All clouds are clocks-
even the most cloudy
of clouds.

-Karl Popper

Clocks and Clouds

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Clocks and Clouds is thrilled to add a new set of contributions to the well-established tradition of noteworthy undergraduate research at American University. This fall we proudly present five strong and distinct voices to important discussions both on campus and in broader academia.

Clocks and Clouds unites and validates the many disparate efforts at AU to promote excellent undergraduate research. Our success this fall would not have been possible without the tireless dedication of student-authors, faculty, administrators, and our journal's hardworking staff. The diversity of this semester's journal is a testament to the unified purpose and resolve of these efforts.

The quality of our journal is a reflection of the overall quality of undergraduate education at AU. The authors in this semester's edition apply method-based research skills to serious problems in the realms of domestic and global political affairs. Paul Jeffries utilizes an intimate relationship with existing literature to inform a precise and nuanced array of statistical testing, arguing that Investment Freedom contributes to a given European Monetary Union nation's trade successes. Kara Schiaparelli, Melanie Mackenzie, Austin Krug, Abigail Newbold and Joe Wagner generate their own data in their effort to better understand school segregation in Northern Ireland. The group's alternative break trip, led by Professor Kimberly Cowell-Meyers in the Department of Government, provided the access and intellectual stimulation for their project. Seth Taylor provides a quantitative examination of how a declining honeybee population might be affecting crop prices with conclusions that begin to shed some light on a troubling phenomenon. Lee Walter builds a unique study of how misconceptions about AIDS may affect AIDS infection rates in several African nations, calling for governments and NGOs alike to invest in countering misinformation and in more systematic data collection. Kate Pashby employs a technically sound discourse analysis to investigate biases in the Jordanian medical community, Pashby's research uncovers a likely vestige of colonialism.

Clocks and Clouds' success demonstrates that undergraduates can produce research worth sharing. We invite you to join us in an exploration of these perspectives.

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CLOCKS AND CLOUDS FALL 2015 STAFF

LET THEM EXPORT CAKE: AN EXAMINATION OF THE ROLE OF ECONOMIC FREEDOMS IN FOSTERING INTRA-EMU EXPORT GROWTH

Paul Jeffries

Abstract

This paper investigates the relationship between various types of economic freedom and intra-EMU export growth. Export growth is the primary empirical puzzle that this paper seeks to explicate, and is important because the EMU's inception preceded significant current account differentials that can mainly be attributed to changes in exports, as imports remained relatively constant. The independent variables—all types of economic freedom—were chosen in light of Cerny's theory of the "competition state," which highlights the importance of intra-state competition, theorizing that increased economic freedom renders a state more competitive thereby increasing exports (Cerny 2010). Employing standard econometric analysis and using export growth data from Aristotelous' (2006) gravity model along with ten pre-coded variables for types of economic freedom, I find a positive and statistically significant** correlation between Investment Freedom and bilateral intra-EMU export growth. These results suggest that the determinants of bilateral export growth intra-EMU remain multitudinous, while Investment Freedom is one of the most influential among them.

Introduction

At present, the Greek financial crisis is one of the most polemic subjects in the news. With bailout packages for Greece still being negotiated at the time of this writing, many wonder what the future holds for Greece, particularly

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with regards to its role in the Eurozone; talk of the infamous "Grexit" abounds (Lilico 2015). Much more than just a national issue, the crisis in Greece has become a case study for the larger discussion of the European economic system. Many point to Greece as a situation that may adumbrate the future for the various economies in Europe (De Grauwe 2010).

To offer a comprehensive explanation of the current state of the European economic system and the recent crisis in Greece would be a Herculean task. Instead, this paper focuses on a small component of the European international political economy—the bilateral trade between nations within the European Monetary Union (EMU), predominantly exports. In an increasingly globalized world, trade is seen as increasingly important to a nation's economic health (Hirst et al. 1992); hence, the normative implications of this research stem in part from the belief that we can learn more about the wellbeing of EMU nations through the lens of trade analysis.

The specific choice of exports as the focal point of this paper stems from the intriguing quandary they propose. While research has unambiguously shown a positive impact of the EMU on intra-EMU imports, the EMU's effect on exports amongst its adherents has been widely divergent, making exports the driving force behind the ever-widening differentials between the current account balances of EMU nations (Belke et al. 2008). Moreover, the adherent nation most in distress as of late—Greece—also struggles the most when it comes to export growth. As it was put in a recent podcast by NPR's Planet Money: "you like Greek yogurt? [It's] probably not made in Greece [anymore]" (NPR 2015). This all begs the question of what has caused these disparities; how can we understand the curious trends in intra-EMU export growth?

To understand export growth trends within the EMU, I will review the topical scholarly literature on effective currency areas and European monetary integration, while drawing on those within the epistemic community. A broad consensus exists in the literature that the overall effect of EMU on the bilateral intra-EMU trade growth of its adherent nations is positive and significant. Furthermore, the literature demonstrates that this positive effect is not universal. Some members experience little trade growth, or even negative growth; hence, I endeavor to better understand the potential causal mechanisms that govern this disparity. What variable(s) best explain the differentiated EMU effects on bilateral country-specific trade growth between the adherent nations of EMU?

Section I: Literature Review

The EMU is, by all accounts, a relatively new entity, but with a nonetheless, rich, complex, and sometimes turbulent history. The EMU is fundamentally a currency union; therefore, it is appropriate to begin this literature review by delving into the scholarly work on currency unions.

Study of currency unions' effects on trade—particularly motivated by the onset of EMU—is far from a nascent field; however, some general trends still characterize the majority of pertinent scholarly writings. Normally, analyses operate at the macro-level, with such scholars (Rose 2000; 2001; Frankel and Rose 2002; Glick and Rose 2002) "focus[ing] almost exclusively on the overall impact currency unions have on trade while paying very little attention to whether there are significant differences across the individual countries involved" (Aristotelous 2006). These scholars and others who have confirmed their modeling (Barr et al. 2003; De Nardis and Vicarelli 2003; Micco et al. 2003) have all demonstrated that "the effect of EMU on bilateral trade between the 12 countries that adopted the Euro as their national currency was positive and statistically significant" (Aristotelous 2006). It is worth noting, however, that while the literature has consistently upheld the EMU's positive effect on trade at the macroscopic level, this positive effect has seen a downwards revisionary trend over time (Aristotelous 2006). Nonetheless, the most recent comprehensive study still shows that half of the econometric calculations "imply that currency union at least triples trade; 90% of [Rose's] estimates imply a trade expansion effect of more than 25%; and almost all are statistically significant" (Rose 2002). In the scholarly literature, this general positive effect of currency unions—specifically the EMU—on trade flows has become known as the "Rose effect" (De Grauwe 2002).

Some scholars have challenged the validity of the "Rose effect" for its econometric soundness (Persson 2001; Nitsch 2001; and Baldwin 2006). However, most scholars—particularly those dedicated to European monetary integration—such as Bun and Klaasen (2002), Micco et al. (2003), De Nardis and Vicarelli (2003), Flam and Nordstrom (2003), and Berger and Nitsch (2006), believe that the "Rose effect" is at the very least positive and sizeable (De Grauwe 2002). That said, 10% of EMU adherents did not see a large trade expansion effect. One must nonetheless wonder: which member-states were these, and why did they differ?

Viewed concomitantly, Rose's econometric study of the overall currency union effect on trade and the more specific studies of the generally positive trade effects spurred by EMU from scholars such as De Nardis and

Vicarelli beg the question: if the positive effects of EMU are not universal, what differentiates the trade winners from the trade losers? To answer this question, the level of analysis must be refined from the more macroscopic level of analyzing the EMU as a whole to the country-specific level.

At the writing of this paper, the two studies most often referenced that examine the EMU effects on trade at the state-specific level—exploring the trade effects of EMU on each individual signatory—are Micco et al. (2003) and Aristotelous (2008). Nonetheless, Micco, Stein, and Ordoñez's paper still adopts a more macroscopic focus than Aristotelous', as it focuses on the effect of EMU on trade relationships outside of the union, finding "no evidence of trade diversion. On the contrary, some of [their] results suggest that the euro leads to higher trade not just with other euroland members, but also with the rest of the world" (Micco et al. 2003) While an important contribution to the literature, Ordoñez et al. sacrifice some degree of precision as a result of their widened scope; hence, while the substantive results of Micco et al. confirm those of Aristotelous, one must turn to Aristotelous to see the most specific and extensive research on country-specific trade effects within EMU.

Aristotelous' 2006 paper picks up where Rose left off and where Ordonez et al. began to investigate, endeavoring to understand the effects of EMU on the trade of each adherent. As they are of great importance to this paper, Aristotelous' empirical analysis and specific gravity model will be expounded on later, as one of the variables for this paper's empirical analysis derives from the findings of Aristotelous' model. Aristotelous' main conclusion in this paper (2006) was gleaned from his use of fixed-effects analysis of pooled data. He found that the impact of EMU on trade is positive and statistically significant for Belgium/Luxembourg, Finland, Germany, Ireland, the Netherlands, Portugal and Spain. For Italy, the effect is positive but not statistically significant. For Austria, France and Greece, the effect of EMU on their trade to the euro area is negative and statistically significant (Aristotelous 2006). As one can see, the previous quandary pertaining to the 10% of nations in Rose's most recent study that did not exhibit a positive trade effect because of EMU is now clarified thanks to Aristotelous' modeling; instead, the gap in the literature to explore has now become a question of what differentiates Austria, France, and Greece—whose bilateral intra-EMU exports were negatively affected by EMU—from all of the other EMU adherent nations, who experienced positive effects.

Aristotelous, along with other scholars, can provide us with a variety of theories that might explain this differentiation in EMU effects on exports. As Aristotelous writes, "[F]rom a theoretical perspective, the differentiated effect of EMU on trade may arise because EMU countries differ in terms of trade

composition, different level of economic development, different level of integration, or even different degree of trade openness" (Aristotelous 2006). Each of these potential explanations has its merits, but some more so than others.

Trade competition and level of development, while perhaps theoretically promising as intervening variables in the creation of this disparity in EMU trade effects, are not supported by the substantive contributions in the literature. Aristotelous defuses the argument for trade competition as a possible explanatory variable by citing case studies: "Differences in trade composition or level of development cannot be sources for the differentiated EMU effect on trade. EMU had a positive and significant effect on the trade of Portugal and a negative and significant effect on the trade of Greece, two countries with similar trade composition, level of development, and even population" (Aristotelous 2006). This refutation is supported by other scholars, including Vicarelli et al. (2008), who found that even states such as France and Germany that share a dominant sector were affected by the EMU in vastly different ways. Aristotelous defuses the argument for different levels of integration as being a potential explanatory variable again via the case study, stating: "the level of integration could be an explanation for the effect of EMU on Greece's trade since Greece is isolated geographically from the rest of the EU, but this explanation could not be valid for France, a country that is one of the founding members of the EU and is at its geographical [center]" (Aristotelous 2006). Further scholarly work supports Aristotelous' conclusions, highlighting EMU as one of the best case studies to date concerning integration (Ludema et al. 1999).

From here, it seems that of Aristotelous' proposed explanations, all that remains promising is the hypothesis that trade openness can explain the bilateral trade growth differentials. Aristotelous hints that the impact of trade openness has yet to be explored, but shows signs of veridicality: "The most likely source of the EMU differential effect on trade is a country's degree of trade openness. Countries with a higher degree of trade openness (such as Germany) are likely to reap greater benefits from the lower transaction costs, reduced exchange rate uncertainty, and enhanced competition through greater price transparency resulting from the introduction of a common currency" (Aristotelous 2006). While logically and theoretically promising, this assertion has yet to be empirically tested in a substantive manner. This is part of the purpose of this paper.

In a more recent paper, Aristotelous explores Greek exports, demonstrating that "the effect of the EMU on Greece's exports to Eurozone is

negative and statistically significant," an astonishing discovery given that one of the primordial purposes for EMU was to increase intra-EMU trade (Aristotelous 2008). Perhaps even more important, however, is Aristotelous' conclusion that the empirical evidence "suggests that the negative EMU effect on Greece's exports to Eurozone is in part due to a loss in Greece's competitiveness in Eurozone markets" (Aristotelous 2008). This finding, suggests that trade competitiveness may be a variable of vital importance in determining the nature of the EMU's effect on a constituent nation's bilateral export growth. Trade competitiveness and the principles of neoclassical economic theory will be explored in greater depth in the forthcoming section on theory with an eye towards better understanding how competitiveness in Eurozone markets informs an EMU nation's trade growth.

As can be seen, a substantive gap in the literature is present, offering a promising research avenue to explore. Aristotelous' first paper, along with the work of Ordoñez et al., has elucidated the disparate trade effects of EMU on its constituent nations, with some suggestion that degree of national trade openness might be responsible for this disparity. It is Aristotelous' concluding call for further research in this area to explore the possibility that trade openness might account for the varying ways in which EMU nations did and did not experience the 'Rose effect' that this research aims in part to answer. Aristotelous' more recent case study highlights the peculiar case of Greece—a state that experienced a negative effect on export growth because of EMU and also saw its intra-EMU overall exports decrease as a result of joining the Euro, in part due to reduced competitiveness.

Given the widespread consensus in the literature that the EMU has had a macroscopically positive trade effect on its constituent nations but with great diversity in the magnitude of the 'Rose effect' experienced at the country-specific level, I aim to depart where Aristotelous left off, seeking to explore whether or not evidence exists to substantiate the claim that trade openness—along with other indicators of economic freedom and openness of varying types—might be influential variables in the causation of the EMU's export effect disparity on its adherents.

Section II: Theory

Having established a clear explanation of where this research fits in the context of the aforementioned epistemic communities, the primary theories on the basis of which the forthcoming hypotheses will be posited now merit explanation. The first theory to be examined will elucidate the perspective I adopt when conceptualizing state economies within the EMU, which is one based predominantly on the 'interstate competition' hypothesis, which derives from one

of the basic premises of neoclassical economics.

The most cited work widely considered to be the seminal contribution to the field that deals with the role of inter-state economic competition in an increasingly globalized world is written by Allen Scott. Therein is his now widely accepted claim that globalization is leading not only to an increase in relationships of interconnectedness but also relationships of inter-state competition (Scott 1999). More specially, I find Philip Cerny's argument pertaining to the modern transition from "raison d'État" to "raison du Monde" to be quite persuasive (Cerny 2010). In essence, Cerny elaborates on the competition-based relationships between states that Scott began to develop, believing that Foucault's "Raison d'État is being superseded by a transnationalising, globalizing rationality that [Cerny] call[s] raison du Monde, at the core of which is the imperative of maintaining and promoting competitiveness in a world marketplace and multi-level political system—the Competition State" (Cerny 2010). I am persuaded by the arguments of Scott and Cerny, and find it useful to thus adapt the economic viewpoint of competition theory in contemplating state ambitions; it is widely acknowledged that states are increasingly interconnected, but they are nonetheless still competing against one another.

Adopting this mindset, one can begin to imagine that states, much like producers seeking to make a profit, will attempt to render themselves more competitive. In an increasingly globalized world, competition becomes even fiercer, as international trade is facilitated. As transport costs are reduced, geography can become less of a hindrance to trade; thus, the international market becomes increasingly competitive. The key takeaway from this competition theory approach offered by the likes of Scott and Cerny, and adopted in this paper, is the need to view states as engaged in competition, and increasingly so due to globalization. As such, the question surfaces: how did EMU affect the competitiveness of its adherents?

It merits reiterating that the main historical point of interest in this paper is the difference in national economic competitiveness within the European community prior to EMU as compared to after EMU.[1] Beginning with what many would argue is the first major step towards the establishment of EMU—the Maastricht Treaty—economic competition within EMU nations began to change rapidly, as the tools for national differentiation were increasingly limited by the goal of national policy coordination (Grieco 1995). More specifically, many scholars have proven empirically what would seem

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1 As a reminder, this paper focuses only on developments intra-EMU nations; hence, the competitiveness of the states within EMU vis-à-vis states outside of EMU will not be broached here.

theoretically obvious: all that EMU entails—from the single market, to the universal elimination and restriction of intra-EMU barriers to trade, to the introduction of the common currency—have had positive general effects on intra-EMU trade (Berger et al. 2008). Phrased in the diction of Cerny's 'competition state' theory, EMU has made intra-EMU trade more preferable. At the same time; however, EMU served a homogenizing purpose as well, by leveling the competitive economic playing field among EMU nations in many respects. As numerous scholars have illustrated by focusing on specific sectors—for example Pagano, Marco, and Von Thadden (2004) who studied homogenization's effect on the bond markets of EMU's adherents—EMU's resulting policy assimilation amongst its adherents has eliminated many mechanisms that once differentiated the nations of EMU; where once national economic competitiveness was influenced by currency and trade barriers, homogenization has done away with such differences (Pagano et al. 2004).

It is here that the principles of neoclassical economics begin to visibly inform the formation of my forthcoming hypotheses. I find it convincing that by eliminating various mechanisms by which the 'Competition State' had previously been able to determine its own competiveness as regards international trade, EMU has had a moderating effect on the variables that determine a state's competitiveness (Cerny 2010). By eliminating determinants of relative national economic competitiveness such as currency strength and various trade barriers, other determinants will see their relative importance exacerbated as a result of EMU.

Aristotelous' suggestion that a link may exist between trade openness and intra-EMU bilateral export growth is convincing; however, there are other, more convincing potential explanatory variables. The reason why trade openness alone may not have the most powerful effect on state competitiveness and thus bilateral export growth is that some of the components of trade openness will be controlled by EMU's regulatory bodies or its subsidiary treaties. In other words, some of the determinants of national trade openness will have been substantially homogenized by EMU (Grieco 1995). For example, trade openness is generally constituted of tariffs and non-tariff protectionist measures, such as administrative red tape, quality regulations, etc. As a result of this, a large portion of the policies that constitute trade openness will be homogenized by EMU regulatory bodies. This point can be further clarified drawing from the theoretical work on intrinsic vs. extrinsic incentives for reform by Karagiannis and Konstantinidis (2013).

Karagiannis and Konstantinidis (2013) focus on the issue of intrinsic and extrinsic incentives for reform. I propose that the same lens of analysis can be applied to the labeling of policies, as opposed to incentives. For example, let

us return to Aristotelous' trade openness theory. As was discussed, trade openness can be stratified into tariff and non-tariff barriers to trade, the latter not being controlled by the EMU regulatory bodies, while the former is. Given this regulation, regardless of the intrinsic national motivations for tariffs prior to EMU, all adherent states after EMU will have to homogenize their policies, thereby all adopting a similar policy of no tariff barriers to trade intra-EMU—a policy decision that was extrinsically imposed and not necessarily intrinsically motivated. This homogenization will, however, not interfere with states' policies on non-tariff barriers to trade, meaning that greater disparity will exist between the non-tariff protectionist policies of EMU nations, leading to greater differentiation and thus more obvious differences in competitiveness as competition states.

In conclusion, I argue that the scope of promising variables that might explain the disparity in intra-EMU bilateral trade growth must be expanded. Instead of simply trade openness—the effects of which would be in part limited due to the homogenization of the extrinsically regulated components thereof—I propose that all varieties of economic freedom be examined. Out of all of types of economic freedom—from Trade Freedom to Freedom from Corruption—I propose that the variables least affected by extrinsically imposed EMU regulations will correlate with bilateral intra-EMU export growth to a greater extent than those types of freedom that were more greatly affected by EMU regulations. For example, Monetary Freedom will most likely not have as much predictive statistical power in determining a nation's intra-EMU export growth because EMU nations share a currency and thus will have largely homogenized and extrinsically regulated Monetary Freedom. Following the same logic, a variable such as Investment Freedom appears to be quite promising, as the EMU regulatory bodies govern investment to much a lesser extent than they do trade or currency; hence, one would expect greater variations in Investment Freedom amongst the EMU nations and thus a better chance that Investment Freedom will play a significant role in the determination of intra-EMU export growth.

Drawing from neoclassical economics and its many subsidiary theories such as that of the 'Competition State,' I see a potential explanation for the divergent outwards trade effects of EMU on its adherents begin to emerge: EMU has created a significantly homogenized international economic playing field in which national absolute and comparative trade advantages have less determinants, rendering the remaining determinants more influential. With this theoretical justification having been explained, the hypotheses to be tested are as follows:

Hypotheses

H_1 : As Market Openness increases, so too will weighted intra-EMU export growth.

H_2 : As Investment Freedom increases, so too will weighted intra-EMU export growth.

H_3 : As Trade Freedom increases, so too will weighted intra-EMU export growth.

H_4 : As Financial Freedom increases, so too will weighted intra-EMU export growth.

H_5 : As Overall Economic Freedom increases, so too will weighted intra-EMU export growth.

H_6 : As Monetary Freedom increases, so too will weighted intra-EMU export growth.

H_7 : As Business Freedom increases, so too will weighted intra-EMU export growth.

H_8 : As Fiscal Freedom increases, so too will weighted intra-EMU export growth.

H_9 : As Property Freedom increases, so too will weighted intra-EMU export growth.

H_{10} : As Freedom from Corruption increases, so too will weighted intra-EMU export growth.

Each of these hypotheses serves to test the potential relationship between my outcome variable and one of my 10 independent variables. As I will expound, Market Openness is a variable that I codified myself for the purpose of this paper, aggregating the effects of Investment, Trade, and Financial Freedom inspired by the Heritage Foundation's dataset overview. Finally, I expect the correlative strength of the relationships explored in hypotheses pertaining to variables with little extrinsically imposed EMU regulation to be higher than those that are regulated to a greater extent by EMU. Using the same example as previously referenced, I predict that H_2 will be one of the most robust out of all of the hypotheses, given the minimal regulatory power exerted by EMU over the investment policies and regulations of each nation.

Section III: Methods

With this theoretical framework having been clearly explained, an in-depth characterization of the different variables to be used in this paper is now needed. For reference, the majority of the terms used to describe variable coding and operationalization are drawn from Chaudoin, Milner, and Pang (2015).

The outcome variable in this paper is the average growth in intra-EMU bilateral exports over the temporal range from 1996-2003. It may also be termed our dependent variable. The current method that allows for the synthesis of such a variable is the gravity model, which is known for having provided "some of the clearest and most robust empirical findings in economics" (Aristotelous 2006). The much aforementioned Professor Aristotelous has given me consent to use the gravity model from his 2006 paper—which will be discussed shortly—as well as the empirical results from said model for the purposes of this project; hence, a new gravity model need not be constructed. Notwithstanding, it is obvious that the same unit and temporal boundaries adopted in Aristotelous' paper must therefore be adhered to in this paper's analysis as well for the purpose of coherence.

A final note on the temporality of this paper's data: the beginning of the sample period I consider, just as with Aristotelous' paper, matches up perfectly with the sample period from Micco et al.'s 2003 paper, and, as stated by Aristotelous and Micco et al., "the shorter the time period used, the lower the endogeneity bias in the EMU coefficient due to the optimal currency criteria. Thus, the beginning of the sample was set to 1992 to limit the endogeneity bias" (Aristotelous 2006).[2] In short, the relatively restrictive temporal limits of this research need not be sheerly a negative point.

