Economic Integration in Africa: Effectiveness of Regional Agreements

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Abstract

Classic economic theory predicts that trade flows will increase when barriers are reduced. Using gravity equation models, I show that African economic integration agreements do not follow this presumption. While trade flows have been studied extensively, relatively little work has looked at Africa, the least developed continent. The regional economic communities have faced difficulties and their success is still an open question. With the African Economic Community planning to build economic integration through the use of regional blocs, it is important to understand their effectiveness. I use gravity models to isolate the partial and general equilibrium impacts of major regional trade agreements and use anecdotal and qualitative sources to provide supplementary evidence to address the variation between the effects of heterogeneous integration agreements.

1 Introduction

Popular opinion views Africa as an economic backwater and assumes that there has been no push to develop intra-African trading relationships. The opposite is actually true with the idea of regional economic integration flourishing throughout Africa over the past several decades. Virtually every country in Africa is a member of an intra-African trading agreement as well as being either a member or beneficiary of some inter-continental trading relationship.

Despite attempts to unify, or at least coordinate, the disparate African trading blocs economic integration has proceeded almost exclusively on a regional, rather than pan-African, scale. The most recent attempt to bring the African trading blocs into a dialogue has been through the African Economic Community. Founded through the Abuja Treaty which was signed in 1991 and entered

into force in 1994, the African Economic Community had the overarching goal of creating a Eurozone-style economic and monetary union for Africa by 2028. With virtually every African nation as a signatory, its nominal goals across six stages are promoting free trade agreements and customs unions within existing regional blocs and then consolidating them into a pan-African framework for economic integration.

The real economic power in Africa, however, rests with the regional economic communities and thus far little integration has been accomplished at the continental level. The regional communities are primarily economic agreements, although some also have provisions for political and military cooperation. The African Economic Community has dubbed five major regional communities "pillars", some of which have overlapping membership. These "pillars" largely predate the African Economic Community and while the they may play a larger role in the future of Africa, thus far the regional communities have operated independently. Because of the limited role of pan-African economic agreements, this paper will examine economic integration agreements on the regional level.

This paper has three primary goals. First, I will examine a subset of the longest standing and most prominent economic integration agreements in Africa. This will provide a background on the membership and level of successful integration. The scope and effectiveness of agreements will set a foundation for expectations of their relative impact on trade flows. The second goal is to generate and explain estimates of the effects of these agreements. The generation of the estimates will rely upon the use of gravity equation models while the explanation for the effects – and their differences – will rest in anecdotal information about the individual agreements. Due to the heterogeneous nature of the agreements and their idiosyncratic historical circumstances it would be unreasonable to assume that the estimates can be effectively interpreted separately from the economic and historical context. The third and final goal of the paper is to move beyond partial equilibrium effects and examine the trade agreements in a general equilibrium context. Any trading relationship, whether bilateral or multilateral, will change relative price terms with all other trading partners. A complete analysis of the effects of these agreements requires the inclusion of these effects.

2 Economic Integration Agreements

This paper examines the effect of a series of economic integration agreements on trade flows between African nations. I use this term instead of the more common "free trade agreement" because it is broader. Agreements with an economic impact range in scope from mere preferential treatment on trade in goods to full monetary and economic unions. Throughout this paper an economic integration agreement refers to any agreement which includes at least a free trade agreement, but may also include a higher level of integration. I date an economic integration agreement from the entry into force of an attempt to reach free trade (Baier, Bergstrand, and Vidal 2007). While many agreements, especially in Africa, fall

short of that goal, I base the inclusion of African agreements on their intent. Because these agreements are intended as vehicles for promoting development, it is instructive to examine the effects of attempts to integrate. Trade agreements which aspire only to preferential treatment not free trade are not included with other economic integration agreements.

The entire gamut of economic integration agreements that include African nations is, unfortunately, too broad a scope for this paper. I limit the scope of agreements specifically addressed and explained in order to allow more depth into the analysis of each agreement. The primary criterion is that the agreement must have entered into force by 1990. With data continuing until 2000, this ensures that all agreements have at least ten years of observations. Virtually every agreement phases in over five to fifteen years, with most not taking full effect until a decade after they nominally enter into force. It is also plausible to assume that there are substantial lags to the effects of trade agreements (although there may also be an anticipation effect given that the time table of the phase-in in known) which could mean that the full effects of an agreement may not be seen for nearly fifteen years. In this paper I examine the effects of five major African agreements.

2.1 Arab Maghreb Union

The Arab Maghreb Union or Union du Maghreb Arabe (AMU) is the product of calls for unification in northern African since the 1920s. Originally supported by Arab nationalists, it received increased support during the anti-colonial independence movements. The first Conference of Economic Ministers in 1964 was the earliest serious attempt to begin economic integration. They formed the Conseil Parmanent Cunsultatif du Maghreb (CPCM) between Algeria, Libya, Morocco, and Tunisia. It had the goal of managing development, intra-regional trade, and relations with the European Union. While it never became effective, it provided an impetus for a move in the late 1980s to bring the parties back to the table after relations improved between Algeria and Morocco. The 1st Maghreb Summit of the five Heads of State had the original four members plus Mauritania in June 1988 and by 17 February 1989 they signed the AMU treaty in Marrakech (Mistry 2000).

The goal of the new group was to "work gradually towards the revitalization of the free movement of people, goods, services and capital" (treaty, quoted in Frankel 1997, pg 277). By 1991 the members agreed to an aggressive liberalization program. They hoped to form a full free trade agreement by the following year and establish a common market by 2000. The goal of reaching a full free trade agreement was never achieved although some significant liberalizations have occurred within individual sectors. Despite its ineffectiveness thus far, there are continued efforts to rehabilitate the agreement as well as continuing sector and bilateral liberalizations between members. The bilateral and sectoral agreements do not amount to free trade but some represent significant liberalizations compared to high preexisting barriers (Sekkat 1994).

The African Economic Community designated the AMU as one of its five

pillars and as the focal point for promoting economic integration in northern Africa. Despite the minimal depth of integration and failure to meet its economic plans, the AMU may see a growth in trade. The trade would come from the liberalizations within individual industries and cooperative projects between member nations, such as joint planning infrastructure. The amount of the extra-agreement liberalization due to the AMU and relations facilitated by it is unclear. The region has also been a significant beneficiary of Association Agreements with the European Union which may have served as an impetus for regional growth through increased economic activity and infrastructure. While most of the impact is on trade with Europe, some of this effect may spill over to intra-regional trade. The effect of any partial liberalizations among the AMU countries could have significant impacts because of the relatively high trade barriers prior to its implementation.

