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WASHINGTON UNIVERSITY IN ST. LOUIS

Program in Political Economy

The Curse of Windfall Income:
How Foreign Aid and Natural Resource Dependence Constrains Growth

by

Adams Bailey Nager

A thesis presented to the
Graduate School of Arts and Sciences
of Washington University in
partial fulfillment of the
requirements for the
degree of Master of Arts

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ABSTRACT OF THE THESIS

The Curse of Windfall Income: How Foreign Aid and Natural Resource Dependence

Constrains Growth

by

Adams Bailey Nager

Master of Political Economy and Public Policy

Washington University in St. Louis, 2013

Professor Norman Schofield, Chair

Literature exists on two ‘curses,’ the natural resource curse and the curse of foreign aid, which limit growth in developing nations. At their core, both the natural resources curse and the curse of aid derive from the same root cause- the curse of windfall income. The windfall curse is a macroeconomic side-effect that negates the positive effects of unearned capital by raising domestic prices and lowering competitiveness. While windfall income creates growth in a countries service sector, it represses growth in the manufacturing sector. These trends help explain the inability of both foreign aid and natural resources to fuel sustained growth in windfall income-dependent economies.

Introduction

Developing countries face a strange paradox. Natural resources, which would be logically expected to provide capital for rapid economic expansion, frequently end up doing more harm than good. This phenomenon, which has been examined extensively by economists and political scientists, is commonly known as the resource curse.

The resource curse is not the only illness to affect developing economies. Foreign aid can also paradoxically set a country back. Foreign aid displays many of the same basic symptoms of the resource curse, including limited growth, incentives for irresponsible political actions, and low competitiveness abroad. In fact, the two curses are so similar that they should be considered the same affliction- the curse of reliance on unearned capital to generate development, or the curse of windfall income. This paper attempts to illustrate the similarities between the natural resource and foreign aid curses, identify the driving mechanism behind the curse of windfall income, and empirically demonstrates the dangers of the two curses and the similarities between them.

In essence, both foreign aid and natural resources are gifts to a developing economy. A natural resource gift derives from nature. A country that is endowed with easily extracted minerals has a huge pool of potential income which they can choose how quickly to use. The extraction process has very little interaction with the non-resource sector of the economy, especially in poor countries where almost all of the skilled labor and capital needed for extraction comes from abroad. Developing countries endowed with natural resources court international corporations, typically from either China, Europe, or the United States, to provide this labor and capital.

Discovering and exploiting natural resources, such as oil, can generate incredible amounts of income. Increasing production, however, typically results in stagnation or contraction of non-resource export sectors. Natural resource exportation inflates a nation's currency, making domestically produced goods less competitive in international markets. This process is known as Dutch Disease.

Aid functions similarly. While oil and other resources can be classified as gifts from nature, aid is a gift from first-world donors. Influx of government revenue is expected to boost the performance of the economy. Much like oil, donated goods and funds from abroad are not earned by an economy. Western donors either produce goods and ship them to poor recipient nations or send money to furnish public goods. While this encourages productivity in Western economies, it floods the recipient country with goods that are essentially free. Inflows discourage manufacturing by negatively affecting a country's competitiveness. Effects on the country's economy can be significant.

Neither aid nor resource income are tied to an economy's productive capacity. Rather, foreign aid and natural resource boons can be considered windfalls. In this paper, I argue that both aid and resources are 'cursed' because neither are earned. Windfall income creates adverse macroeconomic effects that limit competitiveness. Export-oriented non-resource sectors such as manufacturing shrink due to high domestic prices and currency overvaluation, while non-tradable goods such as services see steady growth fueled by an artificially large supply of domestic wealth.

In the remainder of this paper, I will define windfall income, review the literature on the effects of both aid and resources on an economy, and argue why the curse of

foreign aid and the natural resource curse should be treated as the same disease. I then analyze possible mechanisms by which windfall capital inhibits growth and identify which mechanism fits the specifications that would define the curse of windfall income. I test these theories empirically and then conclude.

Section I: The Curse of Windfall Income

Windfall income can be defined as income that does not derive from the efforts of domestic labor, land, and capital. Most windfall income takes the form of either foreign aid inflows or natural resource rents.¹ For many resource economies, foreign companies provide the capital and skilled labor to extract resources. Most inputs to the industry are produced abroad, meaning that the resource sector has only a tangential relationship with the remainder of the economy.² Similarly, aid is frequently given either in the form of internationally produced goods or in funds to provide localized services such as health and education. These goods do not help productivity inside the recipient country, but merely provide countries with more goods. Such aid can be instrumental in providing much needed resources to the poor and in improving the standard of living but do not, however, translate to a stronger or more productive export economy. Aid strategies such as capital goods or expert consultants who work to increase domestic productivity should not be grouped into this category, as this aid aims to increase productivity within the country instead of merely providing goods.

¹ Remittances also fit the characteristics of windfall income. However, remitted income is usually too small to factor seriously into this discussion. Furthermore, they are not controlled by the government but by individuals, so government incentives are not skewed by these transactions. Rajan and Subramanian (2005) dismiss economic effects of remittances, saying that levels of remittances naturally decline when the exchange rate is overvalued.

² Christina Wood (2011) finds in her World Bank report on growth and jobs in MENA countries that oil sector was major engine of growth in many countries, but growth resulted in negligible job creation.

The difference between earned and windfall income can be illustrated by comparing the economies of Botswana and Angola, both of which are heavily dependent on natural resources. When resource extraction requires significant investment, infrastructure, and labor from within the country, these resource rents cannot be considered windfalls but a product of a successful domestic enterprise. Integration with the resource sector leads to more robust growth in the non-resource sector which results in a more healthy, diverse economy. This is the case in Botswana, where much of the economy revolves around mining diamonds. The mining industry is highly reliant on local labor and investment to fuel production. Botswana's economy has grown steadily since 1980 and is one of the only nations in Africa that can truly be considered a success story. While Botswana is still poor, has high income inequality, and is overly reliant on its diamonds, it has experienced high rates of steady growth not typically seen in countries reliant on resources.³ More importantly, despite high levels of diamond production, the non-resource export sectors have not been seriously affected by Dutch Disease.⁴ Former Botswana president Mogae stated: "For our people, every diamond purchase represents food on the table; better living conditions; better healthcare; safe drinking water; more roads to connect our remote communities and much more."⁵

Neighboring Angola is also highly reliant on natural resource income, yet non-resource sectors are not nearly as involved in the production of resources as in

³ "CIA - The World Factbook." *Welcome to the CIA Web Site — Central Intelligence Agency*. Web. 21 Dec. 2011. <cia.gov>.