Now, an elucidation of the source of my pre-coded independent variables is appropriate. The theories previously explored suggest that different types of economic freedom would be promising potential causal mechanisms behind the differential bilateral trade growth effects experienced by the EMU nations; however, finding a variable that quantifies a concept such as "trade openness" or other types of economic freedom proves quite difficult. I searched through a variety of reputable data sources, including the WTO, IMF, World Bank, Peterson Institute, ICC Open Markets Index, and the Heritage Foundation. Of all of these sources, the only database that had adequate codebook information, pre-coded variables, and a data set that spanned the

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2 It merits clarifying that the temporal range of Aristotelous' data (1992-2003) does not match perfectly with the Heritage data set's temporal range (1996-present); hence, for the purpose of statistical reliability, the more constrained temporal range was chosen for the empirical analysis in this paper: 1996-2003.

timeframe necessary was the Heritage Foundation's Index of Economic Freedom (O'Driscoll et al. 2001). This database, which provides yearly national scores for overall economic freedom, as well as 10 other disaggregated scores that rank various components of economic freedom and are used to formulate the overall score, includes a detailed description of the codebook behind the codification of each score.

Having now elucidated the general nature of the variables to be examined in this paper, an exposition of their codification is needed. A final clarification needs to be made, however, with respect to state capacity and enforcement. The enforcement capacity of the EU is widely criticized, but not with respect to their oversight of the common market and the elimination of tariff barriers to trade (Crowley 2005). For this reason, it is safe to assume that all EMU nations are complying with the regulations that maintain the common market—such as the mandate to allow no intra-EMU tariffs, for example—as this area of oversight is one in which the EU has historically excelled, even if in other areas they have been less successful (ibid).[3] Having justified these presumptions of scope and capacity, the presentation of my variable codebook is now appropriate (See next page).

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3 Some of the independent variables in the study are inextricably influenced by state capacity. For example, freedom from corruptions is one of the independent variables obviously influenced by state capacity. A state with a high amount of corruption may very well aim to reduce said corruption, but lack the capacity to do so due to a variety of events out of its control (Besley et al. 2007). While at first this may seem troublesome, it is a non-issue for the specific purpose of this research, as my focus is only to examine whether or not a relationship exists between certain types of economic freedom/openness and increased outward bilateral trade intra-EMU; I do not purport to offer an explanation for the trends of each type of freedom a nation-specific level. This again is an issue of method and methodology, as the purpose of the type of statistical and econometric research in this paper is to seek out a statistically supported covering law not falsifiable given the chosen data and tests and the resulting empirics. A more in-depth exploration of the state-specific reasons for trends in national econometric freedom of varying types would be better suited for a case study analysis, but such depth is neither the aim nor within the purview of this paper.

Table 1. Variable coding information including variable name and meaning

Variable Name	Meaning
ARISTOT	Standardized Bilateral Intra-EMU Export Growth Variable (This is my outcome (or dependent) variable, derived from the results Aristotelous' paper)
MARKET	Standardized Market Openness Mean (aggregate of TRADE + INVEST + FINANCE found by averaging the three standardized variables)
INVEST	Standardized mean score for Investment Freedom.
TRADE	Standardized mean score for Trade Freedom
FINANCE	Standardized mean score for Finance Freedom
OVERALL	Standardized mean score for Overall Freedom
MONETARY	Standardized mean score for Monetary Freedom
BUSINESS	Standardized mean score for Business Freedom
FISCAL	Standardized mean score for Fiscal Freedom
PROPERTY	Standardized mean score for Property Rights
NOCORRUP	Standardized mean score for Freedom from Corruption

Each of the above variables, with the exception of ARISTOT, were taken from the Heritage Foundation's Index of Economic Freedom. The codebook for each of the variables is freely available online at their website, and should be referenced for any and all questions about the codification of specific variables (http://www.heritage.org/index/ about). The one exception is Market Freedom, which is a variable I synthesized from the aggregate of Trade, Investment, and Finance Freedom, inspired by the research accompanying the Heritage codebook.

**It should be remembered that year-by-year data were available for the Heritage database, but the coefficients from Aristotelous' data set pertained only to the total effect experienced over the course of the temporal range from his paper. As a result of this, each of the standardized variables synthesized using raw data from the Heritage database were synthesized taking the mean of the temporal range (1996-2003) for the sake of statistical consistency and reliability. These temporal limitations are what preclude me from being able to empirically prove that EMU had a moderating effect on the impact of the various types of economic freedom on outward intra-EMU trade; although the argument that EMU did serve a moderating effect is strong enough regardless given the theory and scholarly support previously expounded.*

While all information pertaining to the variables from the Heritage database is available online, the formula behind the variables from Aristotelous' paper merits brief explanation. Aristotelous' country-specific bilateral trade growth coefficients come from the following econometric model:

$$ln\,(X_{ijt}) = \beta_0 + \beta_1 ln\,(D_{ij}) + \beta_2 ln\,(Y_iY_j)_t + \beta_3 ln\,(\frac{Y_i}{Pop_iY_j/Pop_j})_t + \beta_4 ln\,(AR\Box A_i AREA_j)_t$$
$$+ \beta_5 LANG_{ij} + \beta_6 COMBOR_{ij} + \beta_7 LANDL_{ij} + \beta_8 EU_{ijt} + \beta_9 EU - TREND_{ijt}$$
$$+ \gamma_1 EMU - AU_{jt} + \gamma_2 EMU - BE/LU_{jt} + \gamma_3\,EMU - FI_{jt} + \gamma_4 EMU - FR_{jt}$$
$$+ \gamma_5 EMU - GE_{jt} + \gamma_6 EMU - GR_{jt} + \gamma_7 EMU - IR_{jt} + \gamma_8 EMU - IT_{jt}$$
$$+ \gamma_9 EMU - NE_{jt} + \gamma_{10} EMU - PO_{jt} + \gamma_{11} EMU - SP_{jt} + \varepsilon_{ijt}$$

"Given the specification of the equation, the coefficients of interest in this study are all the 'γs'. Each γ captures respectively the effect of EMU on … [a nation's] trade with other EMU countries." (Aristotelous 2006) For the purpose of this paper, it is the country-specific γ variables that are borrowed and then standardized that serve as my dependent outcome variable. As an example, γ1 once standardized becomes Austria's ARISTOT variable value. For further information on the dummy variables included in Aristotelous' gravity model, see Aristotelous' 2006 paper—particularly his section on Model Specification. Having established these variable labels, the 10 hypotheses can now be conceptualized as tests of relationships between said specific variables as follows:

H_1: As a nation's Market Openness increases, so too will its weighted intra-EMU export growth.

As MARKET increases, so too will ARISTOT.

H_2: As a nation's Investment Freedom increases, so too will its weighted intra-EMU export growth.

As INVEST increases, so too will ARISTOT.

H_3: As a nation's Trade Freedom increases, so too will its weighted intra-EMU export growth.

As TRADE increases, so too will ARISTOT.

H_4: As a nation's Financial Freedom increases, so too will its weighted intra-EMU export growth.

As FINANCE increases, so too will ARISTOT.

H_5: As a nation's Overall Economic Freedom increases, so too will its weighted intra-EMU export growth

As OVERALL increases, so too will ARISTOT.

H_6: As a nation's Monetary Freedom increases, so too will its weighted intra-EMU export growth.

As MONEY increases, so too will ARISTOT.

H_7: As a nation's Business Freedom increases, so too will its weighted intra-EMU export growth.

As BUSINESS increases, so too will ARISTOT.

H_8: As a nation's Fiscal Freedom increases, so too will its weighted intra-EMU export growth.

As FISCAL increases, so too will ARISTOT.

H_9: As a nation's Property Freedom increases, so too will its weighted intra-EMU export growth.

As PROPERTY increases, so too will ARISTOT.

H_{10}: As a nation's Freedom from Corruption increases, so too will its weighted intra-EMU export growth.

As NOCORRUP increases, so too will ARISTOT.

The empirical analysis to be employed will consist first of ten bivariate regressions—one for each of the above hypotheses—with the resulting R2 and Pearson Coefficient values being recorded. Subsequently, standard statistical tests will be applied so as to derive a p-value from the Pearson Coefficients, resulting in a p-value for each of the hypotheses. Using these p-values, I will seek to establish whether or not I can reject the null hypotheses in each of the 10 cases. As would be assumed given the model, standard one-tailed probability will be used.

Section V: Empirical Analysis

The first stage of my empirical analysis involved the normalization of my data, as otherwise it would be statistically impossible to compare the dependent and independent variables. Using standard statistical methods, the outcome variable was achieved by normalizing the bilateral trade coefficients from Aristotelous' 2006 paper, thereby yielding my ARISTOT variable, shown on the next page.

Table 2. Nations sorted by bilateral trade growth from lowest to highest. Bilateral trade coefficients from Aristotelous' gravity model results (2006). ARISTOT variable synthesized using standard statistical techniques to standardize coefficients from Aristotelous' model.

Nation	Aristotelous' Bilateral Trade Coefficients	Standardized bilateral trade growth (ARISTOT)
Greece	-0.130	-1.497698510
France	-0.090	-1.192668264
Austria	-0.050	-0.887638017
Finland	0.034	-0.247074500
Netherlands	0.060	-0.048804839
Belux	0.080	0.103710284
Ireland	0.110	0.332482969
Portugal	0.160	0.713770777
Germany	0.210	1.095058585
Spain	0.280	1.628861516

As there are 10 independent variables, the normalization process for only one exemplar will be shown. Similar techniques were used for the normalization of the dependent and independent variables. This process was repeated for all independent variables, and the first step of converting the mean overall scores to a standardized form is shown in Table 3.

Table 3. Nations sorted by overall economic freedom including mean of their overall scores from the Heritage index synthesized using yearly pooled data from 1996-2003 as well as OVERALL—the variable representing the standardized form of the mean overall scores.

Nation	Overall Freedom Means (1996-2003)	Standardized Overall Freedom (OVERALL)
France	59.175	-1.547133306
Greece	60.500	-1.283134384
Spain	64.813	-0.423892609
Portugal	65.063	-0.374081492
Austria	66.875	-0.012950891
Finland	67.200	0.051803562
Germany	67.725	0.156406909
Belux	70.463	0.701838644
Netherlands	71.575	0.923498116
Ireland	76.013	1.807645450

Having normalized both sets of variables (independent and dependent), I can move on to regress OVERALL against ARISTOT using the standard statistical functions. The combined table used for the ARISTOT vs. OVERALL regression

construction is thus structured as follows:

Table 4. Nations sorted by standardized bilateral export growth—ARISTOT—with corresponding standardized overall freedom—OVERALL.

Nation	Standardized bilateral export growth (ARISTOT)	Standardized overall freedom (OVERALL)
Greece	-1.49769851	-1.28313438
France	-1.19266826	-1.54713331
Austria	-0.88763802	-0.01295089
Finland	-0.24707450	0.05180356
Netherlands	-0.04880484	0.92349812
Belux	0.10371028	0.70183864
Ireland	0.33248297	1.80764545
Portugal	0.71377078	-0.37408149
Germany	1.09505859	0.15640691
Spain	1.62886152	-0.42389261

Having seen an example of the method by which the regressions were constructed, Table 5 below includes the results from all 10 regressions.

Table 5. Summary of R2 results from all empirical analyses conducted sorted from highest to lowest values for R2.

Regression Test Ran	R^2
ARISTOT vs. MARKET	0.3236
ARISTOT vs. INVEST	0.3143
ARISTOT vs. OVERALL	0.1607
ARISTOT vs. TRADE	0.1147
ARISTOT vs. MONETARY	0.0720
ARISTOT vs. FINANCE	0.0582
ARISTOT vs. FISCAL	0.0332
ARISTOT vs. PROPERTY	0.0210
ARISTOT vs. BUSINESS	0.0157
ARISTOT vs. NOCORRUP	0.0062

At this point, the empirics do not yet allow for the support or rejection of the various hypotheses. For this, p-values must be obtained for each variable relationship. Using standard statistical methods, the following data were obtained.

Table 6. Summary of p-values from all empirical analyses conducted, sorted from lowest to highest p-value, in descending order of statistical significance

Regression Test Ran	P - value	Significance Level
ARISTOT vs. MARKET	0.04307397	**
ARISTOT vs. INVEST	0.04591079	**
ARISTOT vs. OVERALL	0.12544684	N/A
ARISTOT vs. TRADE	0.16922193	N/A
ARISTOT vs. MONETARY	0.22668692	N/A
ARISTOT vs. FINANCE	0.25097057	N/A
ARISTOT vs. FISCAL	0.30717388	N/A
ARISTOT vs. PROPERTY	0.34471935	N/A
ARISTOT vs. BUSINESS	0.36509501	N/A
ARISTOT vs. NOCORRUP	0.41468923	N/A

* = 0.1 Confidence Level (CL); ** = 0.05 CL; and *** = 0.01 CL

Given the p-values and corresponding significance levels discovered by the empirical analysis, I can now summarize the findings by identifying which null hypotheses I can and cannot reject, subsequently rejecting all hypothesizes that cannot be supported in a statistically significant manner. See a summary of the findings in Table 7.

Table 7. Null hypotheses listed with corresponding summary of findings—either reject or failure to reject—along with brief justifications

Hypothesis	Null Hypotheses	Result
1	H_0 : Market Openness does not correlate positively with intra-EMU bilateral trade growth.	**Reject H_0**, support the probability of a positive relationship between Market Openness and intra-EMU trade growth.
2	H_0 : Investment freedom does not correlate positively with intra-EMU bilateral trade growth.	**Reject H_0**, support the probability of a positive relationship between Investment Freedom and intra-EMU trade growth.
3	H_0 : Trade Freedom does not correlate positively with intra-EMU bilateral trade growth.	"**Fail to reject H_0**, thus cannot support H_A (cannot support original hypothesis)"
4	H_0 : Financial Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
5	H_0 : Overall Economic Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
6	H_0 : Monetary Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
7	H_0 : Business Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
8	H_0 : Fiscal Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
9	H_0 : Property Freedom does not correlate positively with intra-EMU bilateral trade growth.	"…"
10	H_0 : Freedom from Corruption does not correlate positively with intra-EMU bilateral trade growth.	"…"

Discussion of Empirical Findings

As can be seen, of my 10 originally proposed hypotheses, only two of them hold true at a statistically significant level**; hence, all others can be rejected. Granted, the data were limited by their restricted temporality (1996-2003) and by the dearth of year-by-year intra-EMU bilateral trade growth data; therefore, if more substantial data become available, a richer analysis can be conducted. The data indicate that Market Openness would be the variable with the highest degree of predictive power when it comes to predicting intra-EMU bilateral export growth, as H_1 is empirically supported at a statistically significant level** to a slightly greater degree than H_2, which is also supported at a statistically significant level**. That said, in order to fully expound the meaning of the empirical findings, a series of robustness checks need to be executed.

Robustness Checks

Prior to concluding that Market Openness (MARKET) truly was the variable with the greatest predictive statistical power, a collinearity test needs to be ran, particularly given the fact that Investment Freedom (INVEST) constituted 1/3 of the aggregate index from which my MARKET variable was synthesized. The purpose of this is to determine the veritable robustness of my statistical results, with an eye towards looking past the simple p-values and determining what the data actually means. "Data weaknesses (such as collinearity) reduce the quality of least-squares estimates by inflating parameter variances;" hence, a discovery of collinearity between the two variables for which the null was rejected would call into question whether both tests can be deemed statistically significant (Belsley 1982). The results from the collinearity tests are as follows.
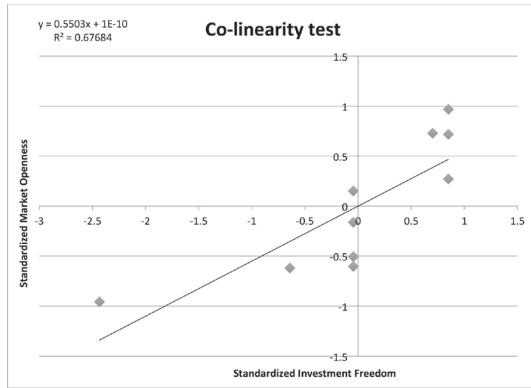
Figure 1. Collinearity test of Standardized Market Openness v. Standardized Investment Freedom. R2 value of 0.67684 suggests presence of collinearity, to be explicated below.

As can be seen, there is a recognizable collinearity problem with the two variables for which the null was rejected: Market Openness and Investment Freedom. This collinearity is visible both graphically, and in the R^2 value: 0.67684, which suggests significant collinearity. While co-linearity is emblematic of data weaknesses, it does not disqualify the reliability of all results, but instead calls for further examination of the results. An explanation for the collinearity and its implications can be found by breaking down the MARKET aggregate variable into its three component variables, as can be seen in Table 8

Table 8. MARKET aggregate variable and its three component variables—INVEST, TRADE, and FINANCE—sorted from highest to lowest R2 value, displayed with corresponding p-values and significance levels.

Variable	R^2	P-value	Significant Level
MARKET (Aggregate)	0.3236	0.04307397	**
INVEST (Component)	0.3143	0.04591079	**
TRADE (Component)	0.1147	0.16922193	N/A
FINANCE (Component)	0.0582	0.25097057	N/A

* = 0.1 CL; ** = 0.05 CL; and *** = 0.01 CL

Upon a detailed examination of the above data, it becomes apparent that the reason for the collinearity between INVEST and MARKET was because

the statistical strength of MARKET was upheld almost entirely by INVEST; differently put, Investment, Trade, and Financial Freedom were not equally important in determining the statistical strength of the correlation between Market Openness and growth in intra EMU outwards trade—it was the disproportionate correlative strength of Investment Freedom that rendered the MARKET aggregate variable statistically significant as well. Thus, my data actually suggest that the one hypothesis most promising in terms of its potential to serve as a general covering law as per the methodological motivations of this research is H_2, as H_1 —while statistically significant—derived its correlative strength only from one of its composite variables—Investment Freedom—the power of which is already more precisely captured by H_2. As a result of this, the statistical tests pertaining to Invest Freedom merit additional focus. The regression information for Investment Freedom is shown graphically in Figure 2.
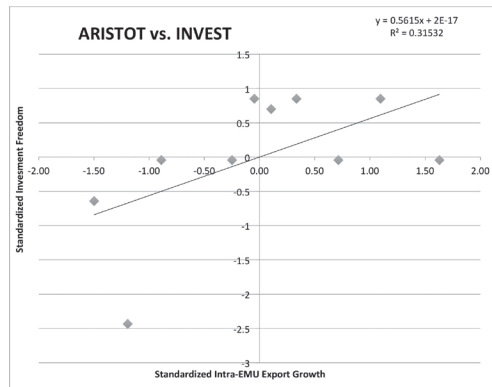
Figure 2. Regression of Standardized Investment Freedom (INVEST) on the x-axis   against Standardized Intra-EMU Export Growth (ARISTOT) on the y-axis. R2 value of 0.31532 suggests presence of moderate positive correlation.

Upon a more detailed examination of the regression it becomes clear that visually there appears to be an outlier in the lower-left quadrant. This data point represents France, which stood out amongst all other nations for which data was gathered as having surprisingly low Investment Freedom as compared to the rest of the EMU adherents. This can perhaps be even better illustrated in table form, as in Table 9.

Table 9. Nations sorted from lowest to highest level of investment freedom, in both standardized and non-standardized form. (Average of pooled means is 70.375 and standard deviation is 8.376).

Nation	Investment Freedom Pooled Means	Standardized Investment Freedom (INVEST)
France	*50.00*	*-2.432564889*
Greece	65.00	-0.641719572
Portugal	70.00	-0.044771133
Finland	70.00	-0.044771133
Spain	70.00	-0.044771133
Austria	70.00	-0.044771133
Belux	76.25	0.701414416
Germany	77.50	0.850651525
Ireland	77.50	0.850651525
Netherlands	77.50	0.850651525

As can be seen from Table 9, France is a clear outlier with substantially lower Investment Freedom than all other nations considered. In fact, every EMU nation lies within less than one standard deviation from the mean Investment Freedom score of 70.375, with the exception of France, the score of which lies more than two standard deviations below the mean. Out of all variable relationships tested in this experiment over the course of the 10 separate regressions ran, France's score for Investment Freedom was by far the most outstanding outlier.

The other intriguing yet not unexpected trend in the data pertains directly to the current Greek financial crisis that in no small part inspired this paper. The nation that most consistently and holistically placed in the same strata of the various indices of econometric freedom was Greece, which ranked lowest in Freedom from Corruption, Property Rights, Monetary Freedom, and Financial Freedom. In the case of each of these four variables, Greece scored 1.5 standard deviations below the mean or worse, once their scores were standardized. This suggests that further investigation into the specific case of Greece with a particular focus on government restrictions on various elements of economic freedom could prove fruitful.

Section VI: Conclusion

This article investigates some of the potential variables that may serve as causal mechanisms behind the intriguing trends in divergent bilateral intra-EMU export growth post-EMU. The outcome variable of interest—bilateral intra-EMU export growth—was drawn from the previous empirical studies of Aristotelous (2006) who utilized an augmented gravity model to identify the disparate effect

of EMU on the outwards intra-EMU trade growth of its adherents. In his conclusion, he theorized that the most promising variable that might explain these disparities was trade freedom, arguing that the countries with the highest degree of trade freedom would reap the greatest benefits of the optimal currency area (ibid).

The empirical analysis of this research does not support Aristotelous' claim that trade freedom is the best predictor of bilateral intra-EMU export growth. H3 –the hypothesis that emulates Aristotelous' claim—could not be supported by the empirical analysis of this paper. To recapitulate the main empirical findings, the only hypotheses which were not falsified by my empirical analysis were H1 and H2—pertaining to Market Freedom and Investment Freedom respectively—both being supported as presenting a statistically significant relationship at the 5% confidence level. Upon further analysis of the regressions, it was discovered that a problematic collinear relationship exists between H_1 and H_2, which can be attributed to the fact that Investment Freedom (H_2) was part of the aggregate variable composition of Market Freedom (H_1). As such, the importance of the statistical correlative power of Market Freedom is greatly reduced.

From here, we can return to the theoretical backbone of this paper, using it to better understand the implications of the empirical findings. In an increasingly globalized world, there is both more inter-state cooperation as well as more inter-state competition (Cerny 2010). This paper examines the potential link between various types of economic freedom and bilateral intra-EMU export growth motivated by the theoretically supported presumption that these variables partially constitute state competitiveness. The imperfect $R2$ values and confidence levels yielded by this empirical analysis, along with the fact that 8/10 hypotheses were rejected and only 1/10 can convincingly be proposed as a general covering law, suggests something that most would have assumed: the economic intricacies of the EMU are incredibly complex, and cannot be explained solely with reference to the variations in economic freedom. That said, what is clear is that differences in Investment Freedom across nations appear to be linked to a nation's bilateral outwards trade growth post-EMU. The question that remains to be answered then, is why it was Investment Freedom alone, and not the other two components of Market Freedom—Trade Freedom and Financial Freedom—that corresponded to higher levels bilateral export growth. One potential explanation stems from topics previously discussed but now deserving of further analysis given the empirical results: EU regulations, enforcement, and homogenization.

