Does Financial Sector Development Enhance the Relationship between FDI and Economic Growth? A Comparative Study of East African Countries

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Abstract: This study examines the causal relationship between FDI and GDP growth in a number of East African countries, focusing on the impact of financial sector development on this relationship. There are strong theoretical reasons to believe that a developed financial sector will enhance the impact of FDI on growth, but empirical evidence remains scant. This study looks first at the short term causal relationship between FDI and GDP growth, using a robust methodology that avoids issues associated with Granger causality testing. This testing indicates little evidence of a relationship. Johansen cointegration testing yields little evidence of a long run relationship when a VECM containing just FDI and GDP growth is estimated, however once variables proxying financial sector development and an interaction variable between FDI and financial sector development are included, we find that although FDI and GDP growth may not be cointegrated directly, there is a relationship running through their interaction with the financial sector, and that FDI only appears to have a positive impact on GDP growth in cases where the financial sector is more developed. This finding is in line with the findings of previous researchers, and has important policy implications.

Keywords: FDI, Financial Sector Development, Cointegration, Causality.

1. INTRODUCTION

FDI is widely seen as a key element in the development process, helping developing countries transition from low to middle income status. Perhaps unsurprisingly, there is a huge literature surrounding the relationship between FDI and economic growth. There is also a significant body of literature looking at the relationship between financial sector development and growth. Some of the literature related to these relationships is reviewed below. However, there has been little in the way of empirical investigation into the importance of financial sector development in enhancing the impact of FDI flows on growth. This is somewhat surprising, as there is an important body of theoretical literature on this topic. This paper seeks to test the hypothesis that financial sector development is an important precondition for FDI to enhance growth using a selection of East African countries as case studies.

East Africa has been chosen because the region contains a number of highly dynamic economies that have seen rapid development in recent years, particularly in their financial sectors. Many of these countries have taken great strides to improve their macroeconomic performance, making them more attractive to foreign investors; not least, they have seen a strengthening in their fiscal positions, the liberalisation of exchange controls, and significant reductions in inflation. At the same time, financial liberalisation, upgrades in institutional and regulatory capacity and the expansion of cross-border banking activities have resulted in a deepening of the financial sectors of a number of countries of the region, making them more stable and resilient. Financial innovation has been particularly important in East Africa, with mobile banking allowing banks to provide services to those even in remote areas. That said, the improvements have not been universal; financial inclusion remains limited, and high costs, short lending maturities, low levels of competition and high levels of concentration inhibit the ability of the countries' financial sectors to reach their full potential in supporting the real economy.

2. THEORETICAL ASPECTS AND LITERATURE REVIEW

There is a substantial body of literature that investigates the relationship between FDI and growth. From a theoretical perspective, much is made of the importance of spillovers (Grossman and Helpman, 1991; Barro and Sala-i-Martin,1995). De Mello (1999) hypothesises that FDI as a positive impact on growth through enhancing technological progress and the accumulation of physical and human capital. It can generate positive effects on productivity, competitiveness and job creation in host countries. A number of empirical studies support the hypothesis of the existence of a positive causal relationship between FDI and economic performance (Walsh and Yiu, 2010; Carcovick and Levine, 2005; Borensztein *et al*. 1995).

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There is also a burgeoning literature examining the relationship between financial development and growth, going back as far as Schumpeter (1911), who hypothesises that financial development enhances growth by reallocating resources to growth-inducing sectors and by promoting entrepreneurship in these sectors; more recent work on this hypothesis has been undertaken by Fung (2009). McKinnon and Shaw (1973) stress that financial liberalisation is a necessary but not sufficient condition to encourage investment in new technologies and technological progress. Later studies use an endogenous growth theory approach to study the impact of financial sector development on growth, stressing the important role of financial intermediaries in collecting and analysing information about firms and markets (Greenwood and Jovanovic, 1990), and the role of financial development in increasing the return on innovation by improving the evaluation of investment projects via information acquisition; by mobilising household savings for innovative endeavours; and through the ability to share and diversify risks and enhance the innovation of intermediate goods (King and Levine 1993). As noted by Levine (1997), better savings mobilisation not only increases capital accumulation, but it also improves resource allocation and boosts technological innovation. Other researchers hypothesise that economic growth causes financial development (Lucas, 1988; Stern, 1989). The empirical findings on the causal relationship between financial sector development and growth have been mixed (Baliamoune-Lutz, 2013; Ewetah and Okodua, 2013; Akinlo and Egbetunde, 2010; Dabos and Gantman, 2010).