⁴ Makoche Kanwa

⁵ Former President Mogae of Botswana, 7th June 2006, cited in Makoche Kanwa

Botswana. While diamonds in Botswana are an export, oil in Angola is a windfall. The Angolan state oil company, Sonangol, both regulates and administers the oil industry. The company relies on contracts with large multinational corporations to provide inputs for extracting and delivering oil to market. To attain these valuable contracts, multinationals pay large, undisclosed signing fees which enrich elites but are hidden from citizens. Government income is used to subsidize specific goods produced by fellow elites, creating a system of cronyism that benefits only a few.⁶

Resources from Botswana must be used in part to pay local laborers and support domestic producers of inputs to the mining industry. Production of diamonds not only generates income for elites but positively affects all levels of the economy. In Angola, the profits of oil are controlled by the ruling elites, and the industry is shrouded in secrecy. Most Angolans never experience benefits from the valuable resource that the country controls.

Resources rents allow the government to maintain stable rule. Furthermore, production efforts by poor Angolans are discouraged by the crippling effects of Dutch Disease, which makes goods produced within the country less competitive compared to foreign goods. The result is intense income inequality. Angola's GDP per capita in 2011 was estimated at \$5,090 in current US dollars, yet the top 10% of earners controlled 44.7% of the country's income and 40.5% of the population lives below the poverty line.⁷

⁶ Ramos, Angola's Oil

⁷ "CIA - The World Factbook." *Welcome to the CIA Web Site — Central Intelligence Agency*. Web. 21 Dec. 2011. <cia.gov>.

The differences between Botswana and Angola illustrate the difference between earned and windfall income. In Botswana, the entire economy works towards diamond production. Resource rents help develop Botswana's economy across sectors and income groups. In Angola, the average citizen has very little interaction with the oil sector. Production is reliant on foreign capital and labor, not on local labor nor domestically produced inputs, allowing the Angolan government to perpetuate an autocratic system where elites claim most of the country's wealth.

Effects of Windfall Income

It stands to reason that windfall income would supply a country with the tools to develop and create economic growth. Both foreign aid and natural resources, however, have systematically failed to produce positive economic effects. The curses also carry negative political consequences. As Ross (1999) states: "Windfalls produce myopic disorders among policymakers that can weaken state institutions that are necessary to foster long-term economic development."⁸ This prediction plays out in the literature, with authors finding that both aid and oil leads to a decline in the quality of economic institutions.

Numerous papers have demonstrated that no robust association exists between aid and growth. Burnside and Dollar (2000) is a pivotal work that shows that aid only benefits an economy in the presence of good institutions. This reinforces the concept of 'Selectivity,' which hypothesizes that windfall income can only help economies with sound governance. Since then, a plethora of studies including Easterly (2003), Easterly,

⁸ Ross (1999). p308

Levine, and Roodman (2004), Hansen and Tarp (2001), Roodman (2004), and Rajan and Subramanian (2005) find that even in countries with good policies, aid does not cause growth. Additionally, natural resources have also been empirically shown to generate unsubstantial growth.⁹

Windfall income is also empirically shown to cause degradation of quality governance. Excess income allows governments to exercise more control over populations. Djankov and Montalvo (2008) empirically demonstrate that a 1% increase in incoming Foreign Aid reduces a country's score on a 10-point index of democracy by between 0.6 and one point. The same paper found a .02 fall in the index for 1% increase in oil rents. Djankov and Montalvo conclude bluntly, "Aid is a bigger curse than oil."¹⁰ Brautigam and Knack (2004) find that even when controlling for GDP per capita and violence, aid has a significant, negative effect on democratic institutions.¹¹

While the existing literature discusses the curse of aid and the natural resource curse separately, the two curses are in essence very similar and should by all regards be considered the same disease. Both have very similar effects in universally lowering economic growth and contributing to deteriorating political institutions. Moreover, while aid and resource income are realized in very different ways, they both supply large amounts of unearned capital to governments.

To infer that the curses are identical, the underlying mechanism that causes windfall income to constrain economic growth must be identified. If the mechanism is

⁹ See Gelb (1998)

¹⁰ Djankov and Montalvo (2008)

¹¹ James Vreeland argues that aid is endogenous to failing regimes, as the countries that request funds from the IMF and other institutions are the countries where the money is needed for elites to stay in power, creating a selection bias.

identical for both aid and natural resources, it can be inferred that the two curses are actually the same curse: the curse of windfall income. Such a conclusion could radically alter approaches to the study of both foreign aid and natural resources and their effects on growth.

SECTION II: Identifying a Mechanism

The question being asked is very specific. There is a mechanism sparked by windfall income that serves to ubiquitously prevent growth in a diverse set of economies. The mechanism increases in severity as windfall income becomes a more substantial component of a country's income. Furthermore, the effects are not closely tied to variation in factors exogenous to the level of windfall income like institutional quality. The mechanism should have comparable effects for both foreign aid and natural resources. Finally, the mechanism should center around a negative consequence of windfall income, not just one that negates a portion of the benefits.

Conceptually, windfall income could negate growth in two ways. First, windfall income could be the equivalent of a sugar pill- a treatment that has absolutely no effect on the outcome. It is hard to argue, however, that excess capital has no benefits. Excess capital can be used to procure public goods, increase economic activity, invest in industry, and provide welfare for the poor. Even where inflows are primarily dominated by elites, benefits should trickle down to the nation's poorest and elicit at least a marginal effect.

The second explanation is that windfall income, while helpful, has a deleterious side effect that negates any benefit the initial treatment might have. This is a much more

feasible solution. While there are obvious benefits to what is essentially receiving free money, there is a roughly equal but opposite effect that eliminates the benefits of windfall income.

In the next section, I examine two classes of mechanism that could cause a negative externality substantial enough to negate growth. The first derives from distortions to political incentives caused by capital that does not derive from the labors of the governed. The second class of mechanisms are economic. Excess capital from outside the economy can heavily skew the internal economy through Dutch Disease, which makes domestic manufactures less competitive compared to goods produced abroad. I describe the effects that these two mechanisms could have on economies, then analyze which phenomenon is more robust in its ability to constrain growth in nations dependent on windfall income in a manner that matches the observed effects of both the resource curse and the curse of aid.