As has been previously expounded, empirically evidencing the

moderating effects of EMU was not a purpose of this paper, primarily due to data inadequacy. Given the lack of year-by-year data for all data involved it would be impossible to pinpoint a moderating effect as a result of EMU—particularly given that the effect might be a lagged effect. That said, it would appear from the empirical results that the various regulations and treaty obligations that govern EMU and EU economic convergence in general affect various national economic characteristics in heterogeneous ways. Investment Freedom, Trade Freedom, and Financial freedom were not subject to the same degree of homogenization—something that may account for the differences between the correlative power of the regressions ran in this paper. Trade Freedom, for example, is codified examining non-tariff barriers to trade as well as tariff barriers to trade, and other obvious forms of protectionism. Given that EU regulations have largely homogenized—and quite successfully so—tariff policy, as well as eliminated other obvious forms of protectionism[4], this means that the Trade Freedom Variable will inherently vary only a small amount at best, as the only codified determinant of real Trade Freedom not homogenized by EU regulations is non-tariff barriers to trade. Even then, non-tariff barriers are difficult to identify, further decreasing the utility of a Trade Freedom Variable.

The lack of correlative strength of the Financial Freedom variable is understandable for the same reasons as mentioned previously in the case of Trade Freedom—it would appear as though the elements of Financial Freedom that would be of relevance to the export industry have been subjected to homogenization as a result of EU regulations. When conceptualizing financial freedom, the focal point is the banking system; however, the real role that banks play in affecting exportation specifically is in their influence of exchange rates—controlled by the Central Bank (Alesina et al. 1999). Given that all the Eurozone has a common currency that is regulated unitarily by the European Central Bank, the differences in Central Bank behavior that in part contribute to the codification of the Financial Freedom variable are nullified due to Central Bank homogenization in the EU. Thus, of the three constituent variables of Market Openness, two seem to have been markedly affected by European homogenization. This apparent homogenizing effect was not influential in the case of Investment Freedom, as no EU regulations or treaty obligations—from Maastricht, to the Stability and Growth Pact, to its modern amendments—regulate investment in any substantive capacity, instead focusing on budgetary or monetary restrictions (Crowley 2005). It would thus appear that the relative importance of Investment Freedom in affecting bilateral intra-EMU export

4 See EC regulations 1466/67—basis of Stability and Growth Pact

growth as compared to the other components of Market Freedom was due to the fact that many elements of economic freedom were homogenized—even if just partially—by EU regulations, while issues of Investment Freedom remains largely unregulated. In summation, the empirical findings of this paper suggest that Investment Freedom is one of the characteristics that still substantially determines a state's competitiveness after the homogenization of various other economic determinants of state competitiveness via EMU and EU regulations.

As with any econometric analysis, the conclusions possible are largely determined by the quality and availability of the data; thus, many of the possible avenues for further research stem from the possibility of the emergence of better data in the future.

First, if year-by-year data for bilateral export growth before 2003 becomes available in the future, a similar study to this could be completed that could also empirically examine the moderating effects of EMU on the various determinants of state competitiveness, while in this paper the moderating effects were only assumed based on theory given lack of necessary data. Moreover, as more recent data become available, a continuation of a study similar to this could be conducted that expands the temporal range considered beyond 2003. Such data would allow for an examination of the potential moderating effects of other important developments in EU/EMU regulations such as the 2005 renegotiation of the Stability and Growth Pact and the more recent developments pertaining the Greek financial crisis.

Aside from possible continuations of research similar to this paper, the empirical findings of this paper suggest a need for different types of research to be conducted to further understand the determinants of intra-EMU export growth, and, by extension, the intricacies of the European economic system. In the section on discussion of empirical findings, a variety of promising potential case studies emerge. The great disparity in Investment Freedom in France when compared to all other EMU nations is definitely a subject that warrants further exploration on a more targeted level, perhaps in the form of a case study. Similarly, the Greek situation is an obvious candidate for case study—something in which many scholars are currently undoubtedly engrossed. These are but a few of the potential avenues for further research that seem particularly appropriate in light of this research. I anticipate a large influx in EMU/EU economics-related scholarly contributions in the coming months, as the precarious Greek situation brings back into question a variety of fundamental issues regarding the strength of the entirety of the Eurozone.

In conclusion, this paper has demonstrated that of all the subcategories of economic freedom, the data suggest that Investment Freedom has the

greatest correlative strength in predicting bilateral intra-EMU export growth. The effects of EU economic homogenization and EMU moderation on the various determinants of state competitiveness are incredibly complex, and the dearth of very strong correlative relationships between the independent variables explored in this paper and outwards intra-EMU trade growth suggest that even after homogenization, the determinants of bilateral export growth intra-EMU remain multitudinous, while Investment Freedom appears to be one of the most influential among them.

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FIRST THE LAND AND THEN THE LANGUAGE: LINGUISTIC IMPERIALISM IN TRANSJORDAN AND PALESTINE

Kate Pashby

Abstract

In Jordan, a state renowned for medical tourism, all physicians are proficient in English because medical classes are taught in English, indicating that English, rather than Jordan's official language of Arabic, is the prestige language of Jordanian medicine. As a result, Jordanians who have access to English through wealth and education receive more opportunities than those without access. These language ideologies come from Jordan's history as a British mandate. This paper applies the framework of Critical Discourse Analysis to a set of primary sources, Palestine and Transjordan administrative reports, 1918-1948, in order to determine imperial-era linguistic realities and discourses. Using this method, it is possible to identify one social reality and two discourses that worked in conjunction to construct English as a prestige language: 1) not everyone had equal access to education, 2) English was a language of higher learning, and 3) the British educational system was superior to Ottoman and Arab systems. Neither documented resistance to nor acceptance of English's prestige status represented the entire population. Globally, current English usage in former British protectorates and colonies depends upon both imperial-era discourses about the subject people and an individual's socioeconomic position within their society.

Introduction

In the past hundred years, the English language has taken root in the Arabic-speaking world. Modern concepts in transportation and technology are often translated into English cognates, such as taksī, awtūbīs, faysbūk,

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cumbīūtir, al-īntirnit, and tiknūlūjīā rather than Arabic words. English also seems to have a reputation as a more "scientific" language because it is used as the medium of instruction in medical classes in Jordan, formerly a British Mandate. This language usage is particularly intriguing because it indicates that English, not Arabic, is Jordan's prestige language of medicine. In fact, the Jordanian Rheumatism Society not only held its 2014 International Congress in English, with "no simultaneous translation," but also in collaboration with the British Society for Rheumatology (Arab League Against Rheumatism 2014). According to Suleiman (2011), so many Arabs prefer English to their native Arabic because English evokes prestige and modernity "by virtue of its connection with power and globalization" (63). But this explanation does not take into account the vestiges of imperialism apparent in Jordanian medicine. Though globalization certainly plays a significant role in English's status as a prestige language, the imperialization of Arabic began decades before.

After the intellectual developments of the 18th century Enlightenment and the technological advancements of the 19th century Industrial Revolution, the Western world realized that it had reached a new stage of civilization (Adas 1990). Science, and indeed the positivist concept of the scientific method, had heralded a new, golden age of modernity. The West then determined that non-Western peoples were still living with the same "backwards" traditions they had been practicing for centuries. In places with long-gone advanced civilizations—namely India, China, and Egypt—the West believed that it could teach the people about their own glorious pasts, enabling them to regain greatness through education (Adas 1990; Prakash 1999).

Sub-Saharan Africa, on the other hand, was supposedly too primitive for any such task, and as a result its colonies were treated with even more disregard for their peoples than other 19th century imperial possessions (Gifford and Weiskel 1971). Thus the West embarked on a civilizing mission of spreading science and modernity through advanced infrastructure and limited education, both of which further facilitated imperialism (Adas 1990). Imperialized peoples resisted both passively and violently, but, as postcolonial sources like Prakash (1999), Said (1994), and most notably Algerian revolutionary Frantz Fanon (2004) have noted, organized resistance was often a vehicle of the Western-educated elite.

After the Allies defeated the Ottoman Empire in WWI, the British gained Transjordan and Palestine.[1] The two were British Mandates from 1918-1946 and 1918-1948, respectively, though Britain retained somewhat of a sphere of influence over Jordan a decade after its independence (Fieldhouse 2006). Using

1 "Transjordan" and "Palestine" refer to the British Mandates. "Jordan" refers to the post-Mandate Hashemite Kingdom of Jordan

the primary source series Palestine and Transjordan Administration Reports, 1918-1948, I have investigated how imperial language policies and discourses have influenced present-day language ideologies in Jordan. I have determined one social reality and two general discourses that worked in conjunction to construct English as a prestige language before the age of globalization cemented English's high status. I will then connect this history to the present with some ethnographic observations collected while studying in Amman in fall 2015.

Fairclough and Critical Discourse Analysis

I incorporated concepts from Norman Fairclough's method of Critical Discourse Analysis (CDA) into a more traditional discourse analysis of my primary sources. Unlike other forms of discourse analysis, CDA enables users to 1) critique discourses, 2) situate the discourses within a broader social context, and 3) challenge these discourses and the social order they support (Fairclough 2015). Fairclough's use of explanatory critique is crucial here—most analyses of discourse only use normative critique, or "immanent" critique, which solely "identifies internal contradictions within the social reality, including those between what is supposed or said to happen and what actually does happen" (Fairclough 2015, 12). On the other hand, explanatory or "transcendental" critique determines how the discourses found through normative critique are constructed by society and maintain the status quo (Fairclough 2015). In other words, explanatory critique is a crucial but oft-ignored second step of discourse analysis that incorporates social and historical context into the analysis.

Fairclough's idea that is most fundamental to my research, however, is the mutually reinforcing relationship between social structures and discourse. According to Fairclough,

> Social practice does not merely 'reflect' a reality which is independent of it; social practice is in an active relationship to reality, and it changes reality. The world that human beings live in is massively a humanly created world, a world created in the course of social practice...As far as the social world is concerned, social structures not only determine social practice, they are also a product of social practice. And more particularly, social structures not only determine discourse, they are also a product of discourse. (Fairclough 2015, 68)

In other words, social structures both create and are created by

discourse. This concept incorporates both the bottom-up direction of change articulated by materialism and the top-down direction of change articulated by idealism, with ideology at the "top" and the means and organization of production at the "bottom." In this paper, "social realities" are the social structures that are created by discourses and inspire the construction of further discourses. It is important to note that each social reality and discourse section in the paper contains both social realities and discourses; the two are not rigid categories, but rather constantly influence each other in multiple ways.

Limitations of *Palestine and Transjordan Administration Reports, 1918-1948*

Surveys and censuses provided an excellent method of controlling the British Mandates through knowledge (Richards 1993; see also Anderson 1991). Their findings, along with any problems the administrators encountered, were compiled into official reports to the League of Nations and British government. Curated by Robert Jarman, the *Palestine and Transjordan administration reports, 1918-1948* combine these reports with letters from British civilian and military officials. These documents span the entirety of British rule in Palestine and Transjordan, beginning with the military administration of 1918-1920, surpassing Transjordan's declaration of independence in 1946, and ending with the British withdrawal from Palestine in May 1948. While the series is an excellent resource, the original documents leave a number of gaps and other limitations.

In fact, some of the reports are missing. In the series' introduction, Jarman (1995) notes that British Colonial Office minutes indicate that the 1939 report was written; however, he could not locate any copies of the document and presumed that it must have been thrown away (vol. 1). Jarman instead published the individual departmental reports that the 1939 report should have been based on. Likewise, the government in Britain ordered the administrators to stop producing reports in 1942, supposedly due to a wartime "shortage of paper" (Jarman 1995, vol. 14, 683) so Jarman published the individual departmental reports for 1942-1946. Unfortunately, the departmental reports for these years exclude Transjordanian education, and Palestine's Department of Education report for 1944-1945 seems to have disappeared as well.

Another problem is the way the reports were written. Like many administrative documents of the time, the reports are replete with passive verb constructions and non-human subjects. It is impossible to determine agency from sentences like, "Steps are being taken to label in the three official languages exhibits of the Palestine Archaeological Museum" (Jarman 1995, vol. 4, 399). In fact, it is

not even clear who composed each report. Only the most important officials are explicitly named (sometimes) in the reports' discussions of events; everyone else who participated in these events is reduced to a vague, anonymous "they."

The most critical issue, however, is the reports' primary focus on Palestine, for which there are several possible explanations. Sequentially, Palestine is always discussed before Transjordan in the reports, so the writers may have simply wanted to avoid redundancy. A more likely cause is the limited scale of British involvement in Transjordan. Transjordan is also seldom mentioned before 1924 because before that time, some British government officials wanted it to be part of Palestine (Jarman 1995, vol. 1). From the British point of view, Transjordan was also not a pressing imperial concern, whereas Palestine was destined for greatness as the so-called Jewish National Home, which would create much tension and violence between Jews and Arabs in the 1930s and 1940s. Though many Transjordanians opposed the Zionist movement (Salibi 1998; Fieldhouse 2006), the state saw little violent opposition (Jarman 1995, vol. 6; Fischbach 2004; Anderson 2005).

Due to the limited amount of information on Transjordan, I have used both Palestinian and Transjordanian data for my research. While Palestine's Zionist history presents a key difference between the two countries, the two have much in common. Both were part of the Ottoman Empire during WWI, and therefore both states' education programs suffered from the same problems. Both states were also under British control; French rule in the Middle East and North Africa was drastically different. The states also had strong political, familial, and economic connections (Jarman 1995, vol. 1) due to their geographic proximity. Moreover, due to a lack of higher education in Transjordan, more advanced students often had to attend Palestinian schools. In Salibi's (1998) words, Transjordan was "Palestine's twin" (126).

Discourse I: English Was a Language of Higher Learning

When the British took control of Palestine and Transjordan, they found the education system in utter disrepair. American missionaries in the mid- to late-19th century had brought high-quality education to Syria and modern-day Lebanon, but they had little luck in establishing their private schools in Palestine and Transjordan (Elshakry 2013). With the advent of Turkish nationalism at the turn of the century, the medium of instruction in all Ottoman public schools became Turkish. Even Arabic was taught as a second language, through Turkish, and there are several anecdotes of incompetent, non-native-speaking Arabic teachers (Suleiman 1994, 2003). Thus most

students in Palestine and Transjordan would have had to learn through a second language. Education suffered even more during WWI, when the Ottoman Empire requisitioned classroom materials like furniture for the war. Consequently, the British set out to reform and restructure public education, and in 1917 they appointed a Major Williams to lead the efforts (Jarman 1995, vol. 1).

After buying more furniture, Major Williams' next course of action was to change the language of instruction in schools. Article 15 of the League of Nations Mandate had decreed that members of each community in Palestine should have the right to an education in their own language (Jarman 1995, vol. 1). As a result, the British created a dual system of (Muslim and Christian) Arab and Jewish public schools, with the Government Arab schools teaching through Arabic and the Va'ad Leumi schools through Hebrew. However, the British also deemed it necessary to introduce English as a foreign language in upper-level elementary classes. Teachers continued English instruction through secondary schools and Training Colleges, which were British-created secondary schools with additional upper-level classes for prospective teachers (Jarman 1995, vols. 1, 3). There were no Training Colleges in Transjordan, so Transjordanian students went to Training Colleges in Palestine (Jarman 1995, vol. 2). In the Government Arab College's early Training classes, students only thoroughly studied Arabic and English literature; all other subjects were merely taught through the framework of elementary education (Jarman 1995, vol. 2).

English proficiency was important because, according to the British, English-language teaching materials were superior to Arabic ones. Thus, not only was English a language of higher education, i.e. taught in upper-level classes, but it was also a language of higher learning, or a prestige academic language. In the 1927 report, the writers included a "Note on the teaching of various subjects." The Government Arab schools section reads (all emphases added),

> Arabic.—*The study of Arabic is greatly hampered in the elementary schools by a complete lack of children's literature.* The only reading books available are two or three series of graduated primers published in Egypt or Syria. No supplementary school readers and no books suitable for home reading exist. [...]
>
> English.—*In English, on the other hand, the supply of books for supplementary and general reading is wide, but no series of readers exists which is scientifically graduated and specially adapted for Arab use.* All Government teachers of English except at the Training Colleges are Arabs, and most of these are still very imperfectly equipped. Partly

for this reason but mainly on general education grounds the syllabus and instructions issued to teachers have laid somewhat greater stress on reading and comprehension than on oral or written composition, in which *no very marked progress can be made until the teachers themselves are able to speak and write correct English with some fluency.*

[…]

History.—*In history, teachers not well acquainted with a European language are unable to find suitable material for the preparation of lessons. The elementary history books available in Arabic are jejune summaries.* In secondary classes an Arabic adaptation of Breasted's "Ancient Times" is used by pupils, but Arabic reference books are few and unsatisfactory. Most teachers now passing out of the Men's Training College are able to use English books and to base upon them lessons suited to all elementary classes.

In elementary and lower secondary classes the defects of less fully trained teachers are partly compensated by the use of historical readers in English language lessons.

Geography.—[…] *All Arabic geographies are inferior in format; maps and diagrams are few, rough and badly reproduced.* There is an entire absence of teachers trained in modern geographical methods, and improvement must be slow until an Arabic lecturer educated in Europe can be appointed to the Training College. (Jarman 1995, vol. 2, 401-402)

This discoursally rich passage reveals a number of key British ideas about Arab education in the Mandates. First, the British considered Arabic textbooks and maps to be useless, if not detrimental to children's education. The Court of Directors of the East India Company in London had already set a precedent in 1821 for utter disregard for 'Oriental' books (Adas 1990), so this sentiment was by no means new. In the Mandates' case, a number of quality textbooks had been produced by American missionaries in Syria in the mid-19th century (Suleiman 2003; Elshakry 2013), but if any of these books still existed a century later, they were heavily outdated. Late Ottoman education had presented no need to publish new, quality textbooks in Arabic because the

language of instruction was Ottoman Turkish.

Second, there was a relatively simple solution to the Arabic materials problem, again with a precedent in Indian education: use textbooks and maps created by Europeans in European languages. The British recognized in the 1926 report that elementary boys' schools "show an increasing capacity to profit from works of reference in English" (Jarman 1995, vol. 2, 255). However, the British also believed that English should be offered in moderation. In the "Note on the teaching of various subjects," the writers explain that foreign Arab schools had superior Western teachers who taught through Western languages, thereby giving students access to superior classroom materials. Yet if the Western language was introduced before students mastered their native language, "The mental development of pupils may thus be retarded, if not permanently checked, by imperfect command of any medium of thought and expression" (Jarman 1995, vol. 2, 402). The British disagreed with these private, Western European-run schools' method of introducing foreign languages because it did not enable the young students to become truly proficient in any one language. In other words, the British thought that their method of education even surpassed other Western methods.

Third, this European-language solution depended upon teachers' education and ability, and many teachers were simply not capable. During the Mandates' first few years, the British found current teachers to be incompetent, so the Government provided scholarships for several high-achieving secondary students to go to Training Colleges in Palestine or even foreign universities in Lebanon, Egypt, and Britain (Jarman 1995, vols. 1, 2). When these students matriculated, the unsavory teachers were dismissed and the students received their teaching positions (Jarman 1995, vols. 2, 5). In the meantime, the Palestinian and Transjordanian Governments took additional steps to improve teachers' English proficiency. In November 1927, the Transjordanian Government invited Palestine's Assistant Director of Education to visit schools in two large towns and instruct teachers on how to teach English (Jarman 1995, vol. 2). In 1934, as there were still no Training Colleges in the Mandate, Transjordan's Government again sought Palestine's help, this time in holding a class on English language instruction (Jarman 1995, vol. 5). Palestine, in turn, had appointed a "British Inspector of English language teaching" in 1931 (Jarman 1995, vol. 3).

Finally, as a general consequence of all of these ideologies, the British system of education was discursively positioned as superior to both Ottoman and Arab systems. Teachers educated in European schools were not only better because of their access to high-quality European-language materials. They also knew about modern, positivist research methods, which made them more scientific and therefore better teachers. European teachers were also more motivated and

less myopic than their Arab-educated counterparts. In imposing their lofty education standards upon Palestine and Transjordan, the British aimed to modernize and Westernize the Mandates.

Social Reality I: Not Everyone Had Equal Access to Education

A discussion of British education's supposed superiority first requires a discussion of what the British education system, specifically the Government Arab school system, looked like. The British implemented a literacy campaign to spread education to everyone from Government messenger boys to prisoners to illiterate adults (Jarman 1995, vols. 1, 3, 7, 14). But "widespread" does not necessarily mean "equally accessible," and the British reproduced, and thereby sanctioned and widened, existing social inequalities (see Fieldhouse 2006) in the education system. In addition to religious segregation, people's access to education was stratified by their location, gender, physical and mental disabilities, and conformity to the new social order.

In Palestine and Transjordan, elementary schools contained seven classes that were divided into two phases: the lower cycle, which consisted of the first five classes in town schools and the first four classes in village schools (Jarman 1995, vol. 14), and the upper cycle, which contained the remaining two or three. In secondary schools, the first two classes were considered "post-primary," and the next two classes were preparation for Palestine or Transjordan Matriculation, with pupils divided into "scientific" and "literary" groups according to their academic focuses (Jarman 1995, vols. 13, 14). If the secondary school were a Training School, it would have an additional two years of post-matriculation classes for teaching candidates and university-level students (Jarman 1995, vol. 13). Elementary and secondary schools fell into categories of public/private, Jewish/Muslim/Christian or Jewish/ Arab, urban/rural, male/female, and ability/disability. It is important to note that not all elementary or secondary schools contained the full number of classes, meaning that their pupils had to change schools and travel farther if the students were willing and able to receive a full elementary or secondary education.

This problem was particularly pronounced in rural areas. For example, in Palestine, towards the end of the Mandate, 302 of 330 village schools contained the first four classes of the lower elementary cycle; only 10 elementary schools contained all seven classes (Jarman 1995, vol. 9). There were also 10 rural secondary schools, though these only had two classes each (Jarman 1995, vol. 13). And in the largely-rural Transjordan, there was only

one complete secondary public school for boys, as well as three that offered the two "post-primary" classes, but no public secondary schools for girls (Jarman 1995, vol. 7). The paucity of secondary education in Palestine and Transjordan mirrors the post-WWI situation of British colonial Africa, where colonial officials desired to only educate enough people needed to assist in low-level bureaucratic functions (Prosser and Weiskel 1971).

But in Palestine and Transjordan, transferring to urban elementary and secondary schools was not a viable option for most village students, as the British had created different curriculums for the two school systems. The 1929 report writers explained, "The Government Department has sought to avoid giving too literary a bias to village education, and to provide the village boy instead with an attractive education suited to his own and his country's needs and equipping him to resist the drift to the town where he may become unemployed or unemployable" (Jarman 1995, vol. 3, 65). According to the Survey of Palestine, the primary goal of creating a unique syllabus for rural schools was "to fit the school to the rural environment of the pupil without thereby establishing the rural population as a separate caste from the urban" (Jarman 1995, vol. 13, 121). Village students did not receive much more literary education than was required for basic Arabic literacy, and very few learned English in schools.