Until relatively recently, there had been little in the way of studies looking at the co-dependency between FDI and financial development, but there has been an increasing recognition that the impact of FDI on growth can depend on the extent of financial sector development. These studies are based on the idea that as FDI inflows increase, the cost of innovation falls, and that financial sector development may increase the speed of innovation and technical spillovers from FDI. It is also hypothesised by Alfaro (2006) that this relationship may arise via backward linkages, insofar as financial sector development is able to facilitate linkages between foreign and domestic firms by easing credit constraint and lowering lending and deposit rates. Hermes and Lensink (2003) and Bailliu (2000) find that FDI only has a positive impact on growth if the financial sector is well developed. Alfaro *et al.* (2004) obtain a similar result using stock market indicators. Not all studies come to this conclusion: Durham (2004) and Carcovick and Levine (2005) have found that no significant evidence of this relationship, giving rise to the idea that the relationship may depend on the level of development of the financial sector of the country concerned. This possibility is reinforced by the findings of Chee and Nair (2010) who undertake a panel data study looking at 44 countries in Asia and Oceania, and find that the effect is strongest for the least developed countries of the region.

There is an interest to understand the causal relationship between these three elements; a better understanding of the dynamics of the relationship can have important policy implications. Using a similar approach to that proposed for this study, Choong *et al*. (2004) tested the co-dependency hypothesis for three developed countries and six East Asian countries in order to investigate the role of the domestic financial system in transferring the technological diffusion embodied in FDI inflows. They find that FDI and economic growth are not cointegrated by themselves directly but rather through their dynamic interaction with the development of the domestic financial sector, meaning that FDI will result in positive technology diffusion (and therefore growth) in the long run only if the evolution of the financial sector has reached a certain level. Adeniyi and Omisakin (2012) undertake a similar study looking five West African economies and find that for most of these countries financial sophistication matters for the benefits of FDI to register on economic growth.

This study will seek to enhance the literature in the third of these areas, namely investigating the relationship between financial sector development, FDI and economic growth, using data from East Africa. This region is an interesting case study because it includes a number of economically similar and interdependent countries, which have been successful in attracting FDI, which have significant differences in terms of financial sector development.

3. METHODOLOGY AND DATA

Causality testing is traditionally used to examine the short term relationship between variables, and usually either Granger or Sims tests are used (see Granger, 1969; Sims, 1972), which involves formulating null hypotheses as zero restrictions on the lagged coefficients of a subset of the variables. The problem with such tests is that they are grounded in asymptotic

theory and consequently valid only for stationary variables. This means that for non-stationary variables (such as most macroeconomic variables) a vector autoregression must be estimated in differences in order for inferences based on asymptotic theory to be valid. However, unit root tests for stationarity tend to have low power, and typical time-series using macroeconomic data (which tends to be annual) means that sample sizes are relatively small. Consequently, this could result in incorrect inferences. In order to avoid these issues involved in the use of standard Granger causality tests, this paper uses a more appropriate methodology in the form of Toda and Yamamoto's (1995) test, which fits a standard vector autoregression in the levels of the variables, thereby minimising the risks associated with wrongly identifying the orders of intergration of the series (Giles, 1997, Kelly and Mavrotas, 2001). Given that Toda and Yamamoto's methodology intentionally overfits VARs and so may be inefficient when the number of variables and lag length are inappropriate, a sense check is undertaken by also performing standard Granger causality tests. In looking at the long-term relationship between the variables, Johansen and Juselius multivariate cointegration tests will be used (Johansen and Juselius, 1990), with stationarity testing undertaken using Augmented Dickey Fuller tests (ADF; Dickey and Fuller, 1981).