Unknowns

It could also be argued that foreign aid and natural resources could potentially be harmful through unknowns. Fluctuations of world resources prices and variation in aid donations from first-world nations means that a country dependent on either aid or resources cannot ever be fully confident about the value of inflows in the next period. While this effect is heavily discussed in the literature, the overall effects are not substantial and I reject them as a possible cause of the curse of windfall income.

Poor countries dependent on aid are at the whims of foreign donors. If first-world economies decide not to provide as much aid, government budgets and consequently

the public goods they fund can fluctuate wildly. Additionally, the unknown quantity of foreign aid can produce a moral hazard effect. Donors give primarily based on need, so if a country digs itself into a hole it can credibly count on foreign donors for assistance. An understanding that spending in the present period will not seriously constrain spending in the future compromises incentives to use money responsibly.

The first component of the resource curse is vulnerability to market fluctuations. Every country engaging in international trade is vulnerable to changes in supply and demand to some degree. Countries that rely heavily on one commodity for export are markedly more vulnerable. Fluctuations in markets can drastically raise or lower a country's income with little notice, which can be extremely disruptive.

In the late 20th century, oil prices were highly unstable. From 1970 to 1980, oil prices shot up from less than \$15/barrel to over \$65/barrel. Ten years later prices had fallen back down to 1970 levels. Countries dependent on oil were frequently unable to pay for half-finished projects or public goods due to plummeting oil prices. Many accrued severe debt. On the other hand, when oil prices are on the rise, unexpected excess capital encourages wanton spending among top officials.¹²

Effects caused by unknown future prices and donation levels, however, are not strong enough to provide a feasible explanation for the failures of natural resources and foreign aid to increase growth. At most, these mechanisms are capable only of lessening positive effects caused by windfall incomes. They could by no means act as a viable externality capable of rendering windfall income ineffective. Thus, despite

¹² "History of crude oil prices." *Illinois Oil and Gas Association*. Web. 21 Dec. 2011. <http://www.ioga.com/Special/crudeoil_Hist.htm>

unknowns receiving considerable attention in the literature, I choose to dismiss these effects as unsubstantial and irrelevant.¹³

Section III: Political Effects

Windfall income usually passes through the hands of the government. In the case of foreign aid, incoming aid flows often make up the majority of a government's budget. In 1999, 17 countries in Sub Saharan Africa relied on aid for over 50% of government expenditures (with 10 more over 25% reliant).¹⁴ Likewise, resource production is heavily taxed. In many countries dependent on oil, the government receives little revenue from anything other than the oil sector. Logically, windfall income has the potential to significantly alter a governments behavior. Increased levels of windfall income could potentially allow the state to increase control over citizens and lead to the deterioration of government institutions. Alternatively, windfall income can also destabilize nations and lead to internal conflicts. While specific distortions to the system vary between foreign aid and natural resources, the underlying mechanisms are similar. Both aid and oil can either increase or decrease the stability of a regime.

Political effects of Natural Resources

States built upon oil income, while frequently autocratic, are often quite stable. Many oil-states show little variation over time on standard measures of democratization. Natural resources can make substantial contributions to regime stability, which can

¹³ This conclusion mirrors evaluation by Ross (1999), which also dismisses the effects of unknowns and market fluctuations as unrelated to the root causes of the resource curse.

¹⁴ Brautigum and Knack (2004), Table 1

provide a better habitat for economic prosperity. However, windfall income can also lead stable regimes to solidify and become more autocratic.

A government that receives substantial income from natural resources can use those resources to generate benefits for their citizens. Oil revenue allows the state to lower taxes and improve the quality of public goods such as schools, hospitals, and public works. The government can also spend the money to decrease unemployment and keep people satisfied. Higher spending and lower taxes can appease groups who might otherwise oppose or revolt against the state. Lower risk of revolt leads to increased stability. This process is referred to as the Rentier effect.

Stability is also enhanced through Asset Specificity.¹⁵ Oil income is fixed and immobile. If a successful revolt did occur, the current owners of resources would be unlikely to retain ownership- resource assets would naturally be the first thing redistributed should an overthrow of a government occur. Because of this, elites with income tied to the resource sector have strong incentives to support the incumbent regime and to invest in maintaining the status quo. This pattern of stability is very visible in many oil economies. In Saudi Arabia, for example, Saudi elites are heavily invested in the success of the state. However, such stalwart support has led to little pressure on Saudi Arabia to reform policies or allow citizens increased freedoms. While Saudi Arabia is stable, its stability has allowed it to pass religiously conservative policies that are considered backwards in the west.

Alternatively, natural resource income can just as easily have a destabilizing effect. The Rentier effect only appeases citizens when all citizens are receiving goods

¹⁵ Boix (2003)

and services from the government. If income is not distributed equitably, or if certain groups feel like they are being excluded or not treated fairly, a Grievance effect occurs. Frequently groups who feel unfairly excluded from enjoying natural resource wealth will undertake armed conflict to try and take their fair share by force.¹⁶

Natural resources also means there is more value to ruling the country. While risks facing potential rebels are high, so too is the reward of controlling billions of dollars of resource wealth. Resource wealth does not depend on the overall prosperity of the country. Where the value of controlling a non-resource economy could be substantially diminished by a destructive civil war, instability and conflict does not decrease the value of an oil-field. This makes insurgency a lucrative proposition in resource rich countries.

Rebels can also find allies in unlikely places. Because any owner of immobile natural resources must live with whichever side wins a civil war, rebel factions can garner funding by exploiting the owners of resources. Owners are pushed to hedge their bets by supporting all factions in a civil war to ensure that they retain ownership after the conflict concludes. If an owner refuses to pay, rebels can target immobile resource production centers, sabotage productivity and cause extreme damage. Exploitation can provide rebel groups with vital resources to carry on a crusade against the government.

Natural resources can either help a government maintain stability or provide incentives to incite a rebellion. Which effect dominates depends heavily on the quality of institutions within the state. Where institutions are weak and governments are corrupt or ineffective, Grievance effects caused by dissatisfaction over the allocation of resource rents supersede the positive Rentier effects. In relatively developed countries, civil wars

¹⁶ Morrison (2012)

will be harder to start and less likely to succeed. In underdeveloped countries where the government has paid little attention to large components of the population, guerilla warfare and the exploitation of resource owners is common and effective.