Despite official British intentions, village students became somewhat of a "separate caste" when they went to the towns and found themselves "unemployed or unemployable." In a 1934 article, a writer named Kenneth Stein argued that any member of the agricultural Fellaheen, who would almost certainly have attended a village school in Palestine or Transjordan, "seeks employment but can not [sic] find it; he has not work because the Jews took over all the work; the fellaheen [sic] are driven from the land because the Jews bought it from the rich landlords. The fellaheen are drawn to the towns to seek jobs which they do not get" (qtd. in Anderson 2005, 110). The Fellaheen, who were most if not all of the village students, were unable to compete with former students of town schools who knew English, had more practice at reading and writing Arabic, and had a more in-depth knowledge of history and science. Thus the Fellaheen found themselves jobless and homeless—a group of social and economic outcasts who had been left behind in the push for modernity.

The urban/rural divide was also evident in women's education, which was even more limited than men's. Unlike the urban/rural divide, the gender divide in education was more the result of a patriarchal Arab society; the patriarchal British society merely allowed the divide to continue. The 1929 report's writers stated, "Moslem opinion does not permit of co-education except in the infant or kindergarten stage of elementary day schools. Conservative religious authorities

put the maximum age to which such co-education may continue at five years. Educated Moslems take a more modern view" (Jarman 1995, vol. 3, 221). According to Massad (2001), many colonized peoples saw an increased public role for women as a way to modernize society and attain parity with the West. While women had more rights in Britain at the time than in Transjordan, the Western imperial nations were and continue to be grounded in patriarchy. Thus Transjordan was not attempting to transform its existing patriarchal structure, and women could be made to retain their traditional, inferior status at home.

Maintaining this divide was important for people like Emir Abdullah, who—like many anti-colonialists—compared colonization to rape, which was equal to castration, or the loss of masculinity and move towards femininity. Therefore, in Abdullah's eyes, freedom was "the condition of stable masculinity and femininity" (Massad 2001, 89). Many Palestinians and Transjordanians agreed that women should be briefly educated, but not to the point where they could transform unequal gender roles. As Ortner (2014) notes, American patriarchy is constructed by series of strict, interrelated dichotomies; people who violate those boundaries, such as women in traditionally masculine professions and gender-queer individuals, are considered impure and therefore are verbally or physically attacked.

This patriarchal construction explains why the Women's Training College in Jerusalem, a school for prospective urban women teachers, used "a secondary syllabus which has been adapted for women and includes domestic science, child welfare, physiology and hygiene" (Jarman 1995, vol. 7, 591). Students here needed to know English because English teachers, working under an English principal, taught them domestic science and needlework, in addition to English language classes; all other subjects were taught through Arabic (Jarman 1995, vol. 13). It is possible that the British considered needlework part of the civilizing mission, though Arab women certainly knew how to sew and weave. On the other hand, it is also possible that the British wanted to further imperialize the Arabic language by making English the language of the home, or domestic sphere, in addition to the language of academia. But not all students had access to English. The Women Rural Teachers' Training Centre in Ramallah did not teach English (Jarman 1995, vol. 7), so teachers who graduated from the institution could not teach their female, villager pupils English either.

Students with disabilities also had unequal access to the education system, and they were further stratified according to their particular disabilities. In 1931, the report writers briefly noted, for the first time, that "[t]he only

institution for the education of the mentally defective is at Tel-Aviv, where 24 Jewish children are maintained" (Jarman 1995, vol. 3, 662). Conversely, the next year's report contained an entire section labelled "Education of Defectives," which named four institutions for blind pupils—two were orphanages—in Jerusalem. Two, a Muslim and a Christian institution, taught only handwork, but the second Christian institution and a Jewish institution also provided an elementary-level education. The report also described a Jewish-run school specifically for the "deaf and dumb," in addition to a small, newly created school for the deaf and a Christian school with a class of deaf students. The report finally mentioned the school for the "mentally defective" at the end of the section (Jarman 1995, vol. 4). Curiously absent are those with mobility problems and other physical disabilities. These students were possibly not considered "defective" and were likely educated alongside able-bodied students.

In sharp contrast to blind students' consignment to handwork, the 1933 report again included this section with the note, "A blind Arab student, who obtained his B.A. degree from the American University of Beirut, was elected to a scholarship of three years tenable for the first year at the Royal Normal College for the Blind in Edinburgh" (Jarman 1995, vol. 4, 438). Future reports mentioned this blind student in the "Scholarships" section, along with the other, (presumably) able-bodied students on scholarships, until the blind student matriculated in 1936 and returned to Palestine (Jarman 1995, vol. 6). In 1938, another blind individual—or perhaps the same one—gained special mention as well: "A school for the blind was opened in Hebron, with 14 pupils. The headmaster, who is himself blind, has had a special three years' training in England" (Jarman 1995, vol. 7, 589). Subsequent reports also include this verbatim quote, which is more importantly also excluded from the repeating "Education of Defectives" section. By suddenly acknowledging blind people's accomplishments and, in some cases, grouping them with able-bodied students rather than students with disabilities, the report writers implied that the blind transcended their traditional role. Now, the blind occupied a special position in society, neither wholly people with disabilities nor able-bodied people.

The British also prevented the academically weak from progressing into higher education through a process known as "superannuation." At various elementary stages, including the application process for secondary schools, students could be removed from the education system entirely if they had repeated too many classes and were generally "not fit for promotion" (Jarman 1995, vol. 3, 68). Even students in secondary schools were subject to removal. In 1928, a Government Arab College student "was expelled for grave insubordination and two were removed for unsatisfactory work or behavior" (Jarman 1995, vol. 2, 536), and the next year, "Three students were dismissed for bad behavior and one

for inefficiency" (Jarman 1995, vol. 3, 67). It is unclear how the Government Arab College administrators deemed the students' work to be inefficient or unsatisfactory. In any case, the British extolled the process of superannuation, declaring in 1929, "The gradual removal of old and backward pupils is proving very beneficial to the general standard of the classes" (Jarman 1995, vol. 3, 68).

The discourses supporting this weeding out of imperfect pupils are likely the very same discourses that supported Britain's eugenics movement, which sought to remove physically and mentally "flawed" individuals from society on the grounds that such people threatened social progress (see MacKenzie 1976). While the writers of the 1945-1946 Education Report claimed that the "old and subnormal children have unfortunately to be removed owing to lack of accommodation and qualified staff" (Jarman 1995, vol. 14, 155), and the 1931 writers implied that superannuation helped schools abide by health regulations limiting the amount of pupils (Jarman 1995, vol. 3), the writers of the 1929 report and many other reports made it clear that these imperfect pupils were tainting their classes. Only by removing them could the British make any headway in Palestine's and Transjordan's education, thereby fulfilling the civilizing mission.

Discourse II: The British Education System Was Superior to Ottoman and Arab Systems

The British very clearly believed that their systems of education in Palestine and Transjordan were better than anything the Ottoman Empire did or the Arabs could have done on their own. The British even looked down upon the private European schools in the area because, in teaching through European languages, the Arabs (according to the British) were unable to gain strong reading proficiency in either their native Arabic or the European language. The British endeavored to educate the ideal student, but in order to determine who was fit and unfit for higher education, the British needed to implement a system of quantification. In accepting British discourses about the superiority of their education, Palestinians and Transjordanians also implicitly accepted the inequality inherent in the system, in addition to the quantification required to support it.

At the beginning of the Mandate, the British primarily used quantification to gauge the situation of elementary education. This method of information gathering provided a means of gaining power over Palestinians and Transjordanians, as the British equated knowledge with power (Richards 1993). In 1924, schools administered "intelligence tests," which demonstrated

that young Palestinian boys were less mentally developed than their British counterparts, although the gap seemed to diminish in secondary school (Jarman 1995, vol. 1). Tests like this soon overtook the land: in 1931, the Government created standardized literacy tests for students all over Palestine (Jarman 1995, vol. 3). A 1930-1932 survey of Arabic and arithmetic knowledge produced the following results: "Of the examinees educated in the Turkish time 53 per cent. failed in Arabic and 34 per cent. in arithmetic. Of those educated since the occupation 24 per cent. failed in Arabic and 18 per cent. in arithmetic, but if the Gaza and Hebron areas, which are backward, are excluded the failures in Arabic are only 16 per cent" (Jarman 1995, vol. 4, 118). There was certainly some grain of truth in Britain's imagined superiority over Ottoman education, which after all taught Arabs Arabic through the medium of Turkish. The quote does, however, beg the question of why the writers focused on the failures rather than the successes. The word choice was likely based in Orientalist ideas emphasizing what "Orientals" could not, rather than could, accomplish.

After the Mandate's early years, the primary method of quantification was the Palestine Matriculation Examination, which was offered in English, Hebrew, and Arabic. While the exam was not the only determinant of matriculation, it served as a major factor (Jarman 1995, vol. 2). It was not until 1935 that Transjordan's Education Department created a secondary-school matriculation exam, which was based on the Palestinian one. Students who passed were rewarded with automatic admittance to either the American University of Beirut or the Syrian University at Damascus, as they did not need to take the entrance examination like other applicants did (Jarman 1995, vol. 5). By passing the matriculation exam, these students were deemed worthy of higher education and eventual absorption into the Government.

In 1927, the Department of Education held for the first time an examination for post-matriculation students, i.e. those in upper-level Training classes, who wished to become teachers or learn at the university level. Initially, all exams were conducted through English, with the exception of language examinations (Jarman 1995, vol. 2). Yet the testing languages later switched: according to the 1941-1942 Department of Education report,

> The candidates offering mathematical subjects chose to be examined
> through Arabic, while the arts candidates were examined through English.
> The results of the examination showed that Arabic can be a satisfactory
> medium for post-matriculation instruction in mathematics and physics.
> (Jarman 1995, vol. 9, 757)

English, according to the British, was the language of science, and thereby the most suited for positivist tests like the Palestine Intermediate Examination described above. The reversal of languages further indicates that the original language examinations focused on Arabic literature, while the later ones emphasized English literature. The fact that after 1937, literary students began learning Latin in addition to logic, philosophy, Arabic, and English (Jarman 1995, vols. 13, 14) demonstrates the extent of Britain's language colonization. In fact, students in one school regarded Latin as "unpatriotic" (Jarman 1995, vol. 14, 696), likely on account of its former status as the prestige language of Western intellect during the Renaissance era. These students preferred to honor Arab and Muslim intellect from Islam's golden age, a time known to Europeans as the Middle or Dark Ages.

The math candidates present still more intrigue. Here, Palestinians' struggle over language usage mirrors the Indians' in the 19th century. Historian Gyan Prakash has found that in colonial India, some Indians saw science as a "language of reform" and "superior knowledge" (Prakash 1999, 54, 57) that, with British colonialism, could modernize Indian society and save its people from ignorance and superstition. Yet in order to bring about this change, the Indian intelligentsia had to transform Hindi into a language of science, borrowing enough English words to be scientific but using enough Hindi equivalents to maintain the language's integrity (Prakash 1999). Indian schools did, however, teach English in addition to Western science, thereby constructing Western education as a symbol of imperial repression. While some members of the educated elite took pride in India's Westernization, Gandhi (1939) criticized Western education as irrelevant to many Indians and incapable of providing happiness, saying, "To give millions a knowledge of English is to enslave them" because regular English use facilitated British rule (79). Although Gandhi heavily romanticized pre-colonial India, he was not alone in his resentment of English. For example, modern Indian poet Vikram Seth (1994) has referred to English as "the conqueror's/Authoritarian seal" (64).

The Arabic-speaking world had already encountered the challenge of translation in the mid- and late-18th century, as the educated elite sought to synthesize in and eventually translate to Arabic the works of Charles Darwin, Herbert Spencer, Jean-Baptiste Lamarck and other Western scientists. Arab intellectuals, like their Indian counterparts, believed that many Arabs were hopelessly backward in their rejection of science, although it is worth mentioning that Western missionaries in the Arab world often opposed science in the same way (Elshakry 2013). Over half a century later, it appears that

the Government Arab College's mathematical students wanted to reframe Arabic as a language of science capable of conveying positivism. Rather than wishing to discard Western intellect entirely, these students wanted to adapt their language to fit into Western science, thus creating a uniquely Arab version of modernity (see Sahlins 1998).

But, as Fanon (2004) pointed out, such organized resistance only represents the interests of a small group of elite, who owe their status to the imperial power. With such a vested interest in the imperial status quo, the resistance movement advocates a peaceful evolution and the retention of some ties with the imperial power. According to Fanon, the only way to satisfy the needs of peasants, who made up the majority of Algerian, Palestinian, and Transjordanian societies, was to bypass political parties and unions, violently resisting through guerilla warfare until the imperialized had ridded itself of every vestige of imperialism, including elementary school teachers (2004). While Fanon's overly simplistic view of peasant unity and calls for mass bloodshed are serious shortcomings, he was correct in saying that organized resistance is traditionally a vehicle for the elite. Resisting linguistic colonization in Palestine and Transjordan was only available to the intellectual elite in the Government Arab College, who could request Arabic-language materials from influential members of the Government. Most Palestinians and Transjordanians would not have had such access to influential Government employees as a result of their lower financial statuses. Indeed, many Palestinians and Transjordanians saw the English language as a means of improving their statuses, and therefore had less incentive to resist.

In the Mandate's later years, more students simultaneously adopted British positivism and accepted English as a scientific language by voluntarily taking international exams. The 1922 report is the first to mention students taking the University of London's Matriculation Examination in Jerusalem; both students failed (Jarman 1995, vol. 1). Two years later, the report writers stated that one candidate passed the University of London's Matriculation Examination and a second one passed the Intermediate Science Examination. In comparison, 24 students took the Palestine Matriculation Examination in 1924, of whom nine passed (Jarman 1995, vol. 1). Not all students who took these exams were Palestinian; some traveled to Jerusalem from Egypt and, in all likelihood, Transjordan. But in 1945, a total of 1,297 candidates took London University exams and 283 took other British exams, such as the Cambridge Proficiency in English, the London Association of Certified Accountants, and Pitman's Shorthand Institute. Only 398 candidates took the Palestine Matriculation Examination that year (Jarman 1995, vol. 14).

While all of the candidates for the Palestine Matriculation Examination

would have been enrolled at a local college, thus making them part of the educated elite, candidates for exams with entities like Pitman's Shorthand Institute may only have completed some secondary schooling. These less-educated individuals used British examinations to receive higher-paying jobs. In turn, their increased wealth may have enabled their children to receive college- or university-level education. However, some private schools— typically run by Western missionaries—provided high levels of education through European languages. According to one report, students in these schools often had low proficiencies in written Arabic, and therefore preferred the English School Certificate examination to the Palestine Matriculation. In fact, there were three times as many students at the matriculation level in private schools in comparison to Government schools (Jarman 1995, vol. 13). These private school students would have comprised the bulk of the candidates for British exams.

By voluntarily taking British examinations, sometimes at the expense of Palestinian ones, the majority of Palestinian (and likely Transjordanian) students confirmed English, not Arabic, as the true language of positivism and science. The mathematics students at the Government Arab College had lost. Those who took professional British examinations further demonstrated that positivist thinking enabled financial success—even stenographers needed to nominally quantify themselves as either worthy or unworthy of employment. But as a consequence of adopting British positivism, Palestinians and Transjordanians implicitly accepted the inequality that positivism perpetuated. If some students were more intelligent, or better than others, why should they all receive an equal education? Thus Palestinians and Transjordanians not only accepted that English education was the best and that English was the prestige language of academia, but also that not everyone should have access to English. By sanctioning the unequal access to English, Palestinians and Transjordanians also accepted unequal access to social and economic opportunities.

Conclusion

Britain sought to strengthen control over its imperial possessions by increasing British knowledge of them. But since knowledge was power, these colonies, protectorates, spheres of influence, and mandates could on the other hand potentially improve their own relative power, provided that the British deigned to bestow knowledge upon them. In the event that the British spread technology in the form of railroads and telegraphs, dispelled superstition

and replaced it with science, and created schools and provided scholarships for Western education, the imperial territory might consider itself modernized. Yet these territories were supposedly still far behind the continually advancing West. "Modernity" did not necessarily guarantee "power," and renegotiations of power seldom yielded significant ground to the imperialized.

If the subaltern spoke in their own language, did they ever speak at all? They could be heard, certainly, but if they were not using a language of science and modernity and enlightenment, were their words worth listening to? Even today in the intellectual realm, some languages are more equal than others—as Gayatri Chakravorty Spivak (1987) once put it, "[O]ne might think of the status of a Shakespeare scholar who has read all of his Shakespeare in Bengali and a scholar of Bengali culture who has had a semester's Bengali in a U.S. graduate school" (126). Globally, the Western scholars studying the Oriental "other" are atop the hierarchy, followed by the Orientals who are scholars, followed by the uneducated Oriental masses.

Educated Palestinians and Transjordanians sought to improve their own statuses by differentiating themselves from uneducated Palestinians and Transjordanians. However, neither this group nor the minority elite who attempted to create an Arabic revival were responsive to the demands of less-educated Fellaheen and Bedouin, who knew little to no English. While the urban elite used English as a vehicle for advancement, this path to success was irrelevant to the rural poor. Instead of shifting the imperial balance of power in all of Palestine's and Transjordan's favor, the elite merely allowed the gap between themselves and the poor to widen, improving only the elite's status relative to Britain.

During their rule in Palestine and Transjordan, the British claimed to want equality by spreading education to "everyone" in the Mandates. Yet the Palestine and Transjordan administration reports seem to indicate that some Orientals were more Oriental than others. The British created a highly stratified and segregated education system based on religion, gender, dis/ability, location, and compliance with the new social order. This system constructed English as a prestige academic language and reinforced Palestinians' and Transjordanians' acceptance of the system. Education entailed a greater English proficiency, since English was the language of science and higher learning. And when Palestinians and Transjordanians accepted the British education system's superiority, they accepted the education system's language ideologies and social inequalities. Consequently, Palestinians and Transjordanians believed that people should be educated in the English language, through the English system of education, so they could become more scientific and therefore modern.

Despite now having a standardized curriculum that introduces English

in kindergarten, the linguistic divide persists in present-day Jordan. At a souq in Amman, where merchants peddled jewelry, antiques, artwork, and other souvenirs to tourists, most of the male merchants addressed customers with varying degrees of spoken English proficiency. Often, the women who ran stalls spoke in Arabic, possibly a product of being taken out of schools at younger ages than their male counterparts. University-educated individuals, some of whom took courses only in English, speak English to Western tourists whenever possible, even if the tourists respond to them in Arabic. Taxi drivers, on the other hand, are frequently only able to communicate with tourists through Arabic and the occasional English-language phrase. And service industry positions that have a lot of contact with tourists, such as hotel concierges and hostesses at certain restaurants, are frequently staffed by female Asian immigrants who have a stronger command of English than non-university-educated Jordanians. Future research must investigate how social and economic status continue to restrict access to education, and thereby future opportunities for social and economic improvement, in modern-day Jordan.

Perhaps the British desire to educate Palestinians and Transjordanians was less benign than the British implied. In Thomas Babington Macaulay's infamous 1835 "Minute on Indian Education," he wrote,

> We must at present do our best to form a class who may be interpreters between us and the millions whom we govern; a class of persons, Indian in blood and colour, but English in taste, in opinions, in morals, and in intellect. To that class we may leave it to refine the vernacular dialects of the country, to enrich those dialects with terms of science borrowed from the Western nomenclature, and to render them by degrees fit vehicles for conveying knowledge to the great mass of the population. (qtd. in Spivak 2010, 36).

The British came, the British saw, and the British conquered, waging a clandestine intellectual war against the Oriental. They created a group of educated elite who then sought to widen the gap between the elite and the rest of the population. The civilizing mission was complete.

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DIVIDED SOCIETY, DIVIDED SCHOOLS, DIVIDED LIVES:
THE ROLE OF EDUCATION IN CREATING SOCIAL COHESION IN NORTHERN IRELAND

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Abstract

The Troubles, a period of conflict between mostly Protestant Unionists and mostly Catholic Nationalists in Northern Ireland, ended in 1998 with the signing of the Good Friday or Belfast Agreement. The division of society, however, continues in its segregated education system. In Northern Ireland today, 93% of children attend either a Protestant or a Catholic school (Conflict Archive on the Internet). Despite widespread agreement on the need for change, and the transformation of other institutions in society such as the parliament, civil service and police, little progress has been made in reforming the education system since peace was established. Our project utilizes qualitative interviews with academics, educational policymakers, teachers, and students themselves. We also visited three different types of secondary schools in Northern Ireland and conducted a poll of secondary school teachers to examine the efforts to reform the education system since the peace agreement. We find there are two dominant, and mostly incompatible proposals on the table, integrated and shared education, as well as the less prominent proposal of an explicit curriculum to be used in all types of schools. Significant impediments remain to the success of all three, including the fact that the younger generation is not politically engaged, that Northern Ireland lacks an infrastructure for religious education outside of public education, and that the segregated system has led to increased differences in quality between Catholic and Protestant educations.

I. INTRODUCTION

With the signing of the Good Friday Agreement in April of 1998, Northern Ireland entered a new period of peace after more than three decades

of conflict that resulted in the deaths of over 3,500 people (Conflict Archive on the Internet). Despite the widespread optimism following the agreement, sectarian tensions that go back over 300 years continue to impact Northern Ireland. Nowhere is this division more clearly seen than in the education system, which remains segregated between Catholics and Protestants, despite the nearly 20-year-old peace agreement.

The Northern Ireland education system is at a critical juncture in its history, with pressure building for reform and debates raging about its future. In this paper, we examine the factors blocking educational integration in the Northern Ireland education system and analyze the proposals for change. To accomplish this, we conducted site visits to schools, as well as qualitative interviews with educational policy makers, academics, students, current teachers, and the next generation of teachers (graduate students in education) in Northern Ireland. We also conducted a poll of secondary school teachers trained to use a specific type of history curriculum. The different proposed solutions outlined in this paper combat the problem in varied ways: through complete educational integration, shared educational experiences, and explicit historical and civic education curriculums. Our results indicate that the problem of segregated education derives from issues of parental choice in regard to quality of education and desire for religious ethos within public schools as well as a lack of the youth engagement with the historical cleavages of society and the contemporary effects of these cleavages.

II. HISTORICAL CONTEXT

Northern Ireland encompasses the six counties still under British rule after the rest of the island was granted independence in the 1920s. The status of Northern Ireland as simultaneously part of the United Kingdom and of the island of Ireland is an issue that has been hotly and violently contested throughout its history. The majority of citizens are Protestant and Unionist, meaning they wish to remain part of the United Kingdom, and they have historically been the economically and politically privileged class. The substantial minority is Catholic and Nationalist, meaning they wish to dissolve the international border and unite with the Republic of Ireland (however, not all Catholics are Nationalists and not all Protestants are Unionist; these comparisons are generalizations). Northern Ireland was created to preserve the interests of the Protestants in the region while Catholics were systematically discriminated against and given second-class citizen status by the Protestant governing elite, which fueled tension between the two religious groups (Rose 1971, 74-112).