The Johansen and Juselius procedure involves creating a vector autoregression as follows:

$$y_t = \mu + \sum_{i=1}^{p} A_i y_{t-i} + \varepsilon_t$$

Where y_t is a (n x 1) vector of potentially endogenous stationary and non-stationary variables, A is an (n x n) matrix of parameters, μ is a (n x 1) vector of constants and p is the lag length. The system is in reduced form with each variable in y regressed only on lagged variables of both itself and the other variables in the system. This can be rearranged into an error correction mechanism (ECM) to give the following:

$$\Delta y_t = \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} - \Pi y_{t-i} + \mu_t$$

Where $\Gamma_i = -(I_k - A_1 - \cdots - A_i), i = 1,\ldots, p-1$

And $\Pi = I_k - A_1 - \cdots A_p$

Π is the long run matrix which can be written αβ, where α and β are (n x r) matrices. β's cointegrating vectors are the ECMs, and α comprises the parameters which give the speed of adjustment of the system to long run equilibrium parameter levels. The rank (r) of the matrix determines how many combinations of the dependent variables are stationary. We are interested in the case in which the matrix is of reduced rank, in other words there are r stationary linear combinations of the dependent variables, as this suggests the variables are cointegrated. Cointegrating rank is determined using either the maximum eigenvalue test or the trace test.

The maximum eigenvalue test is undertaken as follows. Let λ_i denote the estimated eigenvalues, where *i* = 1,2…n. Then the maximum eigenvalue test is calculated as:

$$\lambda_{\max} = -T \log(1 - \hat{\lambda} i)$$

The null hypothesis is that there are $r = n$ cointegrating vectors, the alternative is that $r \leq n + 1$.

The Trace test is similar to the maximum eigenvalue test:

$$Trace = -T \sum_{i=r+1}^{n} \log(1 - \hat{\lambda} i)$$

In this case, the null hypothesis is again that there are $r = n$ cointegrating vectors, the alternative is that $r \leq n$.

Turning to data, obtaining data on GDP and FDI is straightforward, it is taken from the IMF's International Financial Statistics (IFS) database. The variables are both nominal and in local currency; in all cases the data are deflated. Finding a measure of financial sector development is more complex as there are a number of potential choices (see IMF, 2005). Often, researchers use measures of the size of the financial system relative to GDP (a typical one being broad money, or M2, to GDP). A quantification of the number and types of financial intermediaries is a useful measure of diversity and sophistication of the financial sector. There is also a wide range of potential measures based on competition, concentration and efficiency of intermediaries, such as the total cost of financial intermediation as a share of total assets. The issue with these measures is data availability, and this is a particular issue for developing economies. In the end, based on data availability considerations, a measure of claims by financial institutions on the private sector was used (CPS). This is available for all the countries included in the study in IFS, albeit only until 2008, and

is a reasonable (and frequently used) proxy for financial sector development. The interaction term is constructed using the centred FDI and CPS variables. The series begin in 1985 for Burundi, 1992 for Ethiopia, 1980 for Kenya, 1981 for Rwanda, 1988 for Tanzania, and 1992 for Uganda. The relatively short length of the time series is not ideal, and robustness would be improved by using quarterly data in order to have more observations, however such data is not readily available for the variables being examined, and where available, its reliability cannot be assured. Likewise, the fact that the model does not extend beyond 2008 means that it does not capture the significant financial development that has occurred since this date in several of the countries. Although this may be seen as a limitation, in fact the model seeks to empirically test the theoretical relationship postulated in the literature, as such it is not critical that the most recent observations are not included.

A preview of the data does not reveal anything particularly unexpected. In most cases, GDP in real terms shows a steady increase over time, suggesting the series is non-stationary. The notable exceptions are Rwanda and Burundi, which both show a sharp fall in real GDP after the start of conflicts in 1993/4, recovery was particularly slow in Burundi, which experienced a prolonged civil war. In all cases, credit to the private sector (in real terms) has shown a steady increase, suggesting that the series is also non-stationary. Real FDI has been less predictable, with countries experiencing large fluctuations from one year to the next, reflecting on one side the sensitivity of investors to the macroeconomic and political environment (for example and on the other, the low granularity of such investment, such that a large investment one year can have a big impact on the overall figures. However, when smoothed using a moving average, the trend is generally positive apart from for Rwanda, which saw a large drop in FDI following the genocide, which has picked up again but remains significantly below the pre-1994 period, and Ethiopia, which saw a fall in FDI in the 2004-2008 period.