Aid's Effect on Stability

Like with natural resources, foreign aid inflows can have either a stabilizing or destabilizing effect on governments. Many of the mechanisms by which stability or instability are realized are identical to the mechanisms that exist in resource-rich states.

First, aid also triggers the Rentier and Grievance effect. Aid money can help provide many basic public goods, including better public health initiatives, education, and infrastructure. Spending, ideally focused on the neediest segments of the population helps governments protect their people.

Aid also has the power to encourage countries to enact reforms that help liberalize markets and improve a country's economy. Often, organizations such as the World Bank and the IMF offer aid to countries that is conditional on political and economic reforms. Countries liberalize in order to meet criterion for valuable inflows of aid. Furthermore, conditionality effects can provide disincentives against coups or rebellions if donor countries can make credible commitments to cut off funding in the event of a military take-over or a civil war.¹⁷

On the other hand, aid can create incentives that lead to poorer institutions and instability. Like with natural resources, the Grievance effect can take hold when aid is not spent well. Aid frequently distorts a government's spending through a moral hazard

¹⁷ See Dunning (2004)

effect. Governments can count on foreign donors to bail them out if they do not use funds responsibly in the current period, creating incentives to use the money fecklessly or for self-serving purposes. Moreover, by maintaining at least some amount of visible poverty and hunger, a country can increase aid inflows in future periods. When this happens a Grievance effect will occur. Misuse of funds, specifically those intended to provide goods for subjugated or oppressed groups, provides a visible example of a government's corruption, and can lead dissatisfied citizens to support an armed rebellion against the government.

Governments themselves are not the only ones to be corrupted by incoming aid. Militaries of recipient nations are tempted by large amounts of capital under government control. To avoid coups, leaders of aid-dependent countries appease their militaries by channeling large portions of aid into defense-related spending. In his book, *The Bottom Billion*, Paul Collier estimates that 40% of military budgets in Africa are funded by foreign aid.¹⁸ Coups in African economies are still frequent. When a coup occurs, western powers too often continue aid transfers to the new government. Foreign aid is seen as support for the new regime, and validates the coup's legitimacy on an international stage.

Furthermore, the ability of aid conditionality to either exact policy change or to discourage civil war is unclear. There are countless examples of countries repeatedly promising to enact reforms in exchange for aid, only to renege on their commitment as soon as the aid has been received. Likewise, civil wars or other conflicts tend to induce more aid flow, not less. Donors react to human rights tragedies with large donations

¹⁸ Collier, Paul. *The Bottom Billion: Why the Poorest Countries Are failing and What Can Be Done about It*. Oxford: Oxford UP, 2007. Print. p103

meant to ensure the well-being of those displaced by conflict. Montinola (2007) shows that aid conditionality only works in countries where institutional quality is already high. Thus, for the majority of aid recipients, conditionality has limited ability to encourage good policies.

Like natural resources, high levels of foreign aid creates incentives for civil war. More aid means more to fight over. Attempts by different groups to control incoming resources results in bloody conflict. In other cases such as in Somalia, factions fighting civil wars actively prolong a crisis to ensure the continued flow of disaster relief money into the country.

An extensive literature exists on whether foreign aid promotes democracy or gives stability to recipient governments. Like with natural resources, mechanisms for aid's effects on stability hinge on the quality of institutions in the recipient country. William Easterly proposes that institutional quality determines whether aid will cause growth, referred to as 'Selectivity' in the literature.¹⁹ Empirical results on selectivity are mixed and inconclusive, as discussed previously.²⁰

Perspectives on Political Effects

Levels of windfall income seem relatively well equipped to explain a lack of positive political change. In the best case scenario, windfall income freezes institutions in place by providing elites with incentives to keep the status quo. The only mechanism discussed that could actually move governments toward improved policies is aid

¹⁹ Easterly (2002). Cartel of Good Intentions

²⁰ Burnside and Dollar (2000), Easterly (2004), etc.

conditionality (which has a dubious empirical record at best). In the worst case, windfall income either encourages a deterioration of political institutions or actively increases incentives for civil war.

Windfall income's ability to move government policy farther towards autocracy is disturbing. Windfalls enable the government to take away individual rights and take increased control over the economy. Because windfall income is generated independently of the welfare of citizens, governments can continue to receive funding regardless of how citizens are treated. As such, rentier states face low social pressure to reform economic policies.²¹ Given donor's lamentable inability to maintain credible commitments to the conditionality of aid, repressive economic policies are unlikely to decrease windfall income. Investments in regime stability are frequently not beneficial to economic performance, with elites "jealously guarding the status quo instead of promoting development."²²

Political effects, however, do not necessarily match the problem that the curse of windfall income presents. While becoming more democratic is positively correlated with economic growth, countries with non-democratic forms of governments are certainly capable of economic growth, especially when endowed with large amounts of capital. Given the variation of institutional quality among countries receiving windfall income, significant variation in results would be expected based on institutions. Neither the curses of aid nor resources, however, have relatively observable 'Selectivity' associated with growth failures, implying that the actual underlying cause of limited growth is not

²¹ Shambayati (1994)

²² Mahdavy (1970) p443

strongly associated with levels of political freedoms. Furthermore, if increased chances of instability is the side-effect that constrains the benefits of windfall income, there should be noticeable divides between states that experience civil war and those who do not. This divide does not occur and controlling for violence does not negate results.

In addition, while the effects of aid and resources here are similar, they are not homogenous. Aid and oil have comparable, but distinct, influences on political incentives and outcomes. Given the similarity in the negative effects exhibited in both economies reliant on aid and resources, a mechanism that affects both aid and oil in the same way is necessary.

I conclude that while windfall income has significant effects on a government's actions and policies, these distortions cannot adequately explain the curses of resources and aid. The effects experienced by the two are too distinct and are reliant on an external variable- institutional quality. Political and institutional effects, while significant, are overstated in the literatures addressing both foreign aid and natural resources.

Section IV: Economic Effects

Dutch Disease is a serious affliction for many oil economies. The disease has two components. First, a focus on natural resources tends to draw labor and capital away from the non-resource sectors, lowering productivity and competitiveness. This effect is not seen in many developing economies that discover natural resources, particularly oil, because in many cases foreign capital and labor almost exclusively provides the inputs for resource extraction. Poor, developing nations have neither the

educated labor force nor the capital to take on such projects. Even if they did they would lack all important access to foreign markets. Nations contract foreign companies, typically from the US, western Europe, or China, to extract the oil, then retain a sizable portion of the profits through taxes. Therefore, for developing nations, I do not consider this first aspect of Dutch Disease to be a serious economic malady.