Arab Maghreb Union (AMU)

Country	Entrance
Algeria	1989
Libya	1989
Mauritania	1989
Morocco	1989
Tunisia	1989

* Includes all countries during study period

2.2   Economic Community of Central African States

The Economic Community of Central African States (ECCAS) began in the 1985 with eleven countries and an intent to form a customs union by 2003. It was a successor to the Customs and Economic Union of Central Africa (UDEAC) which was notably ineffective (Lawrence 1996, pg 130). Founded in 1966 the UDEAC was initially promising but import substitution policies during the oil peak in the 1970s and faltering economies during the following decade disrupted the planned integration (Frankel 1997, pg 274). At the end of 1981, the UDEAC members met to discuss the possibility of forming a larger economic community. Two years later the ECCAS was agreed upon and entered into force during 1985. Its membership totaled nine and was comprised of the UDEAC countries, the members of the Economic Community of the Great Lakes States (CEPGL), and Sao Tomé and Principe. Angola was originally an observer but subsequently joined as a full member in 1999.

The planned liberalization was to take place in stages that would gradually eliminate both tariff and non-tariff barriers. Under this intent, the African Economic Community adopted it as the regional pillar designed to promote trade and integration through the heart of Africa. While some progress was made in the early years, the liberalization program effectively ground to a halt amid the political turmoil in the region (Musila 2005). Zaire (Democratic Republic of the Congo), Burundi, and Rwanda – all member countries – were subjected to brutal civil wars during the 1990s (Mistry 2000). Of these, the civil war in Zaire

caused the most problems with intraregional relations, particularly increasing tensions with Angola and Rwanda fighting for opposing sides.

The African Economic Community named the ECCAS as a pillar despite the lack of formal relations between the two bodies. Despite the African Economic Community's continued support for its standing as a pillar it was not until 1999 that it formally signed the Protocol of Relations that the African Economic Community had signed with the other pillars. While largely a formal symbolic relationship thus far, it is a testament to the lack of organization and cooperation that official relations were not established for so long.

The ECCAS has had some of the least successful economic integration. Trade flows have likely not grown, and possibly decreased in the region, due to the political turmoil. While the turmoil was rooted in the political and ethnic tensions not the integration agreement, it is unlikely that the empirical correlations will indicate that this agreement has achieved its desired results.

Economic Community of Central African States (ECCAS)

Country	Entrance
Angola	1999
Burundi	1985
Cameroon	1985
Central African Republic	1985
Chad	1985
Congo, Republic of	1985
Equatorial Guinea	1985
Gabon	1985
Sao Tomé and Principe	1985
Zaire	1985

* Includes all countries during study period

2.3   Economic Community of West African States

The Economic Community of West African States (ECOWAS) was formed from a group of 15 states in 1975 but the idea of having a trading group for Western Africa goes back a decade earlier. Spearheaded by Nigeria, newly independent states felt that a trading group would reduce dependence on France and other colonial powers and their remaining protectorates as well as allowing private African business to compete more effectively (Foroutan 1992).

ECOWAS is both a large, economically diverse community as well as an extremely poor one. As of 1989, the year before the trade provisions began to take effect, the combined GNP of the 195 million people in the region was US$64 billion. That is equivalent to a per capita GNP of US$326. The region has substantial mining and agricultural capacity which has led most economies to specialize on the export of a few commodities. As a result, while the region may be diverse, the individual nations are not. Since its inception, Nigeria has dominated the group economically and equals the rest of the nations combined in terms of population and economic productivity (Foroutan 1992). Due to its

economic prominence, Nigeria was able to push the formation of ECOWAS as well as control policy since.

The attempts to integrate ECOWAS have also been plagued by political differences. With different colonial histories, parts of the region use English, French, and Portuguese. To compound difficulties, territorial disputes and political confrontations have led to acrimonious relations at times between members. As with many of the other pillars it was created with the nominal goals of eliminating intraregional tariff and non-tariff barriers, liberalize the movement of factors of production, and adopt common external economic policies. A free trade area was supposed to be established by 1989 with a customs union by 1994. This plan was adopted within five years of its creation, but its provisions did not begin to enter into force until 1990 partly due to the economic and political difference between member states. The 1990 trade provisions are when I attribute to the start of the agreement in this paper. While the implementation was behind schedule, by 2000 eight nations had lifted all barriers on the trade of processed goods and 12 no longer had non-tariff monetary barriers (Musila 2005). Visa and entry permit requirements had also been substantially reduced which added to labor mobility (Musila 2005).

ECOWAS has gone further than most of the pillars of the AEC in implementing its belated integration plans. With some trade provisions entering into force since 1990 and free trade among a substantial number of its members this is likely to be one of the more successful major African trade agreements. The dominance of Nigeria in the agreement may lead to some distorted policies which benefit it at the expense of some of the smaller, economically weaker nations. The export oriented nature of many of the ECOWAS economies may also have limited the effectiveness of the liberalizations that occurred because of insufficient markets for their goods within ECOWAS. The generally weak economic performance in many of its poor members may dampen its effectiveness, but trade in the aggregate is freer than it was before the agreement, suggesting that it should display some positive *ex post* effect.

Economic Community of West African States (ECOWAS)

Country	Entrance	Country	Entrance
Benin	1975	Liberia	1975
Burkina Faso	1975	Mali	1975
Cape Verde	1976	Mauritania	1975
Ivory Coast	1975	Niger	1975
Gambia	1975	Nigeria	1975
Ghana	1975	Senegal	1975
Guinea	1975	Sierra Leone	1975
Guinea-Bissau	1975	Togo	1975

* Includes all countries during study period

2.4 Common Market for Eastern and Southern Africa

Another pillar and an agreement studied here is the Common Market for Eastern and Southern Africa (COMESA). This agreement had its genesis in the mid-1960s with the eagerness for regional economic cooperation during the "post-independence period" in most of Africa. The independence of many African nations from colonial control engendered a propensity towards pan-African solidarity and self-reliance. This spirit was manifested in 1965 in the form of the United Nations Economic Commission for Africa which organized a ministerial meeting of the eastern and southern African states. This meeting of newly independent nations in Lusaka, Zambia considered a variety of proposals for regional or sub-regional integration. The Commission recommended the creation of an "Economic Community of Eastern and Central African States." To further this goal an Interim Council of Ministers was established to work on initial programs until a formal structure was approved.

The process saw little progress until the creation of the Preferential Trade Area for Eastern and Southern African States (PTA), which began to liberalize trade and phase-in a free trade agreement. The PTA entered into force in 1981 and is the predecessor agreement to the modern COMESA. I use 1981 as the starting date for the combined trading structure because it was the start of a continuous, if slow, program of liberalization and the PTA explicitly planned to move to a free trade agreement – the minimum depth of intended integration studied in this paper. It would also not be feasible to separate the impact of the two agreements given the relatively short time that the latter COMESA has been active and some of the delays in implementation liberalizations.