4. EMPIRICAL FINDINGS AND INTERPRETATION

First we test for short run causality between GDP growth and FDI, and GDP growth and claims on the private sector. As discussed above, we use Toda and Yamamoto's methodology. The first stage of this process is to specify the model, which involves determining the optimal lag lengths of the levels of own and other variables in the model. This is done by minimising the Akaike's Information Criterion – this criterion improves on standard measures of goodness of fit such as RSS or R2 as it takes into account improvements in goodness of fit that arise simply due to increasing the number of explanatory variables in the model. Having calculated the appropriate lag lengths for the model, we can then specify the VAR. Its robustness is tested using misspecification tests. Having determined a lag length k, we then estimate a (k+d)th order VAR where d is the maximal order of integration that we suspect might occur in the process (The augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981) is used to test for unit roots). The coefficient matrices of the last d lagged vectors in the model are ignored (since these are regarded as zeros) and we can test linear or nonlinear restrictions on the first k coefficient matrices using standard asymptotic theory.

The results of the lag length tests are included in annex. The econometric and statistical adequacy of the VAR model are verified to ensure that the model assumptions are supported by the data. System linearity is tested using the Ramsey RESET (R2) test1. Lagrange Multiplier tests (LM1-LM3) are used to test for departures from the independence assumption of the error term. Normality is tested using standard Jarque-Bera (JB) tests. The results of these tests are reported in Table **1**.

The JB, LM and R2 tests indicate that the various models are appropriately specified. As discussed, performing the Toda and Yamamoto test involves adding extra lag of each of the variables to the equations based on the maximum expected order of integration (in this case two) and using a standard Wald test for coefficient restrictions to test whether the coefficients of the lagged 'other' variables (excluding the additional one) are jointly zero in the equation. Interestingly, in almost all cases there is no evidence of causality, indicating that there is no short-term relationship between FDI GDP growth. The only exception is in Tanzania, where there is evidence of a short term causal relationship from GDP growth to FDI. This result gives little support to the notion of a short term relationship from FDI to GDP growth. Standard Granger causality tests confirm these results.

Thus we turn to the question of a long term relationship between FDI and GDP growth. Stationarity

[1]Ramsey (1969). This test the functional form using the square of the fitted values; the null hypothesis is that the coefficients of higher order terms added to the regression are zero.

Table 1: Misspecification Diagnostics

Equation	Wald	JB	LM1	LM2	LM3	R2
Burundi						
GDP(FDI)	NA	NA	NA	NA	NA	NA
FDI(GDP)	NA	NA	NA	NA	NA	NA
Ethiopia						
GDP(FDI)	2.403	1.567	0.118	2.196	2.088	1.876
	0.153	*0.457*	*0.738*	*0.167*	*0.18*	*0.201*
FDI(GDP)	0.588	3.808	1.568	0.701	0.714	3.349
	0.645	*0.149*	*0.246*	*0.528*	*0.578*	*0.105*
Kenya						
GDP(FDI)	NA	NA	NA	NA	NA	NA
FDI(GDP)	NA	NA	NA	NA	NA	NA
Tanzania						
GDP(FDI)	1.596	15.196	0.049	0.076	0.487	8.323
	0.243	*0.01*	*0.829*	*0.927*	*0.698*	*0.012*
FDI(GDP)	11.567	1.269	0.439	1.684	6.76	1.469
	*0.005***	*0.53*	*0.512*	*0.23*	*0.09*	*0.249*
Uganda						
GDP(FDI)	NA	NA	NA	NA	NA	NA
FDI(GDP)	2.224	1.165	0.06	1.7	6.602	0.281
	0.224	*0.559*	*0.814*	*0.273*	*0.05*	*0.615*

Figures in italics are p values. **indicates hypothesis rejected at the 1% level; Kenya and Burundi are noted as NA because the optimal lag lengths of 'other' variables in these cases was zero, intuitively suggesting no relationship exists.