These tensions erupted in the late 1960s when Catholics rose up in

opposition to discrimination in housing, employment, and the criminal justice system as well as unfair electoral practices. The situation deteriorated into protracted violence as Protestants resisted this campaign, public order collapsed and positions hardened on both sides (Grisham 2014, 123). This led to the reemergence of the Irish Republican Army (IRA), a paramilitary organization whose goal was to reunite both parts of the isle of Ireland under the flag of the Republic of Ireland. The British army was sent in to restore order in 1969, and in 1972 the government and parliament of Northern Ireland were dissolved by the British government, which re-assumed direct authority for governing the province. Sectarian violence continued for three decades.

The breakthrough came in 1998 when multiparty talks resulted in the Good Friday Agreement. This agreement involved nearly all of the political parties and paramilitary groups in Northern Ireland, as well as the governments of the United Kingdom and the Republic of Ireland. The Good Friday Agreement created a new, power-sharing devolved parliament for Northern Ireland and established that Northern Ireland would remain part of the United Kingdom as long as the majority of people in the province wanted it to do so. The promise of new, proportional, cooperative and consensual institutions persuaded the paramilitary forces to end their campaigns, which had jointly injured more than 50,000 people (Conflict Archive on the Internet). However, despite the peace agreement, Northern Ireland continues to be divided due to educational, residential, and societal barriers between religious groups. The education system, in which 93% of children are educated in religiously segregated schools, is a striking example of an institution in society that has not adjusted to the new reality of peace.

III. NORTHERN IRELAND CURRICULUM

From the onset, education in Northern Ireland was divided between Protestants and Catholics, with both churches maintaining their own schools. After the division of the island of Ireland, the United Kingdom government enacted various mechanisms to improve the schooling situation in Northern Ireland, mainly by developing state run schools (Hayes 2007, 457). The original goal was to have churches of all denominations relinquish control of the schools to the state in return for state funding; however, while the Protestant schools conceded ownership of the schools in return for a hefty amount of control, the Catholic church chose to maintain ownership of their schools. This division has led to the current situation in Northern Ireland, which is divided between controlled (or Protestant) and maintained (or Catholic) schools. Both types of

schools receive government funding, but the crucial difference is that the Northern Ireland government directly manages controlled schools while the Catholic Church manages maintained schools.

As the schools have changed ownership over the years, the curriculum has evolved as well. Before 1989, schools themselves were primarily responsible for determining the curriculum, especially the history and civic education curriculum that included discussions on Catholic/Protestant divides. After 1989, with the introduction of the Education Reform (Northern Ireland) Order, passed by the UK parliament, the government attempted to develop a common curriculum capable of satisfying both the Catholics and Protestants (Smith 2003, 22).

In the 1998 Good Friday Agreement, the state revised its curriculum expectations in order to ensure that education was used as bridge to promote cross-community relations (Smith 2003, 21). In order to accomplish this, the state instituted rigorous mandates on the expectations of schools and how they should handle the nature of the divided education. This system ensured that students in both controlled and maintained schools were being taught the same material, particularly with regard to history and citizenship, the subjects most susceptible to different treatment in the separate school systems. In 2007, in response to trends in education to avoid standardization and to instead give teachers the opportunity to utilize skills and outcome-based educational strategies (Interview Three), the curriculum was revised to give teachers substantially more leeway (Terra 2014, 229).

While the ultimate goals of this change were noble, we found that the change also had the unintended consequence of giving teachers the opportunity to pick and choose "modules," or topics, to teach. This inadvertently empowers the teachers to avoid uncomfortable topics or topics that do not fit into their faction's worldview and thus provides formal justification for teacher's reinforcing patterns of bias. In short, the problem of segregated education in Northern Ireland is not just the geographical separation of students from different religious backgrounds, but also a divide in the educational content the two groups are learning. This concept is succinctly described by Luke Terra, associate director of the Haas Center for Public Service and Director of Community Engaged Learning and Research at Stanford University ("Luke Terra"): "The existence of multiple, legitimate, yet incompatible perspectives on the past poses a problem for history education" (2014, 226). The educational divide and the already existing societal cleavages accentuate the divisions of Northern Ireland's society and perpetuate sectarian divisions between the two communities.

IV. METHODOLOGY

In March 2015, we visited Northern Ireland with our American University Scholars course. While in Northern Ireland we conducted interviews with educational policy makers, such as Danny Kinahan, Deputy Chair of the Education Committee in the Northern Ireland Assembly, and Dr. Alan McMurray and Ruth Kennedy, two civil servants with the Council for Curriculum, Examinations and Assessment, the organization responsible for creating and monitoring the NI Curriculum. We chose these interviewees, the foremost scholars of Northern Ireland education, prominent politicians and civil servants in the educational sector, and students themselves at many levels to gain a broad sense of the problems faced by Northern Ireland's educational system. We also conducted site visits to three different schools; one Catholic maintained, one Protestant controlled and one integrated school to understand the different educational environments in Northern Ireland. We conducted lengthy interviews with five candidates for a Master's degree in Education at Queen's University in Belfast and conducted a survey of secondary school teachers who were trained to use the Nerve Centre's Teaching Divided History Curriculum upon our return. Our purpose was to uncover the dynamics of reform within the system.

V. PROPOSALS FOR CHANGE

Throughout the educational community in Northern Ireland, all sides agree on the need for change in the educational system. Catholics, Protestants, the wealthy, the poor, those in government, and ordinary citizens agree that the antiquated system needs to evolve to fit with Northern Ireland's changing society. However, such a multi-faceted issue that faces the impediments of religious affiliation, political disassociation among youth, and quality of education cannot have a simple or easily agreed upon solution. The people of Northern Ireland fundamentally disagree about what the goals of possible changes to the educational system should be and about the most effective paths to such changes.

Integration

The most drastic suggestion for the overhaul of Northern Ireland's educational system is complete integration in which all ties between religious institutions and educational establishments would be dropped (Interview One). Advocates of a completely integrated education system rely heavily on

contact theory, which predicts that early contact between youth of different groups leads to increased cohesion and social understanding across society as a whole. An education system comprised of students from both groups leads to intersectional friendships that can last outside of school boundaries (Hayes, McAllister, and Dowds 2007, 460, Hughes, Lolliot, Hewstone, Schmid, and Carlisle 2012, 535). Proponents of integration argue that the segregated system, in conjunction with religiously and politically homogenous neighborhoods, fosters misunderstanding and blocks intergroup exchanges and experiences (Interview Seven). The main argument in favor of integrated education is based on the theory that, by separating children from birth, the education system instills misunderstanding and discrimination across social groups.

Opponents of integrated education maintain that while integrated education is the obvious solution in other societies, it is not the most effective technique for a society as divided as Northern Ireland (Interview Eight). Integrated schools such as Lagan College in Belfast have existed in Northern Ireland since 1980, but less than 10% of children attend such schools and the sector has not grown since its inception (Conflict Archive on the Internet). In a society with a history of segregated education, the population is reluctant to shift to integration. Additionally, because life is already so segmented in Northern Ireland, there are fears that an abrupt shift to integration could foster increased conflict and misunderstanding. For example, there are some who argue that the recognition of individual cultures, while promoting a shared identity, is vital to Northern Ireland and its population as a whole (McGlynn 2011). Because the population of Northern Ireland has for so long been divided by Protestant-Catholic lines, a rapid change to integrated education may cause more misunderstanding than positive societal change.

In addition, in areas of Northern Ireland that are overwhelmingly Catholic or Protestant, a shift to completely integrated education would not create contact between social groups, assuming that students attended the school closest to them (Interview One; Maginness, Interview Nine). In these areas, integrated education would not spark social change because of the religious homogeneity of the neighborhood. An "integrated school" in name might have an overwhelming majority of either Catholic or Protestant students in reality. Using educational policy as an inciter for social change would not be effective in all parts of Northern Ireland because of pre-existing geographical segregation.

Shared Education

Proponents of shared education present the system as a less drastic plan that still allows for social cohesion to flourish and while increasing contact between religious groups (McCallister, Interview Nine; Interview Five). According to Tony Gallagher of Queens University Belfast, shared education maintains the boundaries between Catholic and Protestant schools, allowing religious groups to have their own educational institutions. However, schools participating in shared education create "porous boundaries" between themselves and other schools (Interview One). For example, schools may have a shared citizenship class or have students on the same sports teams and clubs. At Lisneal College, a Protestant school in Derry/Londonderry, the shared education program is with a local Catholic school, St. Cecilia's, and includes physical exercise classes for parents in addition to citizenship and ethics education for the students (Interview Five). Connections between schools of different religious affiliations allow for contact between students without the risk of losing the valued religious and cultural identities that are linked to the educational system of Northern Ireland.

Proponents of shared education advocate for maintaining some degree of separation between the controlled and maintained sectors of education, preserving the divided system while allowing religion to remain an integral part of public education (Interview One). Some academics (e.g., Hayes et al. 2007) argue that shared education is more practical than integrated education, due to the (relatively) simple transfer of students from one school to another rather than the creation of a new school entirely. The Northern Ireland government has shown support for shared education. In January 2014, the Minister of Education launched the "Shared Education Campuses Programme." This programme promises to build 10 new shared education campus by 2018. It will provide investment for three types of sharing: (1) new shared education facilities, (2) enhancing current shared education facilities, and (3) shared education campuses where "schools are co-located and share infrastructure" ("Shared Education Campuses Programme"). In many cases, shared education is presented as a stepping stone to fully integrated education, or a way to avoid the immediate cultural shock of integration to those accustomed to a life of segregation.

At Lisneal College, shared education is used in classes dealing with contentious topics, such as the Troubles and citizenship. Claire Bell of Lisneal College (Interview Five) supports the use of shared education for teaching contentious topics because students "self-censor" their words and are more

likely to understand other perspectives when there are students from other social groups in the room. While sharing programs are most prominent in secondary schools, Bell believes that shared education needs to happen at younger ages because, as young children, students are less influenced by the opinions of their parents and grandparents (Interview Five). Early intervention with sharing education programs could combat biases formed at home. She also highlighted the importance of offering shared education opportunities to all students, not just the top performers. For example, she emphasized that sharing must be curricular in order to ensure the involvement of poorer students who are less likely to participate in extracurricular activities. This assures that contact experiences are given to poorer students who may not have the opportunity to mingle with children of other groups at activities such as dance, music, and sports.

However, opponents of shared education argue that while sharing programs theoretically promote contact, in practice they highlight the differences between religious and social groups. For example, in a shared citizenship class, students from the Catholic school would be wearing different uniforms than the students from the Protestant school, effectively creating visual barriers for social cohesion. Additionally, social groups within the separate schools are already strong due to extensive time spent together, which makes new friendships more difficult. As students have already created social groups with others who attend their school, they are often reluctant to engage with the students from the other school, in some cases making shared education more of a formality than a real inciter of social change.

A main concern at Lisneal College regarding the shared education program involves the sources of funding (Interview Five). The main cost to the school is providing transport to and from St. Cecilia's for the shared classes, and without much parental and community support, it is difficult to find funding. In some areas, Protestant and Catholic schools are nearby each other, allowing students to simply walk from one building to another, but in rural and suburban communities, transportation is a major barrier to effective shared education. Providing school transportation between separate schools becomes very expensive, especially when shared education programming is a regular occurrence.

Structured Curriculums: The Nerve Centre's "Teaching Divided Histories"

One group, the Nerve Centre, has designed a structured curriculum for the teaching of contentious topics that can be used in all educational settings (segregated, shared, and integrated) to increase cross-group understanding and foster social cohesion. Located in Derry/Londonderry, the Nerve Centre markets

itself as a "cultural hub" and a "creative media arts centre" (Interview Six). It is heavily involved in artistic and cultural events such as the United Kingdom City of Culture celebration, youth computer science and media programs, and movie screenings. The Nerve Centre's three-year program of "contentious topics" curriculum available for use by teachers in secondary schools across Northern Ireland, the Republic of Ireland, and across the world is called Teaching Divided Histories (Teaching Divided Histories). The program is backed by the British Council, the Curriculum Development Unit of the City of Dublin Education and Training Board, and the Council for the Curriculum, Examinations, and Assessments, among other partners.

A main problem with teaching contentious topics in Northern Ireland is lack of student interest and a reluctance on the part of teachers to discuss contentious topics. Students see the Troubles and the time period as their parents' problems, not understanding the contemporary effects these events may have (Interview Two). Teaching Divided Histories combats these issues by employing modern and interactive teaching methods to the curriculum. Additionally, by providing a concrete and explicit curriculum in conjunction with teacher training and resources, the Nerve Centre arms teachers with the tools they need to discuss sensitive topics with their students. The curriculum promotes "shared societies" by addressing the study of conflict with engaging digital media content, presenting the information through structured activities involving films, audio files, comic book creation, and animation (Teaching Divided Histories). For example, while completing a lesson on the Northern Ireland Civil Rights Association (NICRA), students create a comic strip detailing the events that led to NICRA's creation, imagine what people of differing backgrounds might say about the issue, and use photo manipulation software to highlight important parts of photographs of the era (Teaching Divided Histories).

However, despite the availability of such curricula, many teachers remain reluctant to bring such divisive topics into their classrooms. In order to encourage more teachers to use Teaching Divided Histories, the Nerve Centre incorporated teacher-training workshops designed to give valuable technological skills to the program. John Peto of the Nerve Centre called it a "bribery" system (Interview Six) that draws reluctant teachers to the curriculum through their desires to technologically modernize their classrooms. The teacher-training portion is "definite and necessary" in order for Teaching Divided Histories to be sustainable and effective (Interview Six). The Council for the Curriculum, Examinations, and Assessments has instituted a similar program, "Controversial Issues Guidance" that strives to increase teachers'

comfort discussing divisive issues in the classroom through baseline training and remote resources (Interview Three). The Nerve Centre, even with the system of "teacher bribery" in place, still struggles to involve the ideal amount of schools in their Teaching Divided Histories curriculum (Interview Six).

The conflicts of the Troubles and the contemporary effects of the era continue to be somewhat taboo topics in Northern Ireland, a hurdle that must be overcome in order to foster a more inclusive society through educational programs, with equal engagement from both teachers and students. However, through a survey of schools using the Nerve Centre's Teaching Divided Histories curriculum, we received exclusively positive feedback on the curriculum and its implementation into classrooms. Teachers praised the "excellent training and support" and the "variety of ways in which a lesson could be delivered to the students." They also noted that the curriculum was "varied" and "stimulating" and that students were "engaged" while showing "empathy" and "respect" towards their classmates and the topics studied. Students using the curriculum were engaged and interested in the curriculum, showing the effectiveness of structured curriculums such as Teaching Divided Histories in teaching contentious topics. While Teaching Divided Histories has been used only on a small scale (19 schools out of the 210 in Northern Ireland and 6 in the bordering counties of the Republic of Ireland), it has been received overwhelmingly well by teachers, students, and parents. The Nerve Centre's curriculum and the data obtained by surveying teachers using it shows the potential of structured curriculum in addressing contentious topics in secondary education without the need for a systematic overhaul of Northern Ireland's educational structure.

VI. CHALLENGES TO INTEGRATED EDUCATION

Our research identified many roadblocks to reforming the education system. We found that (1) children are not engaged in the politics of the problem and therefore not motivated to seek solutions to the societal cleavages, (2) the strong relationship between the Catholic Church and Catholic schools renders the Catholic church a strong impediment to change, and (3) that Catholic maintained schools now typically out-perform Protestant controlled schools. This means that the community that has been historically underserved by the segregated education system is now the community least interested in its reform.

Children are not Engaged

Even though their parents and grandparents were embroiled in the conflict

in the 1960s and 1970s, children of today's generation appear uninvolved in the history that shapes their current world. Dr. Pete Shirlow, a professor of law at Queen's University Belfast, said that fewer Northern Ireland citizens vote today because they are not motivated by the "orange and green" (in Northern Ireland, orange is synonymous with Protestant and green with Catholic). In making this point, Shirlow is saying that young people in Northern Ireland see voting as sectarian, something they wish to avoid. Even his own children are not interested in Dr. Shirlow's stories about growing up in Belfast in the 1960s and 1970s (Interview Two).

This issue of disengaged children was brought up again at Lagan College. We were able to talk to two students from Lagan College about their school and what they think of the current Northern Ireland education system. Those two students had just been on a school-sponsored trip to South Africa and they were struck by how the students in South Africa were very involved in their politics. The South African students seemed to feel closer to the Apartheid period, as opposed to the Lagan students who feel removed from the Troubles. In South Africa, many of the people that the two Lagan students met were proud to be South African, in contrast to Northern Ireland's population, where there is a conflict of identity and belonging. Some people identify themselves as Irish or from Northern Ireland or British or a combination of these identities (Interview Seven).

The Lagan College students also feel that the current conflict is "ridiculous" now, because the conflicts were based on the opinions of older generations and not the opinions of the current generation (Interview Seven). This points to the conclusion that integration has shaped these students to be more culturally accepting of others. It is important to point out, however, that the students at the integrated school come from different political, religious and cultural backgrounds. Their parents are likely more open-minded because they sent their children to an integrated school and would potentially have different opinions than the majority of the population, and these beliefs could be manifested in those of their children, regardless of whether or not they attend integrated schools.

To experience the other side of the spectrum, we also talked with girls from Dominican College Fortwilliam who live in Catholic neighborhoods and attend a Catholic school. They are entirely surrounded by people of the same background and belief - at school and in their neighborhoods (Interview Eight). To them, the conflict is not "ridiculous" because they feel more closely connected to the divisions within society. The societal divides define their lives in a much more definitive way than it does for the students at Lagan College.

Mark Scott, an education student at Queen's University Belfast, was raised in a Protestant household and went to a Protestant school. Even though he grew up in a Protestant ethos, his parents did not actively support Protestant or Unionist domination of Northern Ireland. When asked whether or not schools in Northern Ireland should stay segregated, he said that since students are not interested in the politics of the problem, schools do not need to be segregated. He also thinks that as more students from different religions enter into shared education programs, the divide between Catholics and Protestants will gradually break down (Interview Four).

While there is an advantage to having the current generation feeling separated from the conflicts of their parents and grandparents, there is also a major disadvantage in their disengagement because it does not foster reconciliation or mutual understanding. If students attend integrated schools, they face better chances of putting aside their differences and working together to build a brighter future. From a teacher's perspective, the university students on track to become teachers (such as those at Queen's University) will have a better chance of teaching in an unbiased manner about the conflict since they did not live through the period of conflict. The disadvantage is that if the conflict of the 1960s and 1970s is not discussed and understood from all points of view, the differing sides will have trouble coming together and breaking down societal barriers. Understanding the past is integral to building a better future. Even if the children are not engaged in the politics of the problem directly, they are indirectly influenced by their parents, teachers and the curriculum, which perpetuates divisions. Furthermore, even though the younger generation has not lived the conflict as intensely as their parents and grandparents and are alienated from the Troubles, many are personally invested in the segregated system. For example, students at Dominican College were adamant that Northern Ireland was "not ready" for integrated education because of the existing discrimination and segregation of the society, which is, in part, a product of the segregated educational system (Interview Eight). Not all see a need for reform in the short-term, and among those who do, there is disagreement on the importance of a common curriculum in addressing the divisions of the past.

Relationship between the Catholic Church and the Education System

The relationship between religion and the education system in Northern Ireland can be very confusing for those who have not experienced religion as a part of a public education system, such as Americans. In Northern Ireland, however, religious institutions have no educational structure to provide religious education outside of the public school system. In all three types of schools in Northern

Ireland, religion is a key part of the curriculum. Religious institutions in Northern Ireland deliver their education to students within the education structure (Interview Three). In Northern Ireland, there are no religious education infrastructures outside of the public school system, such as Sunday schools and church youth groups. People instead rely on the child's school to instill religious knowledge and values.

According to the Council for Curriculum, Examinations, and Assessment, religious education is defined by the Department of Education and Northern Ireland's four main churches ("Religious Education," CCEA), which are Roman Catholic, Protestant, Anglican and Methodist (Northern Ireland Statistics & Research Agency). Religious education is included in every Key Stage, or level of education, in the Northern Ireland Curriculum, along with Mathematics, the Arts, Physical Education, etc., as outlined in The Department of Education's Core Syllabus for Religious Education. This document spells out what students will learn throughout their education about religion. All Key Stages have Christianity as their focus, while Key Stage 3 (Years 8-10) has an extra section about world religions where students "should be given an introduction to two world religions other than Christianity" (29). In Key Stage 4 (Years 11-12) students learn about the different traditions within Christianity and they must study the given topics from the Roman Catholic tradition and from the Protestant tradition (34).

Because of this, many opponents to integrated education, including the Catholic Church, fear that integration would provide subpar religious education. They fear that an integrated system would lead to the fall of the "religious ethos" of their schools (Maginness and McCallister Interview Nine) and a decline in the ability of the church to socialize its congregants. For the implementation of integrated education to be successful in Northern Ireland, either a system of religious education outside of public schools or a method of providing in-school religious education for various religious groups would be necessary.

Different Qualities of Education

A recent trend in Northern Ireland has been that Catholic schools receive better test results than their Protestant counterparts. In 2015 59.1% of Catholic school leavers (students exiting the public education system) achieved two or more A-Levels, as opposed to 52.4% of Protestant school leavers (Toogood 2015, 3). Catholic schools graduate students with higher achievement levels, as measured in number of A-levels achieved, than their

Protestant counterparts. This creates a cyclical effect of class relations because Catholic students, having had a better secondary education, tend to carry their success into later life. James, an Education Master's student from Queen's University, Belfast, said that if he were to have children, he would send them to a Catholic school because of their higher academic standards, despite his belief in the development of an integrated educational system in Northern Ireland. Personal desires for successful schools can outweigh a belief in the moral superiority of integrated education. This encourages Catholic schools to avoid integration in order to maintain their academic superiority (Interview Four).

In another example, the religious "ethos" of Catholic schools like Dominican College Fortwilliam and the quality of their education encourages the pride of the alumnae, which has created a huge endowment. This gives the school the ability to teach seven different languages in a year, two of which were taught through one-on-one instruction (Interview Eight). On the other end of the spectrum is Lisneal College, a Protestant school in Derry/Londonderry. Claire Bell, the Head of History, said that the children that go to her school are not "better off," so they do not go to extra-curricular activities that include children from different backgrounds (Interview Five). They just "mix within their own community" ("Divided Histories"), rather than going to expensive after-school activities such as dance, art, and sports, which would allow them to interact with Catholic youth. Variations in qualities between the Protestant and Catholic sectors of education foster increased resistance to educational reform among the (now) more privileged Catholic community.

Other Challenges

While the challenges explained above are the three main impediments, there are a multitude of other challenges that hinder a fully integrated education system due to the complexity of Northern Ireland's society. For example, parents like the idea of being able to choose what school to send their children to. If there are only integrated schools, parents have no way of influencing their children's education. Separate schools also allow traditions to continue while teaching the religious ethos of the school (Interview Four).