The modern iteration of this agreement, COMESA, was founded in 1993 and formally succeeded the Preferential Trade Area on 8 December 1994. This transition was a required element of the PTA treaty ten years after its entry into force. Despite the slower than planned integration, the conversion took place and the time frame for implementing a free trade area was extended.

The implementation of the original goals for COMESA has been delayed. The original plan was for a full free trade agreement among all members to be in place by October 2000. Only nine members actually met the target of free trade by that date. The primary reason for they delay in implementation was concern that tariff revenue would be lost or that domestic industries would lose important protection (Musila 2005). A customs union is still an intended, but as yet unrealized, goal.

COMESA currently has a combined population of over 389 million. The trading bloc covers 12 million square kilometers with an annual import bill of US$32 billion and exports of US$82 billion. COMESA is unique among the pillars of the African Economic Community in that it almost entirely encompasses another one. Except for South Africa and Botswana all members of the South African Development Community (SADC) are members. The SADC is the only one of the five pillars that will not be studied here. That is because it started later than the other agreements and thus the limited time frame would make estimates of its effectiveness unreliable. As the SADC is completely con-

tained within COMESA, any effect that it had will be included in the analysis of COMESA.

Despite its partial and delayed integration, COMESA has reached free trade status among approximately half of its members. Due to its level of integration, the general presumption is that it provides an incentive for increased trade.

Common Market for Eastern and Southern Africa (COMESA)

Country	Entrance	Country	Entrance
Angola	1981	Mozambique	1981
Botswana	1981	Namibia	1995
Burundi	1981	Rwanda	1981
Comoros	1981	Seychelles	1981
Djibouti	1981	Somalia	1981
Egypt	1981	Sudan	1995
Eritrea	1981	Swaziland	1981
Ethiopia	1981	Tanzania	1981
Kenya	1981	Uganda	1981
Lesotho	1981	Zaire	1981
Madagascar	1981	Zambia	1981
Malawi	1981	Zimbabwe	1981
Mauritius	1981		

* Includes all countries during study period

2.5 South African Customs Union

The South African Customs Union (SACU) is the modern version of one of the oldest trading relationships in the world. With origins tracing back to a 29 June 1910 agreement between South Africa, Basutoland, Swaziland, and Bechuanaland. Great Britain's Governor of the Union of South African and High Commissioner for the three protectorates implemented this agreement – he signed it four times, once on behalf of each party – and it remained in effect until the mid-1960s when the British began to lose their colonial possessions (Kirk 2005).

A renegotiated agreement was signed in 1969 and entered into force the following year between South Africa, Botswana, Lesotho, and Swaziland. I date the agreement from this point. South Africa was the dominant player in the agreement with 90 percent of the gross domestic product and substantive control over external trade policies. Furthermore, the agreement guaranteed that Botswana, Lesotho, and Swaziland would remain somewhat economically dependent on South Africa through the apartheid period. In return the government budgets of the other nations were largely funded by the tariff and excise revenue sharing provisions of the agreement (Kirk 2005). Following independence, Namibia joined the agreement in 1990 raising its membership to five.

The early 1990s saw calls to negotiate yet another iteration of the agreement because of the association with the apartheid regime and the dominance of

South Africa in the policy-setting process. These negotiations began in 1994 and continued for the better part of a decade. The new agreement was ratified in 2002 (Kirk 2005). Despite tense political circumstances, it has maintained mostly free intraregional trade and a high common external tariff and I treat it as a continuous agreement.

Due to their common history, the members of the SACU have had close economic ties. Four of the members, excepting Botswana, even share a currency. Botswana, Lesotho, Namibia, and Swaziland receive most of their imports from South Africa. This is a key market for South African non-commodity exports. By 2000, the SACU covered over 50 million people and US$136 in gross domestic product with a regional growth rate of 1.9 percent annually (although the non-South African members tended to be two percentage points higher) (Kirk 2005).

South Africa is the industrial center of the agreement and the less industrialized members have economies focused on commodity exports. Botswana has had the highest growth rates in the group stemming from the development of its diamond industry. Mining has grown to 30 percent of the economy while manufacturing activity is less than 5 percent of gross domestic product. Lesotho also relies on mining, but in a different way. Among the least wealthy countries, it relies on remittances from migrant mining workers in South Africa which comprise more of the GDP than do domestic activities. Swaziland is the most agriculturally focused member state with a strong focus on exporting commodities. The newest member, Namibia, is also a mining-focused economy with over half of its gross domestic product coming from the diamond industry.

As the deepest level of economic integration in Africa the *prima facia* expectation is that the SACU has had a relatively large, positive impact on intraregional trade. While this may be the case, that presumption should be tempered. Due to the historically stronger relations between the member states there was a relatively high level of integration before the implementation of the SACU. As a result, the impact on trade barriers may be smaller than expected. The dominance of South Africa in policy making may have led to policies which benefited it at the expense of the other member states. The final mitigating factor is that the small number of included countries and the export-oriented nature of their economies may have meant that any new benefits to trade were not enough to cause a substantial increase and retooling of the economy.

Southern African Customs Union (SACU)

Country	Entrance
Botswana	1969
Lesotho	1969
Swaziland	1969
Namibia	1990
South Africa	1969

* Includes all countries during study period

3 Partial Equilibrium Gravity Models

In this section, I discuss the theoretical underpinnings of the gravity equation. The fundamental contribution of the gravity equation to the study of international trade flows has been the ability to conduct *ex post* analyses of the effects of trade agreements. The other primary method is using general equilibrium models to provide *ex ante* estimates of the benefits of trade agreements based on predicted trade as well as consumption and welfare effects. The *ex ante* analysis has the benefit of providing policy makers with reasonable expectations for the cost and effect of potential trading arrangements. Nonetheless, it is also beneficial to examine the *ex post* effects to review the impacts of current agreements. The other advantage of the gravity equation is that it does not require a system for assigning values to the level of trade liberalization. Barriers to trade, whether explicit tariffs or other impediments, are extremely difficult to accurately measure.