The second symptom of Dutch Disease is a more serious threat to developing nations. When countries export sizable quantities of resources, the value of their currency appreciates on international markets. This makes international goods less expensive compared to domestically produced goods, and makes domestically produced exports less competitive on international markets.

Results of Dutch Disease in oil economies are readily observable. In many economies dependent on oil, lavish projects and public works provide jobs to the public. Leaders and elites amass huge fortunes which purchase expensive imports. Non-resource sectors are usually dominated by services, with wages reliant on the money the elites have earned from exporting resources. What is lacking, however, are domestic jobs producing basic manufactures or tradable agricultural products.

In an economy where Dutch Disease has significantly altered the value of the state's currency, domestically manufactured goods are no longer able to compete with cheaper imports. The country's economy has a comparative advantage of producing oil. Because so little domestic labor goes into the production process, most workers are left with few economically viable options other than providing non-exportable services to the owners of resource wealth.

Governments sometimes try to fight Dutch Disease by subsidizing production of manufactures in order to make industries competitive. In Angola, these subsidies were given to elites as a form of patronage, making a few specific industries competitive to keep powerful individuals allied with the government. Venezuela adopted more egalitarian policies to support infant industries, yet manufactures subsidized with oil wealth still never became viable. The government ended up paying failing companies to stay in business to prevent widespread unemployment.

Countries that grow on the back of natural resource frequently have a highly unequal income distribution. Equatorial Guinea has seen impressive growth fueled by increased oil production since 1993, with GDP/capita propelled to \$36,600 in 2010 (the highest in Sub-Saharan Africa).²³ The wealth, however, reaches only the top tier of society. In 2006, 77% of the population were living under the poverty line despite GDP per capita levels above those in Germany, Japan, and the United Kingdom.²⁴ Similar conditions are seen in resource-based economies across the world.

The effect of Dutch Disease is readily apparent in Gabon. The country of just over a million people is one of Africa's top producers of oil. Libreville, Gabon's capital, is a modern looking city with a thriving service sector and substantial levels of public goods. The city is home to a host of French nationals who provide most of the skilled labor and expertise in extracting and marketing oil. Shops in the city display an impressive array of foreign luxury goods. In his book "Untapped: The Scramble for Africa's Oil," John Ghazvinian describes a grocery store in Libreville selling high quality

²³ "CIA - The World Factbook." *Welcome to the CIA Web Site — Central Intelligence Agency*. Web. 21 Dec. 2011. <cia.gov>.

²⁴ "Oil Corruption in Equatorial Guinea - NYTimes.com." *Energy and Environment - Green Blog - NYTimes.com*. 9 July 2009. Web. 21 Dec. 2011. <<http://green.blogs.nytimes.com/2009/07/09/oil-corruption-in-equatorial-guinea/>>.

foods, mostly imported from Europe. Strangely, the store sells no bananas- a staple of local production before the oil boom. Today, bananas are no longer a profitable enterprise in Gabon and domestically grown bananas are almost impossible to find in the capital because of extreme currency appreciation. Instead, bananas are imported from neighboring Cameroon while fruit is left rotting on trees in Gabon's interior. The country currently imports approximately 60% of its food supply. Importing food has detrimental effects on the poor in Gabon, many of whom relied on agriculture as their primary source of income. While the rich collect rents from oil, the poor no longer have the ability to scratch out even a meager income. While GDP per capita in the country ranks at nearly \$6,500, well above the average in Sub-Saharan Africa, 40% of Gabon's citizens are unemployed and 66% live on less than one dollar a day.²⁵

Economic effects of Foreign Aid

Oil and other natural resources can inflate currencies and hurt the non-resource sectors of an economy. Foreign aid can also generate currency appreciation that has detrimental effects similar to natural resources. The World Bank found that exchange rates in African countries are overvalued, which appears to be a combination of appreciation from resources and from aid flows.²⁶ Currency appreciation can restrict growth in manufacturing sectors, robbing the country of much needed employment outside of the subsistence agriculture sector and making the country increasingly

²⁵ Ghazvinian, *Untapped* p102

²⁶ World Bank (2000)

dependent on aid. Aid negatively affects the production of tradable goods in recipient economies through two mechanisms: a substitution and a pricing effect.

A prototypical example of the substitution effect is Malawi's fledgeling textile industry, a fast growing sector which was largely derailed by an influx of donations from would-be-philanthropists in Northern Europe after trade liberalizations in 1994. Scandinavian aid organizations have been shipping second-hand clothing to the Southeast African countries of Malawi, Tanzania, and Mozambique under the banner of foreign assistance. Donated articles of clothing are sold at rock bottom prices on street corners all around Malawi. Low price clothing sold for a few cents has practically monopolized the Malawian clothing market.

Malawians, however, are not in dire need of clothing. In fact, Malawi, like most countries in the region, had a burgeoning textile industry that produced clothes at reasonable prices and employed thousands. The influx of donated goods has dominated the textile industry and driven domestic manufacturers out of business. An estimated 40,000 Africans have lost their jobs due to low cost imports of textiles that the citizens did not need.²⁷

Pricing Effect of Foreign Aid

The substitution effect of incoming foreign aid is readily apparent. Not as obvious, however, is the mechanism by which inflows of foreign aid unrelated to the textile sector can still negatively affect the textile industry's productivity and competitiveness. Macroeconomic effects related to incoming aid act like Dutch Disease,

²⁷ "Afrol News - "Aid" Leads to Bankruptcy in Malawi, Mozambique, Kenya." *Afrol News - African News Agency*. Web. 21 Dec. 2011. <<http://www.afrol.com/articles/10712>>.

inflating the cost of domestic goods compared to international alternatives and negatively affecting competitiveness.

To use an example, say that international donors funded the construction of a school in Malawi. Aid dollars donated from abroad would be used to hire laborers and purchase building materials. Once it was constructed, aid dollars would provide a wage for teachers and purchase textbooks and other basic materials to cover operating costs. On the surface, this allocation of aid resources seems only to have positive consequences. Increased education serves as investment in human capital which can improve productivity and strengthen democracy in future periods.