A majority of the girls from Dominican College with whom we spoke are in favor of segregated schools because they say that people are not ready for integrated education. They believe many people are too narrow-minded and that conversations between narrow-minded groups would not be beneficial. They are afraid that integrated schools would spark more tensions between young people

of different religions. They do see, however, how segregated schools divide the community and maintain older norms (Interview Eight). This creates a paradox: students are not "ready" for integration because of the long history of segregation within the school system. Without integration or contact programs, however, it is left unexplained whether they ever will be ready.

One problem we observed at the different site visits is that children of different religions are not only segregated at school, but at home. They often live within communities of their own religion and they do not socialize with young people with different backgrounds. Many students only start socializing with young people of different religions when they go to university. Mark Scott from Queen's University, Belfast went to a Protestant grammar school that prepared him academically for university, but left him culturally unprepared. Meeting so many new people at university, including Catholics, was "overwhelming" for him (Interview Four).

Pete, another Queen's University, Belfast graduate student in Education, said "there is too much emphasis on the fact that [schools are] Protestant or Catholic" and that will not lead to a single society "because you can't build a strong society if you're separate." He believes that integrating schools would help bring together a unified Northern Ireland because then young people would learn from one another. And, though separate schools, according to another Queen's University, Belfast student, Jade, keep views from being challenged, bringing students together does not automatically reduce divisions in the way the conflict theory suggests. In her student teaching, she experienced a shared classroom and she struggled to facilitate interaction between the two groups because they had never interacted before (Interview Four).

VII. SIGNIFICANCE OF RESEARCH AND SUGGESTIONS FOR FURTHER RESEARCH

Northern Ireland made an impressive leap in community relations with the Good Friday/Belfast Agreement, which formally ended the period known as the Troubles, which was characterized by political violence between Protestants and Catholics. Despite the desire of the Good Friday Agreement to promote sound community relations between the two groups (Barnes 2002, 22), Northern Ireland still remains a divided society, which is clearly reflected in the schooling system. Segregated schooling has two implications for Northern Ireland. The first is that segregated schooling perpetuates prejudices

and stereotyping between Catholics and Protestants, which negatively impacts broader community relations. These negative community relations have significant implications. The political representatives of the two groups are increasingly becoming polar opposites in regards to their policies, with little support for moderate policies. Segregation therefore continues to have a tremendous negative impact on Northern Ireland.

In the first implication, segregation between Catholics and Protestants promotes ignorance about the other group. Because of the lack of interaction, students in segregated schools do not have the opportunity to learn about the other group. This inability to get to know the other side of the conflict perpetuates stereotypes and prejudices (Hughes 2014, 193). Furthermore, in the absence of contact, there is a perpetuation of mutual ignorance and suspicion, which could potentially reignite the violence that was a characteristic of the Troubles (Abrams et al. 2005, 269). Juxtaposed to this lack of ignorance, numerous scholars praise the benefits of promoting contact between the two groups to reduce prejudice (Hughes 2014; Hayes 2007; Gallagher 2004). Friendships that develop between Catholics and Protestants can lead to increased understanding, the ability to take the perspective of the other, and the ability to reassess the group's own biases (Hughes 2014, 206). Therefore, the promotion of better community relations between the Catholics and Protestants by reducing segregation will reduce prejudice and increase the stability of Northern Ireland's society.

A reduction in segregation and the ensuing growth of community relations would also have political benefits, most notably the creation of a religiously moderate citizenry. The continuation of religious prejudices due to segregation has resulted in Northern Ireland becoming more religiously divided, especially in terms of the electoral behavior and party preferences (Hayes et al. 2007, 477). In effect, this creates two political extremes–Unionist and Nationalist–that have few policies in common and thus have difficulties reaching agreement. Therefore, segregation has led to political deadlock, as politicians increasingly cannot find sources of agreement because of both their own divisive worldview as well as the polarized worldview of their constituencies. The key solution to this problem would be the end of segregation and the increase in community relations, which will promote a center and common ground in Northern Ireland politics (Hayes et al 2007, 476).

Given the significance of understanding the role of educational policy in inciting social change, there are many avenues for future research on this topic. It is important to shed further light on the relationship between educational systems and societal cohesion, in Northern Ireland and elsewhere. There are several particularly compelling possibilities for future investigation: 1) The role of

educational policy as a tool for encouraging social cohesion in other countries, 2) The effects of segregated education and divided society on country-wide mental health, 3) The changing socio-economic relations between the Catholic and Protestant communities in Northern Ireland and how they have affected public opinion of educational reforms, and 4) The practical effects on educational success of the different school systems in Northern Ireland. It has been established that Catholic maintained schools generally outperform their Protestant controlled and integrated counterparts, but the underlying causes behind this phenomenon are left unclear.

VIII. CONCLUSION

In conclusion, the Northern Ireland education system continues to face significant problems as it develops in the years following the Good Friday Agreement. This project used qualitative interviews, site visits, and survey data to identify the key challenges to reforming Northern Ireland's education system: politically unengaged youth, the intertwined relations between religious institutions and public education, and marked educational quality differences between maintained and controlled schools. We examined the three prominent proposals for change, and while all show promise to be effective, their potential success relies on the engagement of the population and their willingness to embrace change. Despite the fact that the majority of school-age children in Northern Ireland were born after the end of the Troubles, the division between Catholics and Protestants seems fixed in the continued segregation of the school system. The Northern Ireland education system itself is a reflection of the social cleavages and religious segregation in the society as a whole, and has been shaped by these same cleavages and biases. However, the educational system may conversely be used as a path towards increased social cohesion through the implementation of contact programs, explicit curriculums, and integration. The educational system in Northern Ireland is part of the reason that the society remains harshly divided 20 years after the Troubles, but changes to the system have the potential to move Northern Ireland towards increased social cohesion and harmony in a religiously and politically divided society.

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POLLINATING PRICES: ESTIMATING THE RELATIONSHIP BETWEEN HONEYBEE POPULATION AND ALMOND PRICES

Seth Taylor

Abstract

This paper examines the potential effect of decreasing honeybee population on crop prices by estimating the relationship between honeybee population and the price of almonds over time. As a declining honeybee population becomes an increasingly salient issue, the public must be aware of the potential impacts that honeybee population loss can have on society, including rising crop prices. Understanding the economic impact that honeybee loss can have on consumers and industry is critical to limiting the severity of that impact over time. Using data on honeybee population and almond prices from the USDA National Agricultural Statistics Service, we conduct both an ordinary least squares (OLS) and instrumental variable regression of almond prices using honeybee population. Our approach also includes controls for weather, almond yield and crop area, and transportation costs. Results are analyzed at the 95 percent confidence level. Our OLS regression presents a positive, significant relationship between honeybee population and almond prices, while our instrumental variable regressions are insignificant. The confidence of our findings is constrained by a small sample size, which suggests that further research is necessary to achieve more robust findings.

Introduction

Our first recorded use of honeybees for commercial pollination was in New Jersey in 1909, when they were rented for the pollination of apple crops (Morse and Calderone 2000). In 2000, there were 2.9 million colonies in the

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United States and over 2 million of those colonies were being transported around the nation to serve as pollinators for different crops (Morse and Calderone 2000). A Cornell University study estimated that the value of honeybee pollination in increasing yield and quality results in $14.6 billion in value (Morse and Calderone 2000). Roughly another $180 million of raw honey is produced each year. Bees are also responsible for about 80 percent of all crop pollination in the United States (The Nature Conservancy 2015). The value of honeybees as both producers of honey and as pollinators is well recognized, and honeybees have been instrumental in increasing yields and quality in a variety of crops. It was particularly alarming then, when in October of 2006, some beekeepers reported losses of 30 to 90 percent of their hives ("Honey Bee Health and Colony Collapse Disorder 2015). This phenomena has become known as "Colony Collapse Disorder," or CCD. The cause of CCD is a subject of ongoing research. Culprits range from insecticide used on crops that honeybees get nectar from (particularly neonicotinoids), the introduction of pathogens or parasites into the hive, to environmental stressors like lack of diversity in nectar and pollen ("Honey Bee Health and Colony Collapse Disorder 2015). Generally, however, there has been a lack of consensus on what causes CCD, and there seems to be no single smoking gun.

What is clear is that the number of managed honey bee colonies has decreased dramatically in the past decade. The total number of managed honey bee colonies has decreased from 5 million in the 1940s to only 2.5 million today ("Honey Bee Health and Colony Collapse Disorder 2015). From 2006 to 2011, winter honeybee losses averaged about 33 percent per year, with about one-third of these losses being attributed to CCD ("Honey Bee Health and Colony Collapse Disorder 2015). Continued losses of honeybee colonies could threaten the commercial bee pollination industry. At the very least, the loss of honeybees can lead to the cost of pollination services rising, which would induce a general rise in the price of crops that rely on honeybees. This paper attempts to examine the relationship between honeybee population decline and increasing crop prices.

This paper specifically analyzes the relationship between honeybee population and almond prices using both ordinary least squares (OLS) regression and instrumental variable regression. Almonds are used in this analysis for several reasons. First, pollination by honeybees is essential for almond production as almond trees cannot cross-pollinate between varieties on their own. Instead, almond producers rent bee colonies from commercial apiarists in early spring to pollinate their trees for them. Pollination services are so critical for almond production that almond pollination fees accounted for 45 percent of total collected pollination fees in 2011 (Bond et al. 2014). The approximate crop value for almonds from honeybee pollination is $2.84 billion ("Beyond Pesticides" 2015).

This represents almost 19.5 percent of the total value to crop production from honeybee pollination.

Almonds are also used in this analysis because all of their production in the United States is localized to one region. One hundred percent of American almond production occurs in California ("Almond Almanac 2014" 2014). This makes controlling for variables in almond production much easier than choosing a crop that is produced in many locations throughout the United States. Specific control variables in this study include data on temperature, precipitation, and drought, as well as yield and crop area characteristics and transportation costs. If this analysis used other crops, such as watermelons or cotton, controls would have to factor in variation in regions across the United States, which would open up our analysis to significant error in omitted-variable bias. Choosing a crop that is both pollination-essential and is localized is crucial for producing an analysis that is both accurate and relevant for more general discussion of the relationship between declining honeybee population and crop prices.

Hypothesis

Our null hypothesis for this study is as follows:

H_o: There is no relationship between honeybee population and almond prices.

Our alternative hypothesis is:

H_a: There is an inverse relationship between honeybee population and almond prices.

The law of supply dictates that as honeybee population falls there should be an increase in the cost for pollination services. We hypothesize that this increased cost for pollination services will result in higher prices for almonds. If a large enough decline in honeybee population occurs, then we should also see a decrease in total yield of almonds as firms are priced out of optimal levels of pollination services by the rapidly rising cost of pollination services. This decline in yield should also cause an increase in almond prices as the supply of almonds falls. All variables in this study will be analyzed at a 95 percent confidence level.

Literature Review

Substantial amounts of literature have been published on the

relationship between pollinators and crop yields and food security. Research has also been done on the economic valuation of pollinators and the loss in value from their decline. Little work, however, has been done on directly estimating the relationship between pollinator population and crop prices.

Dana Bauer and Ian Sue Wing, of Boston University, have attempted to analyze the relationship between global pollinator loss, reduction in value of global production, and food security by creating a general equilibrium model (Bauer, Dana, and Wing 2010). Their study finds compelling evidence that local or regional pollination shortages could negatively affect the value of production in both crop and non-crop sectors (Bauer, Dana, and Wing 2010). Certain regions like Sub-Saharn Africa suffer much heavier burdens of pollinator loss on production than others under their model and are at heightened risk of food security issues (Bauer, Dana, and Wing 2010, 378). A study published by the Society for Conservation Biology found evidence of declines in yield and crop loss in almonds, blueberries, and alfalfa seed being attributable to pollinator declines (Meffe 1997). This study presents further evidence that pollinator declines can result in food shortages and food instability. The Society finds that further research into the domestication of alternative pollinators as well as action to protect genetic stocks of honey bees is necessary to reduce variation in annual yield of crops (Meffe 1997, 15). These studies present evidence that the decline of pollinators can have a drastic effect on the future of food stability, and present possible solutions to these issues. However, these studies do not make attempts to assess changes in price, instead preferring to discuss qualitative changes in crops based on pollinator decline (i.e. Society study) or create global models that quantitatively discuss changes in the value of production.

Other studies also attempt to assess the value of pollinators by analyzing their relationship with crop yield or by attempting to calculate the loss in total agricultural production if a complete loss of pollinators occurred. One particular study was conducted by researchers Aizen, Garibaldi, Cunningham, and Klein in 2009. Using data from the Food and Agriculture Organization, they gathered data on the production and cultivated area of 87 important crops. Using aggregate measures of the effects of pollinator dependence for various crops, they were able to estimate the reduction in total agricultural production and the relative increase in cultivated land area to make up for it (Aizen et al. 2009). The researchers found that in the absence of animal pollination there would be a 3 to 8 percent reduction in total agricultural production, but that the needed increase in cultivated area to compensate would be many times higher (Aizen et al. 2009). Another study by the same team in 2009 addressed how pollinator shortages would affect annual growth rate in yield as well as growth rate in cultivated area. The researchers did not find

evidence of their prediction that there would be a lower annual growth rate in yield, but did find that there was a higher annual growth rate in cultivated area for pollinator-dependent crops (Garibaldi et al. 2009). They propose that pollination management techniques like renting more hives or hand pollination might have compensated for any limitation to yield (Garibaldi et al. 2009, 37). These conclusions may be useful when attempting to interpret the results from our analysis. Additionally, our analysis should account for strategies such as renting hives because we are attempting to estimate price, which should be directly influenced by pollination services pricing that is in turn affected by honeybee population.

A 2014 study conducted a field experiment to attempt to answer the question of how pollinator contribution affects crop yield and quality. After establishing an experimental zone and identifying the types of pollinators in their zone, they carefully controlled insect pollination in the field to create an experiment and control group (Bartomeus et al. 2014). Results from the study show that insect pollination enhanced crop yield between 18 to 71 percent, depending on the crop (Bartomeus et al. 2014). This study presents a unique method for determining the impact of pollinators on crops and confirms what previous studies have found. Another 2014 study, by European researchers, on supply and demand for pollination services found that for 41 European countries, the recommended number of honeybees for crop pollination rose 4.9 times as fast as honeybee population between 2005 and 2010 (Breeze et al. 2014). For 22 of these countries, the number of honeybees was not sufficient to supply greater than 90 percent of the demand for their services (Breeze et al. 2014).

These studies are very useful for establishing a baseline of knowledge from which to build our OLS and IV regression models. Additionally, the abundance of literature supporting the impact of pollinators on crop yields and quality gives early indication that we should expect to see an inverse relationship between honeybee population and almond prices. Since pollination has a demonstrated positive effect on supply of crops, we should expect that as the supply of almonds increases in direct proportion with honeybee population there will be a fall in almond prices. Because studies in the literature primarily focus on the impact of pollinators on yield and food security, this analysis also fills a gap in the literature. By directly estimating the price of a crop from honeybee population we enable discussion surrounding direct effects on consumers' and producers' bottom lines. We also provide a basis for future research interested in pricing effects of pollinators.

Data and Method

This paper uses two separate methods of analysis and two specifications to analyze the relationship between honeybees and almond prices. Our first method is the standard ordinary least squares (OLS) regression with almond price serving as our dependent variable and honeybee population as our independent variable. Control variables in this regression include the average United States temperature anomaly, average California rainfall, an index for drought in California, yield of almonds per acre, the amount of acres of almond trees, and the price of peanuts. This model attempts to estimate a linear relationship between honeybee population and almond prices while controlling for factors that may influence the production of almonds or their price. Rainfall, temperature, and the drought index control partially for growing conditions that may affect the yield of almonds every year, while yield per acre and acres bearing control for variation in the amount of sellable almonds every year. Temperature being a U.S. average means that its correlation with almond price will likely be weaker than if we used California averages, but this variable's use in our second method requires that U.S. averages be used as will be discussed later. The price of peanuts in this model is used on the assumption that peanuts are a substitute good for almonds. In other words, peanut price is included because changes in the price of peanuts may have an effect on the price of almonds as demand shifts with changes in price. Finally, gasoline price is included as a rough proxy for transportation costs of honeybees used as pollination for almond crops. Significantly more factors go into the cost of transporting bees nationwide, but due to the complexity and multitude of factors data is hard to quantify or collect.

Our second method in this analysis is an instrumental variable regression using a two-stage least squares estimator. Instrumental variable analysis is used when our explanatory variables are correlated with the error of our regression. In the case of our analysis we use instrumental variable analysis because the price of almonds is determined by the interaction of both supply and demand. Using OLS regression in this case may result in the regression coefficients not being close to their true value. To have a non-biased result we must use a method that isolates shifts in price due to changes in supply and demand. Instrumental variable analysis allows us to use instruments, or variables that are both correlated with our independent variable and uncorrelated with the error term, to estimate our independent variable and determine if it is valid. The two stage least squares estimator, in particular, breaks down the process into two stages that use least squares regression. First, we use our instrument to estimate our independent variable, and then we use that estimate of our independent variable to estimate the coefficient of our dependent variable. By using this method we know that our

estimate of our independent variable will be uncorrelated with the error term.

Our instrumental variable analysis uses two instruments; one to control for demand and the other to control for supply. Our demand-based instrument is peanut price under the assumption that peanuts are a substitute good for almonds and as their price changes it has an effect on the demand for almonds. Our supply-based instrument is U.S. average temperature anomaly. Temperature is used because temperatures that are too hot or cold can have a negative effect on the survival of bees. Too hot or cold temperatures can also negatively affect the growth of almonds, and therefore temperature anomaly as an instrument is plausibly correlated with both our independent variable and dependent variable. Additionally, it is unlikely that honeybee population or almond prices has any reverse causality with temperature, and therefore is unlikely to be correlated with the error of our regression. National temperature anomalies are used because our honeybee data is also reported nationally, and California-only averages would not accurately correlate with national honeybee population. By using these two instruments in conjunction, we eliminate variation in the price of almonds from both supply and demand, and attempt an accurate estimate of the supply/demand function for almonds. All control variables for this model are the same, with the exclusion of U.S. temperature anomaly and peanut prices since they are used as instruments.

The two specifications used in our methods are the linear-linear and log-linear specification. The linear-linear specification is our base specification, and simply means that both our independent and dependent variables are linear in nature. The log-linear specification means our models are run using the natural log of almond price while honeybee population is left linear. This specification is used because logarithmic scales have a progression based on orders of magnitude (i.e. 10, 100, 1000). In the case of prices, using a logarithmic specification can help further linearize data if there is a wide range in values. By using this specification it is possible to increase the goodness of fit of our estimations.

This analysis makes use of yearly data from a variety of sources for a 20 year period from 1995 to 2014. Data on honeybee population was gathered from the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) annual "Honey" publication, which reports the annual number of colonies producing honey on both the state and national level ("Honey Report" 2015). NASS's "Honey" report represents the best available data on the number of managed honeybee colonies in the United States. A graph of the number of honeybee colonies over time is reported in Figure 1. Data on

almond price, acres bearing almonds, and yield per acre is gathered from the 2014 California Almond Price Report ("California Almond Price Report" 2014). The price for almonds is reported in terms of the average return to growers in U.S. dollars per pound. Yield per acre is also reported in terms of pounds. This data is gathered and reported annually by NASS's Pacific Regional Office, and the 2014 report is a continuation of a long series of almond price surveys. A scatterplot of almond price vs. honeybee population is presented in Figure 2. Data on yearly peanut price is reported as the return to growers in U.S. Dollars per pound and is gathered from the USDA's Farm Price report.

Data on temperature, precipitation, and drought is gathered from the National Climactic Data Center at the National Oceanic and Atmospheric Administration ("Climate Normals" 2015). Data on temperature is reported in terms of the annual average temperature anomaly for the contiguous United States. Temperature anomaly is the departure in degrees from the long-term average for a region. Temperature anomaly is used instead of absolute temperature measurements because anomalies more accurately describe climate variability over large areas ("Global Surface Temperature Anomalies" 2015). Additionally, we are primarily concerned with variation from the average because of particularly hot or cold temperatures' effects on bee population and crop growth. Data on precipitation is reported in yearly averages in inches for the state of California. The measure of drought used in this study is the Palmer Drought Severity Index (PDSI), which is an index that attempts to assess moisture status comprehensively ("Palmer Drought Severity Index" 2015). It uses data on both temperature and precipitation to calculate water supply and demand, as well as incorporating soil moisture. Including this measure in our study attempts to account for climate variables relevant to crop growth that are not easily collected independently. Data on PDSI is reported in yearly terms for the state of California.

Finally, data on gasoline prices is gathered from the U.S. Energy Information Administration ("U.S. All Grades All Formulations Retail Gasoline Prices" 2015). This data is specifically for retail prices for all grades and all formulations of U.S. gasoline. Including data on all grades and all formulations attempts to account for a variety of transportation methods used for the transport of honeybees for pollination. The price for gasoline is reported in dollars per gallon. Summary statistics of all variables used in our analysis are presented in Table 1.

Results and Analysis

The results of all four regressions are presented in Table 2. Our first regression is an ordinary least squares regression using a linear-linear specification.

Our results from this regression report that our honeybee population variable is both positive and significant at the 99 percent confidence level. Specifically, the coefficient of this variable shows that for every 1000 extra honeybee colonies almond prices increase by roughly .004 cents per pound. These findings do not support our hypothesis. We expected to see that as honeybee population rose the price for almonds would fall, but this analysis estimates that as honeybee population rises so do almond prices. However, the change in price is minute. By this model's estimate it would take an increase of nearly 250,000 honeybee colonies to increase almond prices by a single dollar, independent of other factors. Explanations for this apparent relationship will be discussed in our conclusion.

Other significant variables in this model are yield per acre and the price of gasoline. Yield per acre has a negative relationship with almond price and is significant at the 95 percent confidence level. This analysis estimates that for every extra pound of almonds per acre, almond price decreases by roughly .0015 cents. This is in line with what the law of supply would dictate: as the supply of almonds increases, the price of almonds should decrease, all else equal. The price of gasoline has both a very large positive and significant effect (at the 99.9 percent confidence level) on almond prices. Our model estimates that for every dollar increase in the price of gasoline per gallon almond price increases by roughly $1.69 per pound. This relationship and its magnitude are logical. Not only does gasoline necessarily influence the cost of pollination services, but gasoline is also used to run various agricultural equipment and also likely factors into the process of preparing and transporting almonds for consumption after harvest. The large increase in price of almonds per dollar increase in gasoline price is reflective of this relationship. Other variables in this model are not significant at our established 95 percent confidence level, but contribute to the explanatory power of our model. This models R-squared value is 0.742, which means roughly 74 percent of the variation in almond price is explained by our independent variables.

Our second OLS model, using the log-linear specification, produces similar results to our first model. In this model, honeybee population is once against significant and positive, but only at the 95 percent confidence level, suggesting that the log-linear specification is a worse fit for our data. This is further supported by the fact that our R-squared value for this model is .719, meaning that roughly 72 percent of the variation in almond price is explained by our independent variables. The interpretation of our honeybee population coefficient in this model estimates that for every extra 1000 honeybee colonies almond price will increase by .17 percent. Under this estimate, to increase

almond prices by one percent you would require an extra 5,880 honeybee colonies. Yield per acre and gasoline price in this model are both still significant at their previous significance level. In this model, a one pound increase in yield per acre would result in a .068 percent increase in almond price, and a 1 dollar increase in gas price would increase almond price by 89.6 percent.