Table 2: Bivariate Cointegration Results

Country (data period)	Null Hypothesis: H°: rank=p	Maximum Eigenvalue Test		Trace Test	
		Test Statistic	Critical Value (95%)	Test Statistic	Critical Value (95%)
Burundi (1985-2008)	p=0	10.129	14.265	11.752	15.495
	p≤1	1.623	3.841	1.623	3.841
Ethiopia (1992-2008)	p=0	3.659	14.265	3.766	15.495
	p≤1	0.106	3.841	0.106	3.841
Kenya (1980-2008)	p=0	22.826*	14.265	27.944*	15.495
	p≤1	5.117*	3.841	5.117*	3.841
Rwanda (1981-2005)	p=0	8.793	14.265	10.584	15.495
	p≤1	1.791	3.841	1.791	3.841
Tanzania (1988-2008)	p=0	29.648*	14.265	31.226*	15.495
	p≤1	1.578	3.841	1.578	3.841
Uganda (1993-2008)	p=0	10.634	14.265	10.658	15.495
	p≤1	0.025	3.841	0.025	3.841

*indicates hypothesis rejected at 5% level.

tests were undertaken using Augmented Dickey Fuller tests (Dickey and Fuller, 1981), and all variables were discovered to be non-stationary in levels, but stationary in their first differences[2]. Table **2** shows the bivariate findings, namely the results of the Johansen and Juselius tests for cointegration between GDP and FDI. The findings indicate evidence of two cointegrating vectors in Kenya, and one cointegrating vector in Tanzania, but no cointegration in the other countries.

Now we move on to test the main hypothesis of the paper, which is that there is a co-dependency between

[2]Results available from the author on request.

Table 3: Multivariate Cointegration Results

Country (data period)	Null Hypothesis: H°: rank=p	Maximum Eigenvalue Test		Trace Test	
		Test Statistic	Critical Value (95%)	Test Statistic	Critical Value (95%)
Burundi (1985-2008)	p=0	31.044*	27.584	53.531*	47.856
	p≤1	13.477	21.132	22.487	29.797
	p≤2	5.073	14.265	9.01	15.495
	p≤3	3.937	3.841	3.937	3.841
Ethiopia (1992-2008)	p=0	33.999*	27.584	57.419*	47.856
	p≤1	13.959	21.132	23.421	29.797
	p≤2	8.277	14.265	9.461	15.495
	p≤3	1.184	3.841	1.184	3.841
Kenya (1980-2008)	p=0	28.662*	27.584	63.188*	47.856
	p≤1	23.544*	21.132	34.526*	29.797
	p≤2	10.935	14.265	10.983	15.495
	p≤3	0.048	3.841	0.048	3.841
Rwanda (1981-2005)	p=0	27.741*	27.584	53.922*	47.856
	p≤1	17.169	21.132	26.181	29.797
	p≤2	7.174	14.265	9.012	15.495
	p≤3	1.838	3.841	1.838	3.841
Tanzania (1988-2008)	p=0	62.417*	27.584	94.451*	47.856
	p≤1	17.342	21.132	32.034*	29.797
	p≤2	11.368	14.265	14.692	15.495
	p≤3	3.324	3.841	3.324	3.841
Uganda (1993-2008)	p=0	43.164*	27.584	74.099*	47.856
	p≤1	18.467	21.132	30.936*	29.797
	p≤2	12.453	14.265	12.467	15.495
	p≤3	0.016	3.841	0.016	3.841

*indicates hypothesis rejected at 5% level.

financial development and FDI, namely that the impact of FDI on growth depends on financial sector development. In order to test this we create a multivariate VAR, adding the indicator of financial development, claims on the private sector (CPS) and the interactive term between FDI and financial sector development into the VAR. The results are given in Table **3**.

The findings here are very interesting as there is clear evidence of the presence of cointegrating relationships when FDI and CPS are included together in the VAR – there is now evidence of a cointegration vector in Burundi, Ethiopia, Rwanda and Uganda, the countries for which no relationship was found in the bivariate case. This result is interesting and reinforces the findings of Choong *et al.* (2004) for East Asia.

We need to further investigate the nature of these cointegrating relationships before we can conclude that financial sector development plays an instrumental role in the relationship between FDI and GDP growth. Table **4** looks at the cointegrating vectors, normalised on GDP.