3.1 Theory

The gravity equation is so named because of the predicted direct relationship between trade and economic size and an inverse relationship with distance. This relationship makes intuitive sense with gross domestic product as in indicator of potential trade which is mitigated by trade costs – the most explicit of which is distance. While gravity models have been used empirically since the early 1960s (Tinbergen 1962), the first formal theoretical foundation for this parallel on Newton's Universal Law of Gravitation was presented in the form of a general equilibrium model by Anderson (1979). Subsequent research has shown that the microeconomic foundations of the gravity relationship can be derived from numerous models, including increasing returns to scale (Helpman and Krugman 1985), Heckscher-Ohlin (Bergstrand 1989 and 1990, and Evenett and Keller 2002), and Ricardian (Eaton and Kortum 2002). Since Anderson's original theoretical work, the models assume that the relative expenditures on production and consumption are a function of income and population and will not be affected by trade. In a world with balanced trade and no trade barriers or costs this yields a simplified gravity equation:[1]

$$X_{ij} = \beta_0 \left(GDP_i\right)^{\beta_1} \left(GDP_j\right)^{\beta_2} \left(DIST_{ij}\right)^{\beta_3} \varepsilon_{ij} \tag{1}$$

in which X_{ij} represents the flow of commodities from the exporter i to the importer j. GDP_i and GDP_j are the gross domestic products of the countries i and j, respectively. e is the log normally distributed error. Assuming that gross domestic products are unit elastic, as the literature suggests, and an inverse relationship to distance leave $\beta_1 = \beta_2 = 0$ and $\beta_3 < 0$ (Baier, Bergstrand, and Vidal 2007). In empirical estimations other variables such as adjacency, common language, and integration agreements are commonly added.   This

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[1] See Anderson (1979) for detailed derivation of theory.   I use notation from Baier, Bergstrand, and Vidal (2007) and Baier and Bergstrand (2009)

model excludes price terms under the assumption that they balance supply and demand (Bergstrand 1985).

While the basic model shows an intuitive relationship, assuming a world without trade costs clearly does not mirror actual relationships. The problem is that trade costs are difficult to measure. Therefore, empirical estimations rely on the assumption that trade costs are a log-linear function of observable variables (Baier and Bergstrand 2009). In the case of a distance and dummy variable for an economic integration agreement:

$$t_{ij} = DIST_{ij}^{\rho} e^{-\alpha EIA_{ij}} \tag{2}$$

where t_{ij} represents trade costs, $DIST_{ij}$ is the distance between countries i and j, and EIA_{ij} is a dummy for the presence of an agreement. Thus, a generalized version of equation (1) that allows for generic trade costs may be specified as:

$$X_{ij} = \beta_0 \left(GDP_i\right)^{\beta_1} \left(GDP_j\right)^{\beta_2} \left(t_{ij}\right)^{\beta_3} \varepsilon_{ij} \tag{3}$$

3.2 Data

The data I use to estimate the effects of agreements comes from a variety of sources. I have trade data for 193 countries from 1962 to 2000 as well as economic variables such as real gross domestic products, distance between countries, and dummies for adjacent countries or those with a common language. The countries comprise substantially all of the countries in the world and include all of those that report independent economic information. The bilateral trade data, gross domestic products, and distance information was provided by Scott Baier with the trade data from the information collected by Robert Feenstra from his research for the National Bureau of Economic Research. Language and adjacency information was compiled from the *CIA Factbook*. The data records trade flows (separated by direction) that are in excess of US$100,000 per annum. When calculating real trade flows from the nominal reported ones, I scale the data by the exporter's gross domestic product. All trade, distance, and gross domestic product variables are logs, except when running Poisson estimations. I also capture the effect of membership in other economic integration agreements beyond those studied through a variable for other integration agreements.

The presence of one of the agreements included in this study is indicated by a dummy variable. An important control variable is a dummy variable for other EIAs. This denotes whether the pair of countries have an economic integration agreement other than those studied. To create this I use a dataset created by myself and a team of research assistants under the direction of Jeffrey Bergstrand over the past several years which records integration agreements from 1962 to 2005.

For a large portion of the trade flow data, there is zero reported trade. This occurs either when the two countries do not trade at all or the magnitude of their trade is not sufficient to be reported. Given that the log of zero is undefined the most intuitive solution is to drop them from the data, but that

means eliminating possibly valuable information. It is useful to examine why some countries trade at all and why some do not. Furthermore, dropping a portion of the data could lead to biased estimates. This issue is particularly relevant studying African trade as smaller economies are naturally prone to having less trade than larger ones. I look at two possible solutions to the zero trade problem. For most of the paper, I simply add one to all trade $(X_{ij} + 1)$ before taking the log. This does not substantively affect any other trade values but includes all data in the estimation. While an approximation, this method is commonly used in the literature. The other solution that I address is using a Poisson model. I discuss this more fully in a later section.

3.3 Empirical Results

The results in Table 1 indicate that the AMU is the only integration agreement to show a positive impact on trade flows. When controlling for economic size, distance, language, and adjacency in Specification 3, the AMU appears to have caused a 1,500 percent increase $(e^{2.773} - 1)$ impact over its 11 years. Equivalent to a 29 percent annual increase, this estimate would suggest a dramatic increase in trade. Some of the magnitude of this change can explained by high preexisting barriers, but the magnitude is larger than expected. The other estimates are uniformly negative ranging from -54 percent $(e^{-0.781} - 1)$ impact from ECOWAS to a -94 percent $(e^{-2.909} - 1)$ impact from SACU. The estimates are all significant at the one percent level. While negative estimates for agreements are unusual, the relative impact of these trade agreements matches the anecdotal evidence. Despite its negative result, ECOWAS outperformed most of the agreements. The ECCAS estimate was extremely negative, possibly reflecting the turmoil in the region. The most surprising negative result was the estimate of the SACU. This may be due to the higher levels of previous integration, but it is notable that the estimate became substantially worse after the inclusion of controls for economic size. This could indicate that its economies were growing due to commodity exports without a substantial increase in intra-regional trade. As a baseline for comparison, the estimate for other integration agreements in the aggregate suggest a 15 percent increase in trade.

The impacts of the non-agreement variables are in line with those theoretically and empirically suggested by other gravity studies. The estimates for gross domestic product as both positive with the exporter coefficient suggesting unit elasticity. The direct relationship with language and adjacency is shown as well as the negative impact of distance. As a caveat, the low levels of trade, small economies and fragile relationships among many African nations may lead to dramatic percentage changes.