The next two models are our instrumental variable regression models. For both of these models we used U.S. temperature anomaly and peanut prices as our instruments, and included all other control variables. All variables in these models are non-significant, but the signs on our variables make more sense in the context of our hypothesis and other literature on pollinators' effect on crops. Under these models an increase in honeybee population has a negative effect on almond price, but these estimates are not significant at the 95 percent confidence level meaning we cannot say that these results are not simply an error or artifact of the data. The explanatory power of these models is also much lower at R-squared values of .344 and .374, respectively. Interestingly, it seems that the log-linear specification results in a stronger model for our instrumental variable regressions, but not for our ordinary least squares regressions. Overall, it seems that while our instruments did have some affect on controlling for effects on price from supply and demand factors, there is something missing from the model that prevents our results from being significant. As a result, no useful conclusions can be drawn from these two models. Deficiencies and possible adjustments to these models will be discussed in the next section.

Conclusions and Avenues for Future Research

Our findings did not establish a substantial relationship between honeybees and almond prices, and conclusions drawn from the analysis will naturally be weak. Both of our ordinary least squares models present results that are the opposite of our hypothesis, and although honeybee population in both models is significant, the validity of these results is suspect. First, the sample size in our model is lower than is generally required for OLS and instrumental variable estimators to be unbiased. At small sample sizes (particularly below 30) many of the assumptions that can be made about the validity of statistical analysis using these methods break down. Having access to more frequently recorded (i.e. quarterly) data would increase our sample size significantly and eliminate much of the bias that is likely present in our current analysis. Another issue in our results comes from examining Figure 2, which graphs almond prices vs. honeybee population. When examining this graph it becomes immediately clear that the relationship between

almond prices and honeybee population is weak at best and can only tenuously be called positive. Although our OLS models show significance for honeybee population, it seems that the elimination of only one or two data points could shift the linear regression from positive to negative. If we had access to more data or data across a longer period of time it would be easier conclusively to say if the relationship between honeybee population and almond prices is positive or negative. From the results of our regressions, we can say at best that the relationship between honeybees and almond prices is inconclusive.

Another possible and equally valid conclusion is that honeybee population is not as large of a factor in the final price of almonds as we would like to think. A multitude of factors go into the production of almonds, and the variables used in our analysis are only a subset of the larger ones. The direct effect of honeybee population on almond prices may filter out to be negligible in the long run, although this does not seem to be likely since almonds are considered a crop that greatly benefits from pollination. It seems more likely that the amount of data we currently have available is insufficient. OLS regression is also likely to be inaccurate because of the reasons stated in our methods section, hence our use of instrumental variable analysis as well.

An important control variable that is missing from our analysis is the cost for pollination services for almond growers. Data on pollination service costs are not centralized and seem to be collected sporadically by different beekeeping associations. Having good data on the price that almond growers pay for pollination services would allow us to further control for effects on almond price that honeybees cause. As it stands currently, our honeybee population variable is doing the work of the omitted pollination cost variable, which results in weaker overall explanatory power.

When examining Figure 1, which reports honeybee population over time, there also seems to be a discrepancy in our data and the commonly reported honeybee loss due to colony collapse disorder. The USDA reports that from 2006 to 2011, winter honeybee losses averaged about 33 percent of total colonies in the United States. However, when examining the period from 2006 to 2008 there is only a slight decrease in the reported number of managed colonies, and from 2009 to 2010 there is a large jump in the number of colonies. Despite the NASS "Honey" report having well aggregated and consistent yearly data, there is perhaps a discrepancy in the number of honey producing colonies and in the total number of managed colonies in the United States. If this is the case, and the total number of colonies has been decreasing in accordance with USDA reports, then this is a large source of error in our

analysis. Further research into finding accurate honeybee population data is needed.

Our instrumental variable regressions are non-conclusive for a variety of reasons. As stated above, the sample size we have for this analysis is too low for the assumptions that make IV regression a useful method to hold true. Having a larger sample size would help eliminate these sources of errors and make our models stronger. Additionally, it is likely the case that our instruments are weak and do not fully capture the supply/demand function for almonds. The Consumer Price Index may be a useful instrument to use alongside other instruments. Non-linear specifications for quantity should also be explored to estimate for a nonlinear demand curve. With better data and more complex and better suited instruments a significant IV regression should be possible.

Another possible explanation for our results is that rising prices of honeybee pollination services (unaccounted for in our data) has increased the viability of using alternative pollination methods, thereby offsetting some of the effect of declining honeybee pollination. Some research has been done on agricultural techniques that make use of native insect pollinators as alternatives to honeybees (Scardina 2012), and it is possible that rising costs of pollination services has reduced the opportunity cost of transitioning to alternative pollination methods. This has been seen in China, where honeybee loss has caused farmers to shift to hand pollination of apple trees (Liess 2015).

Generally, even though our OLS regressions show significance, we cannot reject the null hypothesis or confirm our alternative hypothesis. This is primarily due to the lack of sample size, and inherent bias in our estimators as a result. Additionally our instrumental variable regressions are insignificant which are supposed to control for bias that is still inherent in OLS regression for this type of analysis. Further research is clearly needed to determine if a relationship between honeybee population and almond prices exists.

There are a variety of avenues for further research on this topic. For future research on almonds and honeybees better data is needed. If data on almonds can be gathered pre-1995, and better instruments can be found then the models laid out in this paper can serve as a starting point for analysis. Future research can also focus on other crops that benefit from honeybee pollination. Almonds are a useful crop to focus on because almost all of the U.S. production in located in California, and therefore variables in production are easier to control for, but other crops may have better data which would produce a more conclusive result. Research on commercial crops instead of food crops would be particularly interesting. Future analysis on this topic should also make attempts to gather data on the price of honeybee pollination services for the specific crop they are analyzing.

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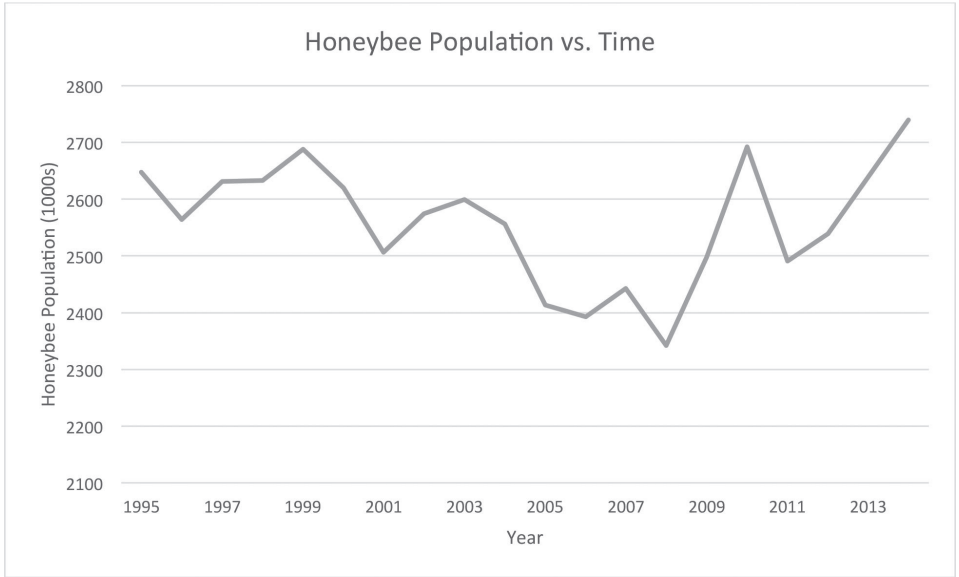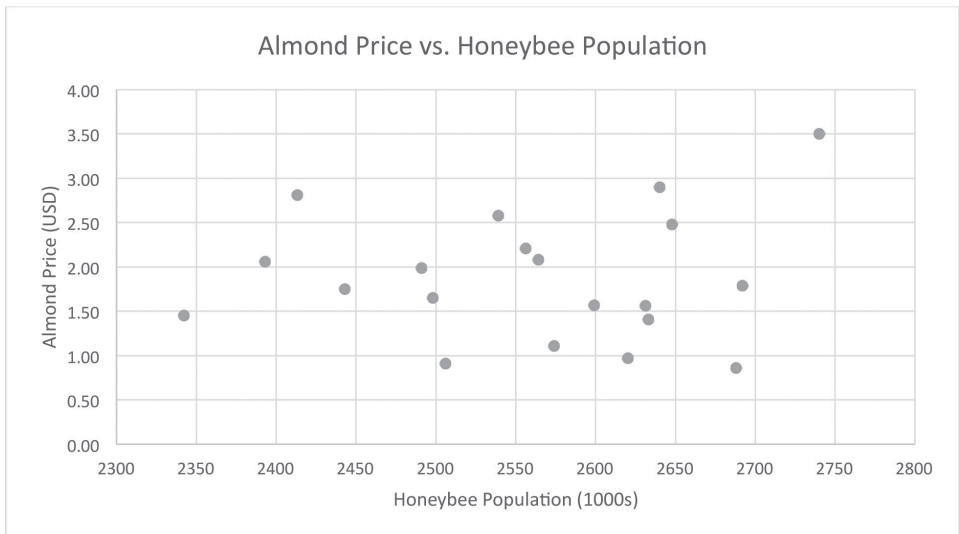
Appendix A: Tables and Figures
Figure 1

Honeybee Population vs. Time

Figure 2

Almond Price vs. Honeybee Population

Table 1

Variable	Obs	Mean	Std. Dev.	Min	Max
Honeybee Pop	20	2560.5	107.2967	2342	2740
Almond Price	20	1.882	.712945	.86	3.5
Peanut Price	20	.23875	.0452814	.173	.318
U.S. Temp	20	.3755	.8345404	-.94	2.46
Rainfall	20	22.5105	7.297524	7.93	36.41
Drought	20	-.506	2.82408	-5.76	4.63
Yield/Acre	20	1835.25	449.5831	885	2540
Acreage	20	616400	147513.2	418000	860000
Gas Price	20	2.21725	.9487913	1.072	3.68
ln(Almond Price)	20	.5612598	.3945833	-.1508229	1.252763

Table 2

	Linear-Linear	Log-Linear	IV_Regression	IV_Log-Linear
Honeybee Pop	.0039391**	.0017425*	-.0016905	-.0009879
	(.0012553)	(.0007366)	(.0032132)	(.0017968)
U.S. Temp	-.1439098	-.1080972		
	(.1391814)	(.0907893)		
Rainfall	.0147309	.0063444	.0031589	.0005153
	(.018217)	(.0119318)	(.0273026)	(.0149855)
Drought	.0173482	.0309086	.0159801	.0258711
	(.0727608)	(.036366)	(.0856792)	(.0437528)
Yield/Acre	-.0014956*	-.0006879*	-.0013185	-.0006066
	(.0005108)	(.0002953)	(.0008533)	(.0004452)
Acreage	-3.37e-06	-1.88e-06	3.63e-06	1.54e-06
	(2.09e-06)	(1.43e-06)	(7.37e-06)	(3.85e-06)
Gas Price	1.687538***	.8960892***	.3852958	.2533422
	(.2908981)	(.1694139)	(.9437386)	(.5139343)
Peanut Price	-6.452281	-3.370659		
	(3.092671)	(1.677022)		
Constant	-5.851463	-2.746075	5.476957	2.694205
	(3.285455)	(1.905814)	(6.730455)	(3.745166)
R-sqr	.7416553	.7193301	.3439645	.374424
RootMSE	.4762514	.274737	.6981115	.3772975
N	20	20	20	20

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

EFFECTS OF CULTURAL FACTORS ON AIDS EPIDEMICS IN SUB-SAHARAN AFRICAN COUNTRIES FROM 2005-2010

Lee Walter

Abstract

Acquired Immune Deficiency Syndrome (AIDS) has ravaged sub-Saharan Africa in the decades since its first recorded case. The disease has reached epidemic levels in many regions, with millions of new cases diagnosed each year. This paper examines the effects of several variables on the infection rates of AIDS in six African countries across six years and tests the hypothesis that widespread misconceptions surrounding AIDS, e.g. the misconceptions that AIDS can be cured by intercourse with a virgin and that AIDS can only be transmitted among homosexuals, affects AIDS rates more than other variables. The study uses small-n methods and the congruence method of analysis on the state level. Ultimately, the study found that while the prevalence of misconceptions about AIDS in various countries does have a noticeable effect on AIDS rates, there are too many confounding variables and not enough data to say with certainty whether or not the hypothesis finds enough support to be plausible. The conclusion calls for more diligence in data collection on the independent, dependent, and confounding variables across the continent so that the results of future studies on the topic can be more conclusive.

Introduction

Ever since the simian immunodeficiency virus' first cross-species infection of a human sometime in the late 50's, AIDS has been responsible for millions of deaths throughout many sub-Saharan African (SSA) countries (Whiteside et al. 2003). But while the virus has reached a far larger percentage

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of people in SSA countries than in any other region in the world, there are large discrepancies between the amounts of people diagnosed with the disease across different countries (Whiteside et al. 2003). What causes some of these SSA nations to suffer from AIDS epidemics but not others? This research question is important to address for several reasons. First and foremost, the citizens and policymakers of the countries examined in this study would benefit greatly from answering this question because if the root causes of AIDS epidemics could be determined, both groups would benefit from being able to address said societal/cultural causes and lower the rate of AIDS in their countries. Furthermore, scholars might be interested in the answer to this research question because finding an answer to it would increase the amount of knowledge regarding how societal and cultural factors affect the magnitude of AIDS epidemics in sub-Saharan Africa. This knowledge could then possibly be used to determine the causes of AIDS epidemics in other parts of the world.

This study will contribute to the scholarly literature on the causes of AIDS epidemics by empirically testing a new hypothesis about the root causes of AIDS epidemics. This new hypothesis is as follows: higher levels of misinformation about how AIDS is transmitted and treated leads to higher levels of AIDS in a given country. The cases used in this study, South Africa, Kenya, the Central African Republic, Uganda, Botswana, and Lesotho, were selected using a non-controlled case selection strategy and data taken from observations of each of these cases is analyzed using small-n methodology. Lastly, all findings and conclusions drawn from this study will be based on the congruence method of analysis.

Literature Review

There are three main schools of thought that have been used as frameworks to answer the research question: economic factors, social factors, and cultural factors. While all of these frameworks provide some explanation as to why some countries experience greater AIDS rates than others, the cultural factors school of thought gives the strongest support for its claims. Prior research has focused only on qualitative observations regarding the extent to which cultural factors have influenced the spread of AIDS in sub-Saharan Africa and has not focused on an empirical analysis of data to demonstrate quantitatively that cultural factors are most influential. This is an unfortunate oversight, as quantitative analyses are easier to draw generalizable conclusions from than qualitative analyses due to the relatively large amount of data points analyzed. This study will contribute to the literature on the causes of AIDS epidemics in sub-Saharan Africa by empirically testing if cultural factors have a strong influence on AIDS rates in a given country.

One school of thought that offers insight into this issue examines social factors. Research in this field focuses on the effects that various social issues present in countries suffering from AIDS epidemics have on their abilities to stop the spread of the disease. A study by Kevin De Cock et al. (2002) examined the role that framing AIDS epidemics as a human rights issue rather than a medical one plays in stopping AIDS epidemics and found that framing AIDS epidemics as human rights crises greatly reduces a country's ability to stop the epidemics (De Cock et al. 2002). However, the researchers make many unaddressed assumptions about what constituted a 'successful' and 'unsuccessful' campaign and did not provide data on enough instances of countries experiencing AIDS epidemics to make generalizable conclusions.

Another study conducted under the social factors framework looked at the extent to which epidemics of injection drug use cause AIDS epidemics in various countries throughout sub-Saharan Africa (Dewing et al. 2006). The researchers of this study concluded that while the spread of injection drug use throughout sub-Saharan Africa has hastened the spread of AIDS in many countries, it is far from the most influential factor in determining how well countries can combat AIDS epidemics (Dewin et al. 2006). Another study by J. Moodley et al. that looked at whether providing AIDS treatment specifically to pregnant women would affect AIDS rates in a given country showed that providing more treatment options to pregnant women as opposed to other groups did lower AIDS rates in some countries, but not by a statistically significant amount (Moodley et al. 2011). Another important study that uses this framework, conducted by Adrian Smith et al. (2009), examined to what extent the legality of homosexual sexual intercourse in various SSA nations affected how quickly AIDS spread found that while making homosexual sexual intercourse legal did increase the rate at which AIDS spread, it did not make a significant difference (Smith et al. 2009). This is the primary difficulty that arises when using the social factors school of thought to analyze potential answers to the research question of this paper: social factors do not seem to have a significant effect on the severity of AIDS epidemics.

Another school of thought that is used to explain the existence of an AIDS epidemic examines economic factors in affected countries. Researchers in this field generally examine the links between the economic strength of a country and how this strength affects whether or not AIDS epidemics occur. Floyd Sian et al. (2012) studied the link between the ability of a country to purchase antiretroviral drugs and the existence of AIDS epidemics. The researchers found a negative correlation between ability to purchase antiretroviral drugs and the existence of AIDS epidemics in the vast majority of

countries they studied (Floyd et al. 2012). While the research methods used in this study were sound, the researchers' seemingly definitive conclusion that economic variables have the greatest effect on whether a country suffers from an AIDS epidemic greatly downplays the significance of social and cultural factors while exaggerating the effects of economic factors as the researchers did not control for cultural or social factors, among other variables. The researchers found that only a small percentage of people were being helped or saved by antiretroviral drugs after an AIDS epidemic broke out, yet still recommended that countries should put disproportionately more money into purchasing the drugs without addressing the role that societal or cultural factors play.

Finally, a study by Jane Freedman and Nana Poku (2005) examined the existence of widespread poverty with respect to a country's ability to stop AIDS epidemics. The study compared the percentages of people in low-income neighborhoods that were infected with AIDS with the percentages of those infected in high-income neighborhoods (Freedman and Poku 2005). While the study did show a slight positive correlation between poverty and likelihood of contracting AIDS, the researchers in this study again both significantly downplay the effects of cultural and social factors and exaggerate how much a country would be assisted by ending poverty by making a strong, unqualified claim regarding the significance of poverty with regards to AIDS epidemics in their conclusion that does not address how their results may be affected by other factors. The trend in these two studies therefore appears to be that researchers who frame their arguments in this school of thought exaggerate the effects of economics by generally not controlling enough for other variables.

Perhaps the most appropriate school of thought that can be used to analyze the research question examined in this paper is the cultural factors school of thought. Researchers who use this school of thought to frame their research study a country's cultural norms and the extent to which these norms affect the course of an AIDS outbreak. For example, Nkolika Aniekwu and Ayo Astenuwa (2007) conducted a study that examined the causes behind why girls and young women were disproportionately vulnerable to AIDS infection compared to men. The researchers found that the most significant factor was the perpetuation of a misconception present in many of the countries they studied which held that having sex with a virgin would cure one of AIDS, but were ultimately unable to determine precisely to what extent the perpetuation of said misconception affected women with regards to other factors (Aniekwu and Astenuwa 2007).

Another study conducted by Edward Mills et al. (2012) examined the extent to which male involvement in preventing AIDS in a given country affected

how well said country dealt with AIDS epidemics. The researchers concluded that male involvement in preventing AIDS by either actively seeking education on how to avoid receiving/transmitting AIDS or being given such an education by the government or other humanitarian organizations did have an effect on how rapidly AIDS was spread in the nations studied, but again, the researchers never clearly lay out to what extent this factor affects the spread of AIDS (Mills et al. 2012).

The third study examined in this literature review using this framework was conducted by Chijioke Uwah. The study examined the link between the perception of AIDS in South Africa and how rapidly the disease was spread (Uwah 2011). The researcher found that the culture of denying that HIV lead to AIDS was one of the primary reasons that South Africa was hit so hard by the AIDS epidemic despite being one of the more politically and economically stable countries in sub-Saharan Africa. The methods in this study and the conclusion drawn by the researcher are both sound, but yet again, the author does not give a definitive answer to the question of to what extent this phenomenon affected the spread of the disease throughout South Africa. The fact that so many researchers using this school of thought were able to determine with some degree of certainty that the variables they were studying probably do have some effect on whether or not a country will suffer from an epidemic of AIDS makes it the most promising choice for examination with regards to the hypothesis.

Theory

This study argues that higher levels of misinformation about how AIDS is spread and/or treated leads to a higher level of AIDS in a given country. The theory put forth for this hypothesis is similar to that of Chijioke Uwah, who posited that the more people in a given country who do not believe that AIDS is caused by HIV, the higher the overall AIDS rate would be in the country (Uwah 2011). The theory in this paper varies slightly from Uwah's in that it examines a different set of false beliefs about AIDS, but for the most part, the theories are closely related.

More precisely, the theory that will be tested in this paper is that when more individuals believe misconceptions surrounding AIDS, such as that only homosexuals can contract the disease or that having sex with a virgin cures AIDS, the percentage of infected individuals in a given country will eventually increase. For those that believe that AIDS can be cured by having sex with a virgin, this means purposefully seeking out only virgins as partners, who

typically are not infected with AIDS unless it was passed down to them by infected parents. For those that believe only those engaged in homosexual activity can contract AIDS, there would be no need to ask their partners about whether or not they are infected with AIDS due to the fact that they believe they are immune regardless.

Believing that having sex with a virgin can cure AIDS would lead to virgins being at a higher risk of contracting AIDS due to the fact that people who hold such beliefs would actively seek them out. Because virgins are not likely to already be infected with AIDS, when they do become sexually active, it is likely that they would quickly become infected due to the fact that they are being sought out by infected individuals. As more non-infected virgins become infected as a result of being sought out by infected individuals, the AIDS rate in a given country would rise.

Individuals who hold the belief that only those engaged in homosexual activity can contract AIDS, on the other hand, would be less likely to engage in safe sex practices and would be less likely to ask their partners if they are infected with AIDS due to the fact that they believe they are immune. Over time, non-infected individuals would contract AIDS from partners that are infected due to not taking the necessary precautions regarding AIDS prevention (i.e. asking one's partner if he or she has AIDS). As more individuals are infected due to ignoring safe sex practices, AIDS rates would rise. Over time, this increase, along with the increase due to more virgins being infected, would increase the AIDS rate in a given country to potentially epidemic proportions.

Research Design

Variables and Data Sources

The independent variable that will be examined is the extent to which misinformation about AIDS has been spread throughout a given sub-Saharan African (SSA) country; the dependent variable is the extent to which AIDS has spread in a given SSA country; the confounding variables that will be examined are the extent of poverty in a given SSA country, the extent to which citizens of a given SSA nation have access to healthcare services, and whether a given SSA country was involved in a civil or interstate conflict at the time that an AIDS epidemic broke out.