When many aid projects are aggregated together, however, the results are not as innocuous. On the macro level, this type of spending can hurt domestic competitiveness and destroy jobs in the manufacturing sector. Employment in the service sector increases, but much of service sector wages originate with and depend on foreign aid. As a result, aid spending on the aggregate makes a country less connected to the global economy and increases reliance on aid inflows.

Several mechanisms contribute to the negative macroeconomic effects a school can have on manufacturing and other export-oriented industries. First, building a school will divert skilled labor away from the manufacturing industry. The construction of the school will require an educated contractor and other skilled laborers to construct. Once built, the school will employ teachers and administrators. The school has increased the demand for skilled labor in the country. Higher demand translates to higher wages. While this is a boon for skilled laborers, export industries are harmed because skilled

laborers are diverted away from factories. To keep their workers, factories are forced to pay higher wage- raising production costs and lowering competitiveness.

Skilled labor is not the only factor of production that will become more expensive. To build a school, aid dollars will purchase building materials and other scarce domestic products. Like with skilled labor, this raises domestic prices of scarce resources, forcing up input costs for the manufacturers.

Finally, like with natural resources, foreign aid inflows alter a country's current account balance and artificially raise the costs of production. Foreign aid primarily constitutes imports that a country does not pay for. Excess imports can skew a natural current account balance, where exports are used to pay for imports. When this equation changes and imports now exceed exports, exports behave as if they are more valuable than they actually are. The set of exports are used to acquire an artificially large set of imports.

The way this effect is manifested depends on the structure of a country's currency. In a fixed-exchange rate economy, the imbalance in the current account will raise domestic prices of vital domestic goods through the mechanisms discussed above. Rising domestic prices caused by the current account imbalance increase prices on international markets and lower competitiveness.

Alternatively, in flexible exchange rate economies, aid inflows simply push up the nominal exchange rate. A higher exchange rate makes domestically produced goods more expensive compared to those produced abroad.

Several studies have attempted to tease out the effects of aid and natural resources on currency rate overvaluation. The most successful is Rajan and

Subramanian (2005), which calculates a currency's overvaluation by comparing a country's per capita income level to its actual price level relative to the United States. The paper finds that aid and currency overvaluation are positively correlated over time. It also found that overvaluation caused non-export sectors and capital intensive industries to grow much faster than export-oriented sectors of the economy. This is exactly the result that the model predicts, and goes a long way towards convincingly demonstrating that aid suffers from aggregate macroeconomic side-effects nearly identical to Dutch Disease.

The Economic Solution

A macroeconomic solution fits the observed conditions that contribute to the resource and aid curses. The negative externality of Dutch Disease has nearly identical effects in both economies based on natural resources and those reliant on foreign aid. Moreover, the negative side effect that causes a lack of growth is directly related to the quantity of aid received. These effects on the macroeconomic level serve to negate the positive gains associated with excess income.

Aid inducing Dutch Disease further solidifies the idea that foreign aid and natural resource curses are identical at a fundamental level. Both curses are fundamentally caused by macroeconomic repercussions derived from unearned income. While adverse effects caused by unknowns and from distortions to political incentives have the potential to limit the benefits derived from windfall income, ubiquitous economic effects actively negate positive aspects of windfall income.

Table 1.

Aspects of Oil and Foreign Aid	In Weak States	In Strong States
Currency Exchange Rates	Aid- appreciated currency, hurts local industry and increases dependence Oil- Dutch Disease	Aid- Governments able to judge what aid is needed. Does not increase dependence Oil- Proper Monetary Policy counters Dutch Disease
Money for discretionary Spending	Aid and Oil- allocations generate Grievances among those who are not reaping the benefits of income	Aid and Oil- government spending on public goods and lower taxes appeases citizens and interest groups
Incentives to Rebel	Oil- Rebels can exploit resource owners for funding for revolts. Aid- Wars will provide inflows of humanitarian aid, which can be controlled by rebel factions	Oil- Asset Specificity raise incentives for elites to invest in regime stability Aid- Conditionality promises to eliminate inflows of aid, placing a premium on stability
Response to Unknowns	Oil- resource prices fluctuate on international markets Aid- government budget relies on unpredictable donor behavior in a certain year, Governments can fall into a moral hazard conundrum	Oil- Governments act responsibly and hedge income from booms to support the economy when prices are low. Aid- Governments avoid moral hazard

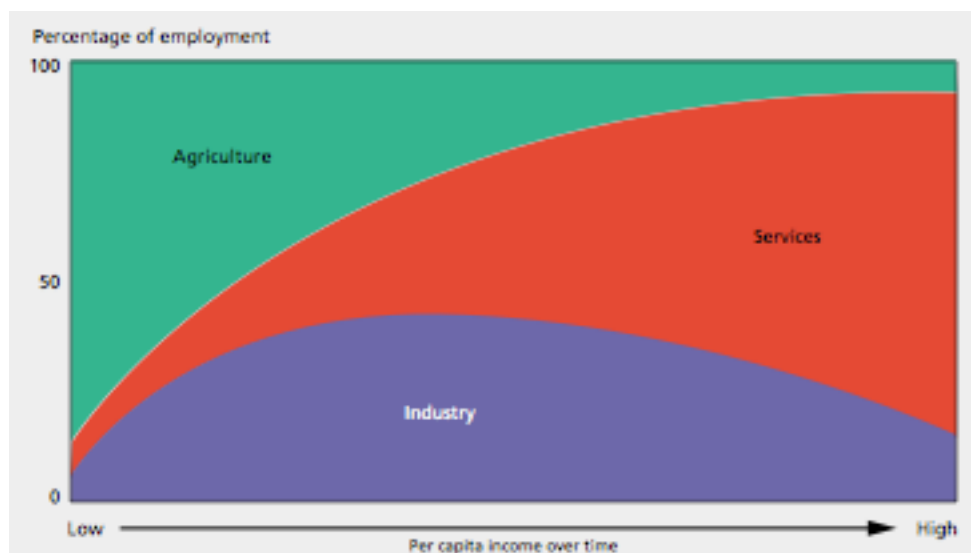
Section V: Sector Growth Fluctuations

The economic-based mechanism theory presented above describes foreign aid and natural resources as contributing to service sector growth while repressing the manufacturing sector. Such a development path is out of sync with how countries have traditionally developed. It bears questioning whether such a path is capable of

sustaining long-term growth. It is possible that windfall income artificially inflates the size of the service sector, which will contract if windfall income is depleted.