3.4 Fixed Effects Estimation

The use of panel data allows for extensive use of fixed effects to further refine the specifications. Panel models are able to control for the unobserved heterogeneity between units. It is reasonable to assume that there are idiosyncratic

Table I
Partial Equilibrium Specifications

Trade	(1)	(2)	(3)	(4)	(5)	(6)
AMU	5.079	5.079	2.472	3.027	2.472	2.472
	(0.315)	(0.290)	(0.203)	(0.203)	(0.247)	(0.502)
ECCAS	-3.100	-3.100	-1.631	-1.129	-2.652	-2.652
	(0.126)	(0.016)	(0.074)	(0.073)	(0.010)	(0.319)
ECOWAS	-2.845	-2.845	-1.186	-0.728	-1.982	-1.982
	(0.082)	(0.034)	(0.045)	(0.044)	(0.054)	(0.139)
COMESA	-2.990	-2.990	-1.708	-1.245	-0.820	-0.820
	(0.053)	(0.011)	(0.024)	(0.024)	(0.032)	(0.092)
SACU	-2.603	-2.603	-3.057	-2.999	-1.345	-1.345
	(0.200)	(0.056)	(0.118)	(0.110)	(0.059)	(0.095)
Other EIA	-0.735	-0.735	-0.333	-0.093	-0.167	-0.167
	(0.050)	(0.048)	(0.038)	(0.038)	(0.050)	(0.110)
Exporter GDP			0.990	0.993	0.683	0.683
			(0.002)	(0.002)	(0.009)	(0.027)
Importer GDP			0.864	0.866	0.471	0.471
			(0.002)	(0.002)	(0.009)	(0.028)
Distance			-0.634	-0.641		
			(0.006)	(0.006)		
Language			1.071	0.959		
			(0.009)	(0.009)		
Adjacent			0.339	0.227		
			(0.041)	(0.040)		
Constant	3.187	3.187	-33.91	-32.77	-22.87	-22.87
	(0.005)	(0.005)	(0.073)	(0.078)	(0.292)	(0.865)
Fixed Effects						
Year				✓	✓	✓
Country Pair					✓	✓
Standard Errors		Robust	Robust	Robust	Robust	Cluster
Observations	1,007,419	1,007,419	754,919	754,919	760,267	760,267
R^2	0.059	0.059	0.507	0.525	0.815	0.815

Standard errors in parentheses

Dependent Variable: Log Trade; Distance and GDP variables are also in log terms

Clustered standard errors are around the country pair

relationships between countries based on political, cultural, and historical ties that cannot be accounted for through observed variables, such as common language or adjacency. Furthermore, even when observable in an anecdotal sense these relationships cannot be effectively measured.

There are two options for controlling for heterogeneity: random and fixed effects. The primary difference is that random effects impose probability constraints on the model, whereas fixed effects allows the unobserved heterogeneity to be structureless (Wooldridge 2006). Random effects relies on the assumption that the heterogeneity has a set mean and variance but is distributed randomly. It assumes that unobservable variables are not correlated with the presence of agreements. This seems unlikely given that nations with positive relations are more likely to cooperate on matters of trade and integration. The Anderson and van Wincoop (2003) model, discussed in greater detail in the next section, suggests the presence of this variation through multilateral resistance terms but makes no prediction regarding its structure. Furthermore, the structure imposed by random effects is such that estimates are only consistent when that is the correct model, while fixed effects are consistent regardless of the "true" model. The price of using fixed effects is that all variables that vary in the same dimension of the fixed effects must be excluded. For the purposes of trade models this means that economically interesting variables such as distance, adjacency, and common language cannot be measured. I follow the literature in using year and country fixed effects in this paper.

The inclusion of year fixed effects in Specification 4 of Table 1 has minor effects on estimates, but no substantial ones. These results are consistent because with trade and gross domestic products in real terms, the year variables mostly measure general, worldwide real growth. Substantial change appears in Specification 5 with the inclusion of country pairs. This directly controls for the time-invariant heterogeneous relations between country pairs. Specification 6 clusters the standard errors around these country pairs. Despite the larger standard errors there is little impact on the statistical significance of the estimates. All are highly statistically significant with the exception of the variable for other integration agreements.

The effect of the AMU decreases to a 890 percent increase or a geometric average of a 22 percent increase a year - still a very high rate of growth. The estimate for the ECCAS significantly worsens to -94 percent. This change makes sense following the inclusion of country pairs. By limiting the comparison to previous trade between ECCAS members, the impact of the turmoil and wars in the region becomes clearer. ECOWAS also worsens significantly to a -89 estimate, while COMESA "improves" to -53 percent. The SACU is the most positively affected by the estimates moving from -95 percent to -65 percent. While -65 percent may not be a "positive" result, it notably follows the inclusion of country pairs. This may reflect that exports dominated the SACU's economic activity consistently throughout the study period.

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3.5   Lagged Effects

Trading agreements with any significant scope are universally phased in, usually over a period of approximately five to ten years. Table 2 shows the results of rerunning the previous models using five year lags. This will capture the effect of agreements starting after they have had five years to establish at least a portion of their economic plans and the economies to adjust. This is particularly important when examining agreements which plan to lag their changes in terms of trade. I do not include specifications with both variables for the agreements and lagged variables in an attempt to capture the effect over time because the model becomes over-specified with implausible results and extremely large standard errors. The interacting of the agreements and years also yielded similarly uninterpretable results.

The results are extremely similar to the estimates found without the use of lags. All of the estimates attenuate towards zero which is consistent for the smaller time frame measured by the coefficient. The estimates are of the total effect of the agreement, not its annualized effect, so if an agreement has a constant effect its estimate will decrease with the reduction of years included. The lack of change shows that the use of lags does not add substantial value in this case. Lags are sometimes used as proxies for the endogenous decision to enter an agreement, but that interpretation is unlikely in the case of agreements which are modified and implemented more according to the availability of current political will than the original outline of the agreement.

3.6   Poisson Estimation

I run similar specifications using a Poisson model as an alternative method of dealing with the zero reported trade problem. The Poisson estimates are equivalent to weighted nonlinear least squares and because it does not use log dependent variables all of the trade data remains. Silva and Silvana (2006) suggest that using $X_{ij}+1$ as an approximation for trade may lead to a significant bias in estimation. Following Jensen's inequality $E(\ln x) \neq \ln E(x)$ they say there is a non-trivial effect from moving from the multiplicative version of the model to the empirically testable log-linear version. They also argue that the zeros present a rounding problem. The rounding may not be random because small trade values may all be rounded down to zero and need to reach a threshold to be reported. Small nations or those with less trade are also less likely to report data and missing observations may be reported as zeros. They suggest using Poisson regression to account for these effects and include all trade data.

Table 3 shows that the specifications using Poisson yield substantially different results than does ordinary least squares. Estimates move towards zero for most variables. All of the integration agreement variables move significantly against their estimations in previous models. The AMU still - at least in the fifth specification - has a positive effect but the estimate has moved from 2.293 in the final specification in Table 1 to 0.190. ECOWAS and COMESA change from strong negative effects to positive, although small in the case of COMESA.