The independent variable is conceptually defined as the extent to which misinformation about AIDS has been spread throughout a population in a given country. The independent variable is operationally defined as whether one or

both of two misconceptions, the misconception that only homosexual men can contract AIDS and the misconception that having sex with a virgin will cure one of AIDS, have become accepted as fact among at least 25% of the population of a given SSA country according to the results of two studies that were conducted by PEPFAR (PEPFAR 2011). Therefore, the independent variable will be an ordinal measure, with the categories defined from lowest to highest as follows: less than 25% of citizens of given SSA country hold both misconceptions as fact, and over 25% of citizens of given SSA country hold both misconceptions as fact. For the hypothesis to be correct there must be a positive correlation between this variable and the DV.

The dependent variable is conceptually defined as whether or not a given SSA country is suffering from an AIDS epidemic in a given time period. It is operationally defined as whether or not greater than 5% of a country's population has been infected with AIDS according to the results of surveys found in the CIA World Factbook (CIA 2013) (Note: 5% is the mean number of citizens in SSA countries that have been infected with AIDS. It should be noted that there is no internationally accepted standard infection rate used as a benchmark for when a country experiences an epidemic; the only standard given by organizations such as the CDC thus far is that an epidemic occurs when the rate of infection for a given disease goes above normally recorded levels. Because AIDS rates have steadily increased across the board since the disease was first discovered, there has arguably never been a time where sub-Saharan Africa was not experiencing an epidemic of AIDS. Therefore, the method used to obtain the 5% was selected to facilitate empirical analysis, the results of which would be very unclear without a means of ordinal measurement). Therefore, the dependent variable will be an ordinal measure, with the categories defined from lowest to highest as follows: given SSA country does not suffer from AIDS epidemic, and given SSA country does suffer from AIDS epidemic. Data on this variable will be collected from the CIA World Factbook because it contains the most complete datasets on this variable for the time frame selected in this study.

The first confounding variable is conceptually defined as whether or not there exists a high level of poverty in a given SSA nation. It is operationally defined as whether half of the citizens of a given SSA country live on less than two dollars per day according to surveys conducted by the World Bank (World Bank 2013) (Note: The two dollar per day threshold was chosen as it is commonly cited by the World Bank as the international poverty line). This variable will be an ordinal measure, with the categories defined from lowest to highest as follows: given SSA country has a low (below 50% of citizens living

on less than two dollars per day) level of poverty, and given SSA country has a high (above 50% of citizens living on less than two dollars per day) level of poverty. Data on this variable will be collected from surveys conducted by the World Bank because it is one of the most reliable sources of statistical information on this variable. There is likely to be a positive correlation between levels of poverty and AIDS rates in a given country as higher levels of wealth presumably lead to better funded healthcare programs that could be used to diagnose and treat HIV positive individuals before they develop AIDS.

The second confounding variable is conceptually defined as the extent to which citizens of a given SSA country have access to healthcare services. It is operationally defined as whether a given SSA country spends more or less than $182 per capita on healthcare. This value is the average amount of money per capita spent on healthcare between the 15 countries that are currently suffering from AIDS epidemics (Note: This value was chosen for the same reason the benchmark for AIDS epidemics was chosen: there is no internationally accepted standard, and creating an arbitrary standard is useful in clarifying the results of empirical analysis). This variable will be an ordinal measure according to the following categories, given from lowest to highest: given SSA country has a low (below $182 per capita) level of spending on healthcare services, and given SSA country has a high (above $182 per capita) level of spending on healthcare services. This variable is measured according to data on per capita spending on healthcare services compiled by the World Bank (World Bank 2013). This source was chosen because it is one of the most reliable sources of data on this variable. There is likely to be a negative correlation between the amount of money spent per capita on healthcare services and AIDS rates in a given country as poorly-funded healthcare systems are presumably less capable of diagnosing and treating HIV positive individuals to prevent them from developing AIDS.

The third and final confounding variable is conceptually defined as whether or not a given SSA country is involved in a civil or interstate war in a given time period. It is operationally defined as whether or not a given SSA country is involved in a civil or interstate war in a given time period, with war defined as, "sustained combat, involving organized armed forces, resulting in a minimum of 1,000 battle-related deaths over a 12 month period" (Correlates of War 2013). This variable will be measured according to the results of studies conducted by the Correlates of War organization in various countries to determine whether or not said countries were involved in a civil (Correlates of War 2013) or interstate (Correlates of War 2013) conflict during a given time period. The variable will be an ordinal measure according to the following categories, given from lowest to highest: given SSA country did not experience intrastate or civil war in a given

time period, and given SSA country experienced intrastate or civil war in a given time period. The Correlates of War organization was chosen because it is one of the most reliable sources of data on this variable. There is likely to be a positive correlation between the existence of an interstate or civil war and AIDS rates in a given country. This is because the destabilizing effects of war would presumably lower the effectiveness of healthcare systems, making healthcare providers less capable of identifying and treating HIV positive individuals, and because phenomena specific to war, such as an increase in incidents of war time sexual assault by perpetrators who are already infected with AIDS, would cause the incidence of AIDS to increase.

Cases, Observations, and Methods

The cases chosen for this study are South Africa, Kenya, the Central African Republic, Uganda, Botswana, and Lesotho between 2005 and 2010, which will result in a total of 36 observations. These countries were selected for several reasons. First and foremost, these choices were heavily constrained by the data that was available on the 15 countries in the world that are currently suffering from AIDS epidemics. Data on all five of the variables that will be examined in this paper was only available on these six countries. Furthermore, it was difficult to find data on all five of these variables for any time period before 2005 and after 2010 as several organizations, such as the World Bank and PEPFAR, do not have the required data on file for unknown reasons. These cases were also chosen due to the fact that they vary greatly in many factors that will be analyzed in this paper such as per capita spending on healthcare, the prevalence of misconceptions about AIDS, and the existence of interstate and civil wars. Lastly, the choice to use a state-level analysis for this study was made because little data exists for any of the variables examined in this study at the local, district, or regional levels.

Furthermore, the chosen time frame contains a decent amount of variation among all of the variables as some of the countries that will be examined in this study were involved in a war in only some of these years, though not others, and some have greatly increased the amount of money they spend per capita on healthcare services over this period of time. The only limitation to this time frame comes from the nature of the disease itself. As AIDS develops as a result of HIV going untreated and incubating within the host for ten years on average, it is difficult to determine temporal priority of the IV over the DV with only a six-year time frame. Still, absent the determination of temporal priority, a strong correlation between the two variables can easily

be demonstrated.

Due to the fact that the observations of each of these cases will be conducted over a relatively short time period, small-n methods will be used to analyze observations, and all conclusions will be based on the congruence method of analysis.

Data Analysis

There is expected to be a positive correlation between the percentage of citizens who believe in one or both of the misconceptions about AIDS and the number of citizens infected with AIDS in a given country, which means that the level of misinformation about AIDS must be 'high' and the existence of an AIDS epidemic must be 'yes' for the hypothesis to find support. It should be noted, however, that even if values for each of these variables do not change enough to switch from one category to another (i.e. if AIDS rates increase from 1% to 4.9% and thus stay in the 'no' category), it is still possible for the hypothesis to find support if there exists a strong correlation between the two variables in the expected direction.

Case: South Africa, 2005-2010

The percentage of citizens in South Africa infected with AIDS grew rapidly between 2005 and 2010, rising from 10.8% in 2005 to 18.3% in 2010 (CIA 2013). The percentage of individuals who believed one or both of the misconceptions examined in this study also grew steadily, going from 14.2% in 2005 to 26.5% in 2010 (PEPFAR 2011). Large changes in the percentage of citizens who believe one or both misconceptions were not accompanied by equally large changes in the percentage of citizens who were infected with AIDS. For example, the percentage of citizens who believed one or both misconceptions increased from 14.2% to 16.2% between 2005 and 2006 (PEPFAR 2011), while the percentage of individuals who were diagnosed with AIDS only increased from 10.8% to 11.4% in the same time period (CIA 2013), meaning that a 2% increase in number of people believing either or both of the misconceptions was correlated with a .6% increase in number of individuals infected with AIDS. This would normally show a correlation between the two variables, but between 2009 and 2010, the percentage of individuals who believe one or both misconceptions only went up .3%, while the percentage of individuals infected with AIDS increased by 1.5% (PEPFAR 2011).

This shows that the correlation between the number of people who believe misconceptions about AIDS and the number of individuals infected with AIDS is

inconsistent or weak in the case of South Africa. An analysis of the data on the first confounding variable shows that poverty levels had little effect on AIDS rates in South Africa. From 2005 to 2007, the poverty level grew steadily from 33.2% to 35.8%, which is consistent with the expected correlation with the DV as AIDS rates also grew steadily in the same period of time (World Bank 2013). From 2008 to 2010, however, poverty rates began to steadily decrease to 32.5% (World Bank 2013) while AIDS rates continued to rise (CIA 2013), indicating that the correlation between this variable and AIDS rates is inconsistent.

An analysis of the data on the second confounding variable shows that even though South Africa consistently spent a 'high' amount of money on health care per capita they still experienced epidemic levels of AIDS for all six years (CIA 2013). Furthermore, higher amounts of money spent on healthcare per capita did not have the correlation with AIDS rates that was expected, as South Africa consistently spent more money on healthcare each year (per capita healthcare expenditures steadily grew from $453.00 in 2005 to $649.00 in 2010 (World Bank 2013)) yet still also experienced higher AIDS rates each year (percentage of people infected grew from 10.8% to 18.3% between 2005 and 2010 (CIA 2013)).

The existence of interstate or civil war also seems not to have much of an effect on AIDS rates. South Africa was involved in a civil war in Somalia between 2006 and 2009 and was not involved in any conflicts in 2005 and 2010 (Correlates of War 2013), but AIDS rates still grew steadily throughout the entire period of the study (CIA 2013). Therefore, the rate of AIDS in South Africa did not change its rate of growth even when the country got involved in and later pulled out of a conflict.

Case: Kenya, 2005-2010

The percentage of citizens in Kenya infected with AIDS grew steadily from 2005 to 2008, increasing from 6.3% to 7%, and then dipped slightly to 6.5% in 2009 before finally decreasing again to 6.3% in 2010 (CIA 2013). The percentage of individuals who believed one or both misconceptions about AIDS grew steadily from 4.5% to 6.3% between 2005 and 2009 and dropped slightly to 5.9% in 2010, indicating that the percentage of individuals who held the misconceptions dropped the year after AIDS rates in the country dropped (PEPFAR 2011). It is therefore possible that variations in AIDS rates could explain variations in the percentage of individuals believing in the misconceptions. This is the opposite of the expected correlation between these two variables.

An analysis of the data on the first confounding variable shows that poverty rates steadily decreased from 67.2% in 2005 to 65.5% in 2009 before increasing slightly to 65.7% in 2010 (World Bank 2013). Therefore, as was also the case with South Africa, the correlation between these two variables that exists is opposite of what was expected as AIDS rates grew steadily during the entire period that poverty levels were dropping and AIDS rates decreased during the period that poverty levels rose.

An analysis of the data on the second confounding variable shows that per capita expenditures on healthcare rose steadily from $22.00 to $37.00 between 2005 and 2010 (World Bank 2013). This indicates that healthcare expenditures grew steadily along with AIDS rates for all years except for 2009 and 2010, when AIDS rates dipped slightly, which is the opposite of the correlation that was expected. This data is also significant because even though per capita expenditures on healthcare in Kenya were considerably lower than in South Africa, AIDS rates in Kenya were considerably lower than in South Africa, indicating that per capita expenditures on healthcare probably had little to do with total AIDS rates in either country.

The existence of interstate or civil war seemed to have no effect on AIDS rates in Kenya as even though Kenya was involved in conflict between 2005 and 2009 (Correlates of War 2013) and AIDS rates rose consistently from 2005 to 2008 (CIA 2013), the drop in AIDS rates began sometime between 2008 and 2009 (CIA 2013). This indicates that the end of Kenya's involvement in the conflict in Somalia did not have temporal priority over the decline in AIDS rates, which shows that it cannot be the cause for the decline in AIDS rates.

Case: Central African Republic, 2005-2010

The percentage of citizens in the Central African Republic infected with AIDS steadily declined from 7% to 4.7% between 2005 and 2009 before increasing slightly to 4.9% in 2010 (CIA 2013). The percentage of individuals who believed one or both misconceptions about AIDS grew from 4.9% to 5.4% between 2005 and 2006, decreased to 5.1% in 2007, and then steadily increased from 5.1% to 6% between 2007 and 2010 (PEPFAR 2011). So while there was one year, 2010, where a rise in AIDS rates was positively correlated with a rise in percentage of people believing one or both misconceptions about AIDS, there was a fairly consistent negative correlation between the two variables, which indicates that the data in this case does not support the hypothesis.

An analysis of the data on the first confounding variable shows that

poverty rates in the Central African Republic steadily decreased from 81.9% to 80.1% between 2005 and 2008, increased slightly to 80.5% in 2009, and then decreased again to 80.1% in 2010 (World Bank 2013). From this data, it can be concluded that poverty rates were mostly positively correlated with AIDS rates.

An analysis of the data on the second confounding variable shows that per capita healthcare expenditures in the Central African Republic were nearly stagnant, with expenditures staying at $14.00 from 2005 to 2006, a small increase to $17.00 in 2007, and another small increase to $18.00 in 2008, which is where it stayed until 2010 (World Bank 2013). This indicates that healthcare expenditures were mostly negatively correlated with AIDS rates, which is the opposite of what was expected.

An analysis of the data on the third confounding variable shows that the existence of interstate or civil war did not affect AIDS rates in the Central African Republic as AIDS rates dropped from 2005 to 2009, which is the same time that the Central African Republic was involved in the Central African Republic Bush War (Correlates of War 2013). In fact, the only year that AIDS rates rose, 2010, is also considered to be the official end of the war. This indicates a possible negative correlation between AIDS rates and the ending of conflicts within a given country.

Case: Uganda, 2005-2010

The percentage of citizens in Uganda infected with AIDS grew from 4.9% to 5.6% between 2005 and 2006, declined to 5.4% in 2007, then steadily increased from 5.4% to 7.1% between 2007 and 2010 (CIA 2013). The percentage of individuals who believed one or both misconceptions about AIDS grew from 3.4% to 4.3% between 2005 and 2008, dropped slightly to 4.2% in 2009, and then increased to 5% in 2010 (PEPFAR 2011). This shows that, for the most part, data collected for this case does support the hypothesis as there is a positive correlation between AIDS rates and percentages of individuals believing the misconceptions surrounding AIDS transmission. Furthermore, AIDS rates and the percentage of people believing one or both misconceptions are both relatively low when compared to other countries that have higher rates of both, e.g. South Africa. This indicates that while the correlation between these two variables is not 100% consistent, it is possible that this is evidence that higher percentages of people believing in AIDS misconceptions is in fact correlated with higher infection rates.

An analysis of the data on the first confounding variable shows that poverty rates drastically declined from 76.6% to 63.1% between 2005 and 2010, which indicates a negative correlation between poverty levels and AIDS rates as AIDS rates increased for five out of these six years (World Bank 2013).

An analysis of the data on the second confounding variable shows that per capita expenditures on healthcare increased steadily from $27.00 to $45.00 between 2005 and 2008, decreased slightly to $44.00 in 2009, then increased again to $47.00 in 2010 (World Bank 2013). This indicates that there was a mostly positive correlation between the AIDS rate in Uganda and the country's per capita healthcare expenditures, the opposite of what was expected.

An analysis of the data on the third and final confounding variable indicates that there is a negative correlation between the existence of interstate and civil wars in Uganda as the AIDS rate in the country continued to rise despite the fact that the civil wars in neighboring Congo, which frequently spilled into Uganda, officially drew to a close in 2010 (Correlates of War 2013).

Case: Botswana, 2005-2010

The percentage of citizens in Botswana infected with AIDS steadily increased from 23% to 26% between 2005 and 2010 (CIA 2013). The percentage of individuals who believed one or both misconceptions about AIDS steadily increased from 23.5% to 28% between 2005 and 2010, which indicates that the two variables were positively correlated for all six years in Botswana (PEPFAR 2011). Therefore, the hypothesis finds support in this case, though it is difficult to tell from the data if the higher rates of individuals believing the AIDS misconceptions have temporal priority over the higher AIDS rates.

An analysis of the data on the first confounding variable shows that poverty levels increased from 35.6% to 38.3% between 2005 and 2007, decreased moderately to 37.2% in 2008, then steadily increased from 37.2% to 38.1% between 2008 and 2010 (World Bank 2013). Poverty rates in this time frame were therefore positively correlated with AIDS rates as, for the most part, AIDS rates increased along with poverty rates, though again it is impossible to tell which variable has temporal priority in this relationship.

An analysis of the data on the second confounding variable shows that per capita healthcare expenditures decreased from $420.00 to $399.00 between 2005 and 2006, then steadily increased from $399.00 to $615.00 between 2006 and 2010 (World Bank 2013). This indicates there is a negative correlation between the percentage of individuals infected with AIDS and the country's per capita healthcare expenditures as the two variables were negatively correlated for five out

of the six years that were examined. This is, again, the inverse of the expected correlation.

An analysis of the data on the third confounding variable shows a negative correlation between the existence of interstate and civil wars and AIDS rates in the country as AIDS rates steadily increased despite the fact that the country was not involved in a war in any capacity between 2005 and 2010 (Correlates of War 2013). This is the opposite of the expected correlation.

Case: Lesotho, 2005-2010

The percentage of citizens in Lesotho infected with AIDS steadily increased from 22.9% to 25% between 2005 and 2010, with only a slight .2% decrease between 2006 and 2007 (CIA 2013). The percentage of individuals who believe one or both misconceptions steadily increased from 22.9% to 27.5% between 2005 and 2010 (PEPFAR 2011). This indicates that there is a positive correlation between AIDS rates and percentages of individuals that believe one or both misconceptions as both increased for five out of the six years examined in this study.

An analysis of the data on the first confounding variable indicates that the percentage of individuals living in poverty increased from 62.3% to 64.2% between 2005 and 2006, decreased to 60.9% between 2006 and 2008, and then steadily increased from 60.9% to 61.4% between 2008 and 2010 (World Bank 2013). This indicates that there is no consistent correlation between the two variables as the poverty rate both increased and decreased while AIDS rates were steadily increasing.

An analysis of the data on the second confounding variable shows that per capita expenditures on healthcare increased dramatically from $43.00 to $109.00 between 2005 and 2010 (World Bank 2013). This indicates that there is a positive correlation between per capita healthcare expenditures and AIDS rates as both consistently rose between 2005 and 2010. Again, this is the opposite of the expected relationship, and it is again impossible to determine from the data which variable holds temporal priority.

An analysis of the data on the third and final confounding variable shows that there is a negative correlation between the existence of interstate or civil wars and AIDS rates over time as AIDS rates consistently increased despite the fact that Lesotho was not engaged in conflict of any sort between 2005 and 2010 (Correlates of War 2013). Again, this is the opposite of the relationship that was expected.

Conclusion

After analyzing the data, it can be concluded with a low level of certainty that there is a positive correlation of indeterminate strength between the percentage of individuals in a country that believe in one or both of the misconceptions examined in this study and the percentage of individuals infected with AIDS in said country. The degree of certainty is low for a variety of reasons. First, only 25 out of 36 observations showed that such a correlation exists, and in approximately 5 out of 36 observations, there appeared to be a negative correlation between the two variables. So while a majority of cases did show a positive correlation of varying strength between the two variables, there were a small number of observations that showed precisely the opposite. This makes it difficult to say with a high degree of certainty that the positive correlation that might exist between these two variables does, in fact, exist.

Second, it is difficult to say to what degree the confounding variables influenced the DV as at least one confounding variable had the expected correlation with the DV in 28 of the 36 observations. Therefore, any of the confounding variables could have been responsible for variations in the DV.

Lastly, it is impossible to say that variations in the IV are responsible for variations in the DV. Not only is the correlation between the two variables weak and inconsistent at best, but it is impossible to determine from the data that changes in the IV have temporal priority over changes in the DV. The only other aspect of the data that could potentially be used as support for the hypothesis is that countries with particularly high AIDS rates, i.e. South Africa, Botswana, and Lesotho, do seem to have much higher percentages of citizens who believe in one or both of the misconceptions surrounding AIDS. This could be an indication that variation in the IV leads to variation in the DV, but again, because it is impossible to determine temporal priority, this finding does not support the hypothesis with certainty.

There were several potential limitations to this study. First and foremost, some scholars may question some of the operational definitions that were used for this study, such as the definition for civil and interstate wars, and some may disagree with the 5% threshold that was used to determine whether or not a country was experiencing an epidemic of AIDS. Other scholars could potentially disagree with the thresholds that were set for other variables, but since many of the categories that were created from those thresholds were not used due to the fact that there wasn't enough variation in the data collected, such objections would be redundant.

Another limitation of this study is that there exists a huge array of

confounding variables, such as amount of foreign aid received, experience of medical personnel, and number of individuals who live too far from medical facilities to benefit from them, that were not examined. Any number of these confounding variables could have affected the data examined in this study, and any number of these variables could better explain variation found in the variables examined in this study.

Perhaps the most impactful limitation of this study is the fact that so few countries were examined. There are many other countries in sub-Saharan Africa that are currently suffering from AIDS epidemics that could not be analyzed due to the fact that data on all of the variables that were examined in this study were not available for them. This resulted in a sample size that is small enough that some would argue that any conclusions drawn from this study could not be generalized to the rest of sub-Saharan Africa.

The last severe limitation of this study is that it only examined a relatively small period of time. The fact that the data was restricted to only a six-year period makes it nearly impossible to determine which variables have temporal priority over others. This makes determining whether or not variation in one variable causes variation in another virtually impossible.

These results can be considered relevant to scholars and policymakers for various reasons. Scholars might find these results interesting because while this study failed to show with any certainty that variations in the IV cause variations in the DV, it does show that there is a slim possibility that the two are positively correlated with one another. Scholars with access to more time and resources than were available for this study might be interested in pursuing this possible explanation as a cause for AIDS epidemics because there is a possibility that variations in the IV of this study are at least one of the causes of variations in the DV. Lastly, the results of this study might be interesting to policymakers because they may wish to give funds to other scholars with the purpose of researching the effects of this IV on the DV.

But perhaps the most important conclusion that can be drawn from the results of this study is that there is a desperate need for more robust data collection in this field. Rigorous statistical analyses such as the one presented in this paper cannot be as effective as they must to combat AIDS epidemics without reams of data to support them. Results of studies such as this would be far more conclusive and useful were it possible, for example, to study the same variables over a thirty year period in every single country in sub-Saharan Africa. This would allow for the use of more powerful analytical tools and statistical analyses as well as more easily generalizable conclusions. Hopefully enough research of this nature will be conducted in the future to demonstrate

to policymakers that answers to the sorts of pressing questions presented in this study simply require far more information to find than is presently available.

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Clocks and Clouds is an American University undergraduate research journal that publishes articles on the cutting edge of political science, international studies, and public policy. The journal is meant to add a voice to the intellectual dialogue both within the American University community and in broader academia. Our name comes from the work of philosopher Karl Popper, where clouds are a metaphor for the disorderly and irregular in social science while clocks represent the predictable and rational. By providing a venue for top undergraduate research, *Clocks and Clouds* aims to find the clocks amidst the clouds.

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