Countries usually developed with traditional sector growth patterns. A country begins with dependence almost exclusively on agriculture. As technology increases productivity and incomes rise, demand for food is satiated and demand for industrial goods go up. The country's industrialization period begins. Industrialization lasts until the population's demands become less material, generating the need for services. As the country continues to grow, services account for an ever growing portion of the economy.²⁸ Most developed countries have very large portions of their GDP derived from services- in 2010, the United States's service sector accounts for 78% of its GDP.²⁹

Figure 1: Traditional Development Path for an emerging economy³⁰



²⁸ World Bank, Growth of the Service Sector, p51

²⁹ World Bank Database

³⁰ World Bank, Growth of the Service Sector, p51

In the modern era, many countries have eschewed the traditional growth schema, skipped the manufacturing phase, and seen growth originate directly from the service sector. Part of this trend can be pegged to the fact that new technology, such as the internet, has allowed services which used to be non-tradable to be outsourced. While answering phones or doing paperwork is a traditional service, countries such as India are completing these tasks for foreigners. These services are essentially exports. Similarly, increased levels of international tourism pad the pockets of many developing countries. Tourist goods are considered services, yet the money spent on them comes from abroad.³¹ This wave of export-oriented services mimics the manufacturing phase and precipitates a second influx of more traditional, domestic-oriented services. This resembles a traditional path of producing first then transitioning slowly to demanding consumption of traditional services.

Service growth is fueled by windfall income. Foreign aid and oil dollars enable a country's service sector to grow without any previous growth in manufacturing. Windfalls raise domestic prices and hurt competitiveness, leading to a decrease in an economy's ability to produce tradable goods. Conversely, the inflow of money in the economy raises the income of producers of non-tradable goods. In essence, inflowing windfall income allows a poor country to mimic their more productive neighbors who have the income to support higher levels of services.

The literature largely ignores the differences in sector growth among economies. Divides are clearly visible, however, in today's global economy. China and many other East Asian developing economies have taken the more traditional approach, with

³¹ Eichengreen and Gupta (2009)

manufacturing led growth leading the economy's transition. In many other emerging economies, industry is not the driving force of development.

Is there a difference between service led and manufacturing led growth?

Prior to the current period, there are very few examples of countries developing based on growth in the service sector. Whether or not service sector led growth is a positive or a negative, the current trend is certainly unique.

In countries experiencing industrially led growth, reliance on manufactures can lead to economies of scale which encourage mass production and lowers production costs. For poor countries, inputs such as labor are relatively cheap, which gives a comparative advantage on international markets. Because a country has the potential to sell goods to the entire world, they can produce on a global scale.³² Services, on the other hand, cannot in most cases achieve economies of scale and can only reach limited domestic markets. Services can be seen as increasing standards of living, but in most cases not creating the basis for future growth.

Both the service and industrial sectors have the potential to generate growth and raise income. However, services, especially traditional services aimed for local consumption, will not perpetuate long term growth.

It is possible that for firms to be competitive abroad with their manufactures, they must first have certain prerequisites for production such as working utilities, communication technology, and the ability to transport goods to markets. These prerequisites may only be attainable via foreign assistance. Additionally, services such

³² Wood, Christina A. "Services versus Manufacturing: Which Matters More for Growth and Jobs in MENA?" *Voices & Views: Middle East & North Africa*. World Bank, 4 Oct. 2011.

as education and public health institutions can raise the quality of labor in the workforce. The existence of a solid service economy could lay the groundwork that makes future industry possible. As the economy transitions and becomes less dependent on windfall income, manufacturing slowly replaces services. This leads to sustained growth, transposing onto a traditional growth path. Evidence of these adverse conditions are reflected in Africa's low labor productivity rates, which are only around half of what they are on average in East Asia.³³ If windfall income can fix conditions that trap poor economies, then growth in basic service sectors may be necessary for growth in other sectors.

The trend towards services instead of manufactures could also derive from poor governing institutions. Firms run into trouble when faced with overbearing government regulations. Firms that produce either traditional services or manufactures for domestic consumption often run unlicensed to avoid costly regulations. Schnieder, Buehn, and Montenegro (2010) estimate that the unlicensed, or shadow, economy of Sub-Saharan Africa could be as large as 38% of the regions total economy.^{34 35} This being said, when asked to name their most substantial obstacle to doing business, African business owners across the continent responded that their two biggest concerns were stable supplies of electricity and access to finance, which polled at 41% and 30% respectively. Governmental factors such as tax rates, crime, licensing, and political instability scored

³³ Dinh and Clarke, Performance of Manufacturing Firms in Africa, p51

³⁴ Schneider, Buehn, and Montenegro (2010)

³⁵ Informal economies may be partially driven by the distribution and sale of donated foreign goods, such as with textiles in Malawi.

a combined 18%. The remaining 10% cited competition from the informal sector as the most substantial barrier to business.³⁶

While windfall income can develop a nation's service sector, many of those services will stop being profitable should windfall income dwindle. This precipitates a situation where windfall-dependent nations become dangerously reliant on either natural resources or foreign aid, with an economy that threatens to collapse if windfalls are shut off. Furthermore, if aid does discourage manufacturing, then donors can be seen as unintentionally damaging the traditional engine for emerging economies. Rajan and Subramanian state: "Manufacturing exports provided the vehicle for [a fast growing economy's] growth take-off, so any adverse effects on such exports should prima facie be a cause for concern about the effects of aid on growth."³⁷

To disprove that the service sector can lead to sustained long-term growth is beyond the scope of this paper. It is possible that basic services funded by windfall income are essential for providing a country with the tools to extricate themselves from a poverty trap. Conversely, one could also argue that manufacture-led growth would have already laid the groundwork for sustained growth if windfall dollars had not raised prices and lowered competitiveness. Instead, this paper seeks to identify and quantify the relationship between windfall income and growth in specific sectors. The main hypothesis tested is that both natural resources and foreign aid promote growth in the service sector of an economy while repressing growth in the manufacturing sector. Implications from such a finding could provide a solid answer for why aid and natural

³⁶ Dinh and Clarke, p126

³⁷ Rajan and Subramanian (2009), p18

resources fail to facilitate growth. It could also impact future aid policy and inform efforts to provide responsible assistance to less developed countries.