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Trade	(1)	(2)	(3)	(4)	(5)	(6)
		Table 2				
		Specifications with 5 Year Lags				
AMU	5.231	5.231	2.705	3.038	1.990	1.990
	(0.432)	(0.363)	(0.237)	(0.235)	(0.287)	(0.467)
ECCAS	-3.058	-3.058	-1.503	-1.128	-1.937	-1.937
	(0.158)	(0.018)	(0.089)	(0.087)	(0.084)	(0.209)
ECOWAS	-2.610	-2.610	-0.991	-0.749	-1.527	-1.527
	(0.112)	(0.056)	(0.062)	(0.061)	(0.063)	(0.134)
COMESA	-2.997	-2.997	-1.653	-1.283	-1.053	-1.053
	(0.061)	(0.010)	(0.025)	(0.025)	(0.031)	(0.077)
SACU	-2.498	-2.498	-3.045	-2.970	-0.742	-0.742
	(0.230)	(0.066)	(0.126)	(0.121)	(0.052)	(0.110)
Other EIA	-0.936	-0.936	-0.332	-0.110	-0.182	-0.182
	(0.061)	(0.055)	(0.046)	(0.045)	(0.063)	(0.127)
Exporter GDP			0.987	0.987	0.661	0.661
			(0.002)	(0.002)	(0.010)	(0.027)
Importer GDP			0.866	0.866	0.436	0.436
			(0.002)	(0.002)	(0.010)	(0.028)
Distance			-0.595	-0.608		
			(0.006)	(0.006)		
Language			1.037	0.939		
			(0.010)	(0.010)		
Adjacent			0.258	0.182		
			(0.044)	(0.043)		
Constant	3.133	3.133	-34.28	-33.04	-21.58	-21.58
	(0.005)	(0.005)	(0.075)	(0.079)	(0.311)	(0.876)
Fixed Effects						
Year				✓	✓	✓
Country Pair					✓	✓
Standard Errors		Robust	Robust	Robust	Robust	Cluster
Observations	913,986	913,986	705,649	705,649	710,499	710,499
R^2	0.051	0.051	0.507	0.522	0.819	0.819

Standard errors in parentheses

Dependent Variable: Log Trade; Distance and GDP variables are also in log terms

Clustered standard errors are around the country pair

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Trade	(1)	(2)	(3)	(4)	(5)
		Table 3			
		Specifications using Poisson Regression			
AMU	-0.789	-0.789	-0.416	-0.440	0.272
	(0.000)	(0.094)	(0.093)	(0.097)	(0.001)
ECCAS	-30.62	-30.62	-26.72	-26.48	-26.10
	(433.6)	(0.035)	(0.071)	(0.073)	(324.1)
ECOWAS	-3.609	-3.609	0.506	0.482	0.137
	(0.000)	(0.278)	(0.268)	(0.268)	(0.001)
COMESA	-9.257	-9.257	-4.971	-4.974	-4.402
	(0.004)	(0.376)	(0.380)	(0.380)	(0.004)
SACU	-30.32	-30.32	-29.87	-29.52	
	(645.6)	(0.056)	(0.096)	(0.099)	
Other EIA	-0.479	-0.479	0.050	-0.013	0.391
	(0.000)	(0.176)	(0.051)	(0.050)	(0.000)
Exporter GDP			0.820	0.821	1.025
			(0.004)	(0.005)	(0.000)
Importer GDP			0.789	0.790	0.174
			(0.006)	(0.006)	(0.000)
Distance			-0.572	-0.573	
			(0.010)	(0.010)	
Language			0.565	0.560	
			(0.020)	(0.020)	
Adjacent			0.301	0.308	
			(0.040)	(0.040)	
Constant	11.51	11.51	-24.36	-24.18	
	(0.000)	(0.017)	(0.259)	(0.265)	
Fixed Effects					
Year				✓	✓
Country Pair					✓
Standard Errors		Robust	Robust	Robust	
Observations	1,007,419	1,007,419	754,919	754,919	474,925

Standard errors in parentheses

Dependent Variable: Trade; Distance and GDP variables are in log terms

The use of Poisson in this case raises two problems. The estimations lose two agreements, ECCAS and SACU, due to colinearity. More difficult to explain is that the interpretations of the control variables change substantially and in ways difficult to explain. The estimate for the aggregate impact of other integration agreements becomes negative which contradicts earlier estimations, the results in most of the literature, and general expectations for the effect of trade agreements. The estimate for the effect of the importer's gross domestic product has also fallen to 0.227. This would imply that there is a statistically significant but much weaker than expected relationship. While economic size need not have unit elastic effects it seems implausible that the size of the importing country has so little effect on how much they purchase.

3.7 Limitations

The most serious limitation to these results is that the choice of any nation to enter into an economic integration agreement is inherently endogenous. If policy makers choose to enter trade agreements in periods when their economies would otherwise do well the effect of the agreement could be overstated. Conversely, if they enter a trade agreement at a time which coincides with unrelated economic troubles the effect of the agreement may appear more negative than a "true" estimate.

The general presumption is that exogenous reduction in trade costs will have a negative effect on trade. Grossman and Helpman (1994) can be used argue that the opposite effect might exist with regard to endogenous trade costs. Their "Protection for Sale" model can imply that trade flows are positively correlated with calls for protectionism. If this were the case, integration agreements could have a positive causal effect on trade but appear to have a negative empirical correlation.

If endogeneity is present it violates the fundamental tenet of OLS that errors must be uncorrelated with the dependent variable. This is a serious error because it can produce biased and inconsistent estimates. The easiest solution is to use a proxy, such as lags. While lagged variables can address endogeneity, they have serious limitations in studying integration agreements. This is because the effect of the agreement itself is lagged and it relies on political support to implement the successive stages of the agreement over the lag period. The effect is particularly strong among African integration agreements; the effectiveness of which is often a function more of current political sentiment than the original agreement.

A preferable solution is the use of instrumental variables (IV) to address endogeneity. While IV is simple to estimate, it is difficult to find a variable correlated with trade flows only through the existence of an integration agreement. While instruments are sometimes used in the literature, they are more commonly for tariff levels than the presence of agreements. It if further difficult to find instruments which work across agreements and regions. Some possible specifications use the gross domestic product at the beginning of the data as an instrument. While that may work on some studies, it does not appear to

be a strong instrument in this case. The relatively small size of many African economies may explain its lack of effectiveness as an instrument.

