameter serves as a formal test of overdispersion for the dependent variable.

Results and Discussion

This study finds from all segments of the large-scale land investments that agriculture, conservation, forestry, renewable energy and tourism are the main purposes that drive large-scale land investment in Africa. The results show that agriculture remains the main impetus for these investments, which implies that more acquisition of arable land in Africa will lead to less availability of this natural resource for other purposes. The implication is that global large-scale land acquisition for agriculture purpose will adversely affect the number of land that can be used for other economic activities, given that land as a natural resource is not renewable. Agricultural large-scale land acquisition includes intention for food crops, biofuels, livestock, and non-food agricultural commodities. At times, the acquired large-scale land is used for multipurpose such as biofuels, food crops and renewable energy. A perusal of Land Matrix database shows different combination of intentions for the acquired large-scale land. In addition, the acquisition of large-scale land for tourism purpose significantly does not exclude it use for other purposes. Similar result is obtained for conservation and renewable energy, such that the more large-scale land acquisition for conservation and renewable energy, the higher the hectares of land acquired are put to use for other economic activities. However, the large-scale land acquired for forestry has limitation for other purposes, given the magnitude of its coefficient.

Table 1: Results of the Sectoral Destinations of Large-Scale Land Investment

Variable	Foreign Investment	Domestic Investment	Foreign & Domestic
Agriculture	-0.1138[a]	-0.1094[a]	-0.1123[a]
	(0.0058)	(0.0078)	(0.0047)
Conservation	0.1310[a]	0.2149[a]	0.1566[a]
	(0.0102)	(0.0143)	(0.0086)
Forestry	0.0352[a]	0.0964[a]	0.0537[a]
	(0.0082)	(0.0097)	(0.0064)
Renewable Energy	0.1449[a]		0.1471[a]
	(0.0210)		(0.0207)
Tourism	0.1577[a]		0.1599[a]
	(0.0089)		(0.0083)
Constant	2.2619[a]		2.2596[a]
	(0.0054)		(0.0043)
Observations	11,392	5,096	16,488
Wald Chi2	2514.30	1411.60	3551.71
	(0.0000)	(0.0000)	(0.0000)
Pseudo R^2	0.0091	0105	0.0093
Log Pseudolikelihood	-24896.74	-11026.94	-35928.90

Source: Computed
Note that a, b and c stand for 1, 5 and 10% significant levels. The figures in parentheses are the robust standard errors.

Conclusions and Outlook

The issue of land among the other natural resources has been topical for a while, but it became more prominence during and after the commodity price crisis of 2007/2008. Prior to this crisis, most of the land issues were characterized by the impact of land tenure, reform, rental and market on the livelihood and welfare of smallholder farmers, households and comminutes. An investigation into the sectoral allocation and the determinants of the global large-scale land investment from the foreign and domestic land investors is carried out in this study. The empirical strategy for this study adopts the standard count model. At the extensive margin of investment; the propensity, probability and/or the expression of interest to acquire large-scale land is being determine by the availability of arable land, which is investment enhancing. Other determining factors are: economic size of the investor' countries in particular, which is also investment-enhancing; weak institution is land investment-inhibiting; governance encourages investment; trade is investment inhibiting; and

security and safety de-motivate investment. At the intensive margin, economic size does not stimulate land investment, so also trade, population density, institutions and security of life and property. However, the availability of arable land, good governance and adequate precipitation are investment-enhancing factors of global large-scale land investment to Africa. Besides, the main sectoral direction of these land investments is the agricultural sector, though there are other sectoral allocation, particularly to renewable energy and tourism. Thus, the study concludes that there are impetus, motivation and incentive for the propensity and probability of expression of interest as well as the statistics of actual large-scale land investment to increase in the future, particularly in the agricultural, renewable and tourism sectors beyond the current land deals and/or transaction, despite the insecurity in some destinations in Africa.

References

Anseeuw, W., Mathieu, B., Thomas B., Markus, G., Jann, L., Peter, M., and Kerstin, N.(2012) 'Transnational Land Deals for Agriculture in the Global South: Analytical Report based on the Land Matrix Database'. CDE/CIRAD/GIGA, Bern/Montpellier/Hamburg.

Arezki, R., Deininger, K. and Selod, H. (2015) 'What Drives the Global "Land Rush?' World Bank Economic Review

Brüntrup, M., (2011) 'Detrimental Land Grabbing or Growth Poles? Determinants and potential Development Effects of Foreign Direct Land Investments'.Technikfol-genabschätzung –Theorie und Praxis. German Development Institute, Bonn.

Cotula, L., Sonja, V., Rebeca, L. and James, K.(2009) 'Land Grab or Development Opportunity? Agricultural investment and international land deals in Africa'. IIED/FAO/IFAD, London/Rome.

Helpman, E., Melitz, M. and Rubinstein, Y. (2008). Trading Partners and Trading Volume.*Quarterly Journal of Economics* 123 (2): 441-487.

Kareem, F. O., Bruemmer, B. and Martinez-Zarzoso, I. (2015), 'The Implication of European Union's Food Regulations on Developing Countries: Food Safety Standards, Entry Price System and Africa's Exports', *GlobalFood Discussion Paper*, No.61.

Martinez-Zarzoso, I. (2013) "The log of Gravity Revisited", Applied Economics, Volume 45, Issue 3. University of Gottingen.

Molua, E.L. and Thiombiano, L. (2015) 'Foreign Demand on Land in Africa: Some Thought on Decision Making in the Central Africa Region, Journal of Sustainable Development, Vol.8, No.1, 44-53

Santos Silva, J.M.C. and Tenreyro, S. (2006) "The log of gravity", The Review of Economics and Statistics, (88):641-658.

Schreur, D.A.M. (2012) 'Large – Scale Foreign Land Investment in the Global South: Trend and Determinants', An unpublished MS.c Thesis, University of Amsterdam.

Winkelmann R (2008) Econometric Analysis of Count Data 5th Edition. Heidelberg, New York: Springer.