The positive coefficient on the CPSFDI indicator in the above table indicates that in three countries, namely Kenya, Rwanda and Uganda, financial sector development, as measured by claims on the private sector has had a positive impact in ensuring that FDI flows generate growth. In line with the findings of Choong *et al*. (2004), in most cases in which the coefficient on CPSFDI is positive, the coefficient on FDI is negative and vice versa (Uganda being the exception). Choong *et al*. conclude that these results suggest that FDI will have a positive impact on

Table 4: Estimated Cointegrating Vectors

Countries (data period)	GDP	FDI	CPS	CPSFDI
Burundi (1985-2008)	1	1.815	2.877	-0.606
Ethiopia (1992-2008)	1	0.001	-4.550	-0.367
Kenya (1980-2008)	1	-0.567	-2.497	0.583
Rwanda (1981-2005)	1	-0.560	-0.870	0.239
Tanzania (1988-2008)	1	0.641	-6.107	-0.277
Uganda (1993-2008)	1	0.017	-5.670	0.579

economic performance only for those countries with well-developed and functioning financial systems; in the absence of such, the effect of FDI on growth is negative. Choong *et al*. note that the finding of an inverse relationship between the variables is in line with the literature, and could arise for two reasons, provided by Al-Yousif (2002), namely due to a business-cycle effect, or due to the inefficiency of the domestic financial sector in allocating resources and operating in a weak regulatory environment. This inefficiency among financial intermediaries actually slows growth down.

5. CONCLUSION

This study looks at the under-researched relationship between FDI, GDP growth and financial sector development, notably investigating the extent to which the last of these helps establish a long run relationship between FDI and GDP growth. We use a methodology which is robust to the weaknesses of traditional Granger-causality testing in order to test whether a short term causal relationship exists between these variables in a number of East African countries, but no significant evidence is found of such a relationship. Using Johansen cointegration tests, we only find evidence of a long run relationship from GDP growth to FDI in the case of Tanzania, no other long run relationships are discovered in the other countries. However, once variables are included to account for financial sector development, long run relationships become apparent. In three countries (Kenya, Uganda, and Rwanda) it is clear that financial sector development has a positive impact in ensuring that FDI flows generate growth. These countries are generally accepted as being the countries with the most developed financial sectors in the region, which gives clear policy recommendations, notably that efforts should be focused on developing the financial sector in order to reap the full benefits of FDI inflows.

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ANNEX: Lag Structure: Akaike Information Criteria Statistic

	Lags			
	0	1	2	3
Burundi				
Dependent Variable				
GDP	55.999	54.619	*54.613*	54.718
FDI	*55.957*	56.015	56.157	56.276
Other variable lags				
GDP(FDI)	*54.613*	54.682	54.712	54.813
FDI(GDP)	*55.937*	55.981	56.123	56.241
Ethiopia				
Dependent Variable				
GDP	52.828	*49.722*	49.78	49.866
FDI	56.304	*56.018*	56.197	56.059
Other variable lags				
GDP(FDI)	49.722	49.833	*49.593*	49.672
FDI(GDP)	56.018	55.775	55.808	*55.213*
Kenya				
Dependent Variable				
GDP	56.217	54.775	*54.588*	54.698
FDI	58.696	58.756	58.791	*58.242*
Other variable lags				
GDP(FDI)	*54.588*	54.659	54.708	54.775
FDI(GDP)	*58.242*	58.313	58.343	58.419

Rwanda				
Dependent Variable				
GDP	55.85	*54.963*	55.056	55.172
FDI	57.041	*56.032*	56.037	56.099
Other variable lags				
GDP(FDI)	*54.963*	55.043	55.163	55.295
FDI(GDP)	*56.032*	56.088	56.21	56.305
Tanzania				
Dependent Variable				
GDP	61.911	*56.906*	56.907	56.988
FDI	65.635	64.913	64.835	*64.126*
Other variable lags				
GDP(FDI)	56.906	56.942	*56.788*	56.957
FDI(GDP)	64.126	*64.016*	63.293	63.249
Uganda				
Dependent Variable				
GDP	61.571	57.109	57.071	*56.772*
FDI	66.034	64.171	63.29	*62.23*
Other variable lags				
GDP(FDI)	*56.772*	56.909	56.892	56.992
FDI(GDP)	62.23	61.819	*61.445*	61.595

Figures in italics indicate the optimal lag length based on minimising the AIC Information Criteria.

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