4   Estimation with Multilateral Price Terms

Gravity models began to be redefined following the publication of "Gravity with *Gravitas*" by Anderson and van Wincoop (2003). The basic model has problems in an N region world ($N > 2$) because bilateral effects will also impact relative price terms with all other trading partners. Except in the unlikely scenario where these relative prices are uncorrelated with trade flows, their omission will bias estimates. This change in multilateral resistance will occur because the decision to export from i to j depends not just on the cost of exporting there, but the opportunities to export to or import from other countries. Using distance as a trade cost, it is intuitive that a county the United States considers remote will be more likely to trade with the United States if all other countries are equally remote to it than if it is located near other trading partners.

4.1   Theory

In their paper Anderson and van Wincoop (2003) present a general equilibrium model for bilateral or regional trading partners in an N region world. Their methods require the use of nonlinear least squares. While the model gives consistent, efficient estimates, it has the clear limitation of requiring researchers to write custom nonlinear programs. This necessity takes away the advantages of the gravity models – flexible models and the ability to use ordinary least squares to derive estimates.

Like earlier gravity models, this theoretical extension is built on microeconomic foundations. While originally designed to model intra-industry it empirically and theoretically works well when applied to aggregate trade flows. It relies on an N region world with imperfectly substitutable products. Consumers are further assumed to have constant and equal elasticities of substation between goods. With returns to scale and monopolistic competition the assumptions generate a world with a continuum from monopoly to near-competitive markets.

As with the traditional model, trade flows are positively related to the economic size of the trade partners and negatively to distance and other trade costs:[2]

$$X_{ij} = \left(\frac{P_i t_{ij}}{P_j} \right)^{1-\sigma} Y_j \tag{4}$$

The inclusion of the price terms shows that relative trade costs are important. Under this model integration agreements effect trade between the bilateral

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[2] See Anderson and van Wincoop (2003) and Baier and Bergstrand (2009) for detailed derivations of the theory in this section. While the model was developed by Anderson and van Wincoop, I use the notation from Baier and Bergstrand (2009).

partners and trade with all other partners. Trade costs can be used to construct multilateral price terms P_i and P_j which measure the trade costs that members of the bilateral agreement face with third parties:

$$P_i = \left[\sum_{j=1}^{N} \theta_j \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \tag{5}$$

$$P_j = \left[\sum_{i=1}^{N} \theta_i \left(\frac{t_{ij}}{P_i} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \tag{6}$$

in which θ_i represents the portion of world GDP in country i (GDP_i/GDP_{world}) and Anderson and van Wincoop also assume that trade costs are symmetric (i.e. $t_{ij} = t_{ji}$). When added to the traditional gravity model in Equation 3 these price terms will account for multilateral resistance:

$$X_{ij} = \beta_0 \left(GDP_i\right)^1 \left(GDP_j\right)^1 \left(t_{ij}\right)^{1-\sigma} P_i^{\sigma-1} P_j^{\sigma-1} \varepsilon_{ij} \tag{7}$$

Anderson and van Wincoop attempt to address the nonlinearity and measure multilateral resistance using region or country fixed effects. While this method eliminates the need for custom programs, multilateral resistance cannot be measured with and without trade agreements using fixed effects. The second problem with fixed effects is that many variables which are interesting to estimate are also region or country specific. If that is the case, their partial effects cannot be estimated while also controlling for fixed effects.

The literature presents two alternatives, both with significant drawbacks. Anderson and van Wincoop's non-linear approach is capable of producing border estimates and comparative statics but requires customized programs. Fixed effects is easier to use and avoids internal distance measurement error, but limits the effects which can be disaggregated and cannot effectively estimate multilateral prices (Baier and Bergstrand 2009). After examining fixed effect in the previous section, here I turn to an alternative solution.

Baier and Bergstrand (2009) show using first-order log-linear Taylor-series how multilateral resistance terms can be approximated easily. The Taylor-series expansions approximate the multilateral price terms from the Anderson and van Wincoop specification and allow them to derive a reduced form which can be estimated using ordinary least squares and account for the impact of trade agreements on the agreeing parties and the relative prices with the rest of the world, as well as the interaction of those two effects. Working from the theoretical relationship established in Anderson and van Wincoop:

$$\begin{aligned} \ln X_{ij} \quad = \quad & \beta_0 + \beta_1 GDP_i + \beta_2 GDP_j + \beta_3 \ln DIS_{ij} \\ & + \beta_4 EIA_{ij} - \ln P_i^{1-\sigma} - \ln P_j^{1-\sigma} + \varepsilon_{ij} \end{aligned} \tag{8}$$

They show that the multilateral resistance terms can be expressed as:

$$-(1-\sigma)\ln P_i = (\sigma-1)\left[\sum_{j=1}^{N}\theta_j\ln t_{ij} - \frac{1}{2}\sum_{i=1}^{N}\sum_{j=1}^{N}\theta_i\theta_j\ln t_{ij}\right] \tag{9}$$

$$-(1-\sigma)\ln P_j = (\sigma-1)\left[\sum_{i=1}^{N}\theta_i\ln t_{ji} - \frac{1}{2}\sum_{i=1}^{N}\sum_{j=1}^{N}\theta_i\theta_j\ln t_{ij}\right] \tag{10}$$

The first term is an average of trade costs with every region for country i or j weighted by gross domestic product. The second term is the gross domestic product weighted average world resistance between all bilateral parties. Substituting Equations 9 and 10 into Equation 8 yields a reduced form general equilibrium equation:

$$
\begin{aligned}
\ln X_{ij} = \quad & \beta_0 + \ln GDP_i + \ln GDP_j - (\sigma-1)\ln t_{ij} \\[2mm]
& + (\sigma-1)\left[\left(\sum_{j=1}^{N}\theta_j\ln t_{ij}\right) - \tfrac{1}{2}\left(\sum_{i=1}^{N}\sum_{j=1}^{N}\theta_i\theta_j\ln t_{ij}\right)\right] \\[2mm]
& + (\sigma-1)\left[\left(\sum_{i=1}^{N}\theta_i\ln t_{ji}\right) - \tfrac{1}{2}\left(\sum_{i=1}^{N}\sum_{j=1}^{N}\theta_i\theta_j\ln t_{ij}\right)\right]
\end{aligned}
\tag{11}
$$

4.2   Estimation

In this section I apply the approximation of exogenous multilateral resistance measures methods to generate estimates using ordinary least squares. This requires that the theoretically motivated trade cost variables be replaced with observable variables. Here I present a basic model, following Baier and Bergstrand (2009), using bilateral distance and the presence of an integration agreement. In the specifications, I apply the same methods with additional variables. From the theoretical foundations, the model is:

$$
\begin{aligned}
\ln X_{ij} = \quad & \beta_0 + \beta_1\ln GDP_i + \beta_2\ln GDP_j \\[2mm]
& - \rho(\sigma-1)\ln DIST_{ij} + \alpha(\sigma-1)EIA_{ij} \\[2mm]
& + \rho(\sigma-1)\ln MRDIST_{ij} - \alpha(\sigma-1)MREIA_{ij} + \varepsilon_{ij}
\end{aligned}
\tag{12}
$$

In some of the literature, the left hand variable is trade flows scaled by the product of the two nations' gross domestic products. This directly imposes unit elasticities on the gross domestic products but is not necessary to the estimation. Following Baier and Bergstrand (2009), I use equally weighted observations in my estimations instead of share weighted. Equal weighted observations avoid endogeneity problems and serve as a reduced form of the Taylor series if the

world is symmetric around economic size and trade. The multilateral resistance terms can be computed as:

$$MRDIST_{ij} = \quad \frac{1}{N} \left(\sum_{j=1}^{N} \ln DIST_{ij} \right) + \frac{1}{N} \left(\sum_{i=1}^{N} \ln DIST_{ij} \right)$$
$$- \frac{1}{N^2} \left(\sum_{i=1}^{N} \sum_{j=1}^{N} \ln DIST_{ij} \right) \tag{13}$$

$$MREIA_{ij} = \quad \frac{1}{N} \left(\sum_{j=1}^{N} EIA_{ij} \right) + \frac{1}{N} \left(\sum_{i=1}^{N} EIA_{ij} \right)$$
$$- \frac{1}{N^2} \left(\sum_{i=1}^{N} \sum_{j=1}^{N} EIA_{ij} \right) \tag{14}$$

In order to estimate the parameters in Equation 12 the multilateral resistance estimate must be subtracted from the original variable:

$$BB_{ij} = \ln DIST - MRDIST \tag{15}$$

This variable will provide consistent estimates of the impact of variables on trade flows after disaggregating the effect of changes in multilateral resistance.

4.3 Empirical Results

The results of specifications using the Baier Bergstrand (BB) variables are in Table 4. These results are strikingly similar to those in Table 1 suggesting that in this case the incorporation of multilateral price terms into the model has little impact. This relationship makes some intuitive sense given that unlike earlier estimations, there are 193 countries in this study. Given the number of other countries and the relatively small size of most of the economies in the integration agreements studied here, θ_i and θ_j in the price terms will be extremely small. As a result, the multilateral resistance adjustments will be small and the corresponding estimation similar. In an N country world, as N increases the impact on price levels from any bilateral change decreases. It is also likely that if the agreements have little effect on trade it is unlikely that they will have a substantial impact on multilateral price terms.

Table 4
Specifications Adjusting for Multilateral Resistance

Trade	(1)	(2)	(3)	(4)	(5)	(6)
AMU (BB)	4.906	4.906	2.224	2.992	2.472	2.472
	(0.318)	(0.293)	(0.210)	(0.207)	(0.247)	(0.502)
ECCAS (BB)	-0.748	-0.748	-1.555	-0.962	-2.652	-2.652
	(0.129)	(0.075)	(0.074)	(0.074)	(0.100)	(0.319)
ECOWAS (BB)	-0.765	-0.765	-1.586	-0.981	-1.982	-1.982
	(0.084)	(0.054)	(0.046)	(0.046)	(0.054)	(0.139)
COMESA (BB)	-1.013	-1.013	-1.413	-0.947	-0.820	-0.820
	(0.055)	(0.030)	(0.026)	(0.026)	(0.032)	(0.092)
SACU (BB)	-0.361	-0.361	-2.537	-2.391	-1.345	-1.345
	(0.203)	(0.131)	(0.145)	(0.139)	(0.059)	(0.095)
Other EIA (BB)	-0.357	-0.357	-0.277	-0.014	-0.167	-0.167
	(0.051)	(0.048)	(0.039)	(0.039)	(0.050)	(0.110)
Exporter GDP			0.993	0.996	0.683	0.683
			(0.002)	(0.002)	(0.009)	(0.027)
Importer GDP			0.867	0.870	0.471	0.471
			(0.002)	(0.002)	(0.009)	(0.028)
Distance (BB)			-0.853	-0.828		
			(0.007)	(0.007)		
Language (BB)			0.796	0.767		
			(0.012)	(0.011)		
Adjacent (BB)			0.581	0.519		
			(0.042)	(0.041)		
Constant	3.467	3.467	223.3	216.5	-22.48	-22.48
	(0.0180)	(0.0146)	(2.133)	(2.070)	(0.292)	(0.865)
Fixed Effects						
Year				✓	✓	✓
Country Pair					✓	✓
Standard Errors		Robust	Robust	Robust	Robust	Cluster
Observations	1,007,419	1,007,419	754,919	754,919	760,267	760,267
R^2	0.055	0.055	0.507	0.526	0.815	0.815

Standard errors in parentheses

Dependent Variable: Log Trade; Distance and GDP variables are also in log terms

Clustered standard errors are around the country pair

5   Conclusion

Despite the attempts to begin the process of economic integration in Africa over the past few decades, they have not been effective in increasing intra-regional trade. With the exception of the AMU, all integration agreements show statistically significant negative effects. These results differ from the effect of other integration agreements around the world. It also differs from studies of other regions, such as Baier, Bergstrand, and Vidal (2007), which shows that throughout the Americas most agreements had substantial, positive effects. Some of the effects may be explained by endogeneity concerns. More may be explained by idiosyncratic historical events such as civil wars in every major region or a general decrease in trade, stability, and forced cooperation following the independence movements against colonial powers. Even if these can explain the negative estimates, it is hard to argue that the agreements had any positive impact.

The ineffectiveness of the regional economic communities, and specifically those designated as pillars, has serious implications for the African Economic Community. Given they are currently relying on the regional communities to promote integration the lack of effectiveness is disturbing. African economies still rely disproportionately on exporting commodities outside of Africa. Whether the lack of effect is due to the nature of African economies, the types of agreements, or the lack of implementation the attempts to integrate have been ineffective. While I do not presume to make policy proposals here, if the African Economic Community or other pan-African organizations want to significantly impact trade the current policies should be reexamined.

Further research into African integration could focus on two primary areas. It could extend this analysis to the present and thus capture the effect of agreements over more years. This could account for effects that are extremely lagged owing to the slow implementation of trade provisions. More agreements could be included into the study with additional years of observations and the effects of moving between groups or forming sub-groups with ambitions towards deeper integration could be examined. African trade could also be studied at the industry level. While the major regional communities aim towards free trade, liberalizations within specific industries is much more common on the bilateral level. Even larger groups that fail to reach their integration goals often have partial liberalizations. A study of specific industries may more precisely identify changes in barriers to trade and better estimate the impacts.

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