Section VI: Data Analysis

The effect of aid on the economy is tricky to measure. Several biases are present in traditional attempts to quantify the effect. First, aid is frequently increased in times of crisis. Much like how police officers are deployed to deal with increased crime levels, aid could be endogenous with failure because donations occur precisely because the country is in a political or economic crisis. Secondly, aid can be given not to boost development but to reinforce an alliance. The top two recipients of American aid are Egypt and Israel, neither of which need the aid for development purposes per se. Finally, for the basic case of aid, there is not a control group for aid recipients. If I find that countries receiving aid grow at a certain rate, there is little to suggest this rate is divergent from the unobservable, untreated outcome. Such a test has no power to estimate the effects of windfall income.

Additionally, the data does not always reflect the total damage to manufacturing sectors from windfall income. Natural resources are frequently used to fund transfers that boost other industries. Therefore some countries may have artificially created manufacturing growth. The windfall income curse may actively skew the economy in an unobservable fashion.³⁸

My data breaks down an economy into broad sectors in order to be able to track a nation's development path. I begin by trying to show the effects of aid and resources

³⁸ Wood, Services Versus. Manufacturing, 2011

separately, to verify that each has a similar effect on the growth of economic sectors.

After, I combine both phenomena into one regression, using aid and resource levels and fluctuations to try to predict the size of the manufacturing and service sectors and their change over time.

These goals are in line with previous work by Rajan and Subramanian (2009), who looked empirically at the effects of aid (and only aid) on economic sectors. While Rajan and Subramanian found results that support the hypothesis that aid is correlated with service sector growth while hurting competitiveness, their data only spans the range of the early 1980's to the late 1990's. My data set adds data from 2000-2010, not only adding more range to the study but including a period in which Sub-Saharan Africa (the most aid-dependent region in the world) has actually seen significant levels of growth and country stability absent from earlier decades. Regardless of previous significance, new trends may have emerged in the last few years.

Rajan and Subramanian (2009) attempt to arrive at a conclusion that aid affects exchange rates. They use data estimating an economy's departure from long-run PPP, compiling estimates of prices inside countries and analyzing how they differ from globally estimated prices. This requires differentiating between what is unfounded appreciation and what is natural growth in prices induced by the Balassa-Samuelson effect, which posits that real exchange rate grows with real income.³⁹ Rajan and Subramanian then control for multiple other policies besides foreign aid that could possible affect exchange rates.

³⁹ Rajan and Subramanian (2009), p10

While the approach used by Rajan and Subramanian (2009) yields results, their research makes numerous assumptions. In this model, I present the correlation as a much simpler trend: high levels of foreign aid and natural resources result in service sector growth and manufacturing sector stagnation. To illustrate this trend, I employ simple macroeconomic cross-country data to attempt to illustrate such a correlation. While I sacrifice some power to make causal statements, my model is less convoluted and more able to make a simple, concise demonstration of how windfall income affects sector growth.

In Table 2, I show the effects of foreign aid on growth in the service and manufacture sector. I define aid as based on the percentage of GNI, which makes sense for the study because I am interested in the total amount of domestic income that is attributed to aid. The aid statistic includes military aid, disaster relief, UN intervention forces, and more traditional development assistance. I choose this measure because 1) the data are more readily available across a broad spectrum of countries and time periods and 2) every incoming dollar that boosts internal consumption can, according to the logic presented in this paper, hurt competitiveness. The downside of this approach is that this opens up the data to susceptibility to outliers. For instance, Liberia in 2010 received 127.5% of its GNI in total foreign aid. Iraq received 78.8% in 2005. Of these two observations, Iraq can be easily dismissed because it was being occupied by foreign troops at the time. Liberia in 2010, however, was enjoying significant economic growth. The extreme number actually reflects how aid dependent Liberia was during this period. Even if accurate, extreme observations present barriers to clean regression results.

In regressing manufacturing and service growth on aid, I am interested in two distinct characteristics of aid: how much aid is the country receiving on average, and whether or not the level of aid has increased or decreased. Theoretically, a country which went from low levels of aid to high levels of aid would experience a decrease in the manufacturing share of its income. However, a country which was already aid dependent at the start of the sample and gradually became less dependent would be expected to become comparably more competitive internationally in 2010 than in 1980, leading to perhaps a larger manufacturing sector. If a country stays relatively constant in its aid dependence, I would expect a relatively constant depressed level of manufacturing.

This is complicated by the fact that in most developing economies, the share of the economy devoted to agriculture declined significantly from 1980 to 2010. In a 50 country sample,⁴⁰ agriculture's share of the economy in 2010 represented only 64.6% of what it represented in 1980. Services have largely made up the difference, with the average service sector increasing by 25.1%.⁴¹ Manufactures and resources have both remained relatively constant (at 102.2% and 91.8% of 1980 levels respectively). With constant aid, manufacturing and service sector growth may occur simultaneously as a function of dwindling agricultural importance. Meanwhile, services are becoming increasingly important, especially in nations that are experiencing the traditional transition towards services after the industrial phase of development.

⁴⁰ The 50 developing countries with complete data, all of which are included in the regressions in Table 3

⁴¹ Growth in services follows expected trends outlined by Figure 1, as the world's aggregate demands for foods and manufactured goods are relatively satiated and the globe is moving now towards higher production of services.

Unfortunately, the data that I am working with is far from perfect. After screening for basic data inclusion and excluding countries that are either considered developed (over \$10,000 GDP per capita) or too small (under 700 km²), the data set dwindles to 101 countries. Only 50 of these countries had all values for the size of four sectors, Agriculture, Service, Manufacturing, and Resources, over the thirty year period.

However, even for these countries the data is susceptible at best. The measurement techniques of the data made available by the World Data bank splits the economy into sectors and assigns each sector a percentage. These percentages, unfortunately, seldom add to 100%. Sector data ranges from accounting for only 80% of the economy to as much as 115%. Some of this variation is expected. Manufacturing is a subset of Industry in the World DataBank's data, meaning that other industry such as mining and construction are not included in the summation. However, observations above 100% are completely unjustified. While I reject some of the most extreme observations, I have no choice but to make due with the majority of the flawed data. I am forced to assume that these errors are random and normally distributed across countries, but that errors are consistent across time and within each country. If the measurements are calculated erroneously but consistently, I am still able to compare changes to the data over time. Most individual data I have examined in depth reveal relatively smooth sector growth rates which indicates consistency among samples. There is an overarching shift across time of percentage totals, with countries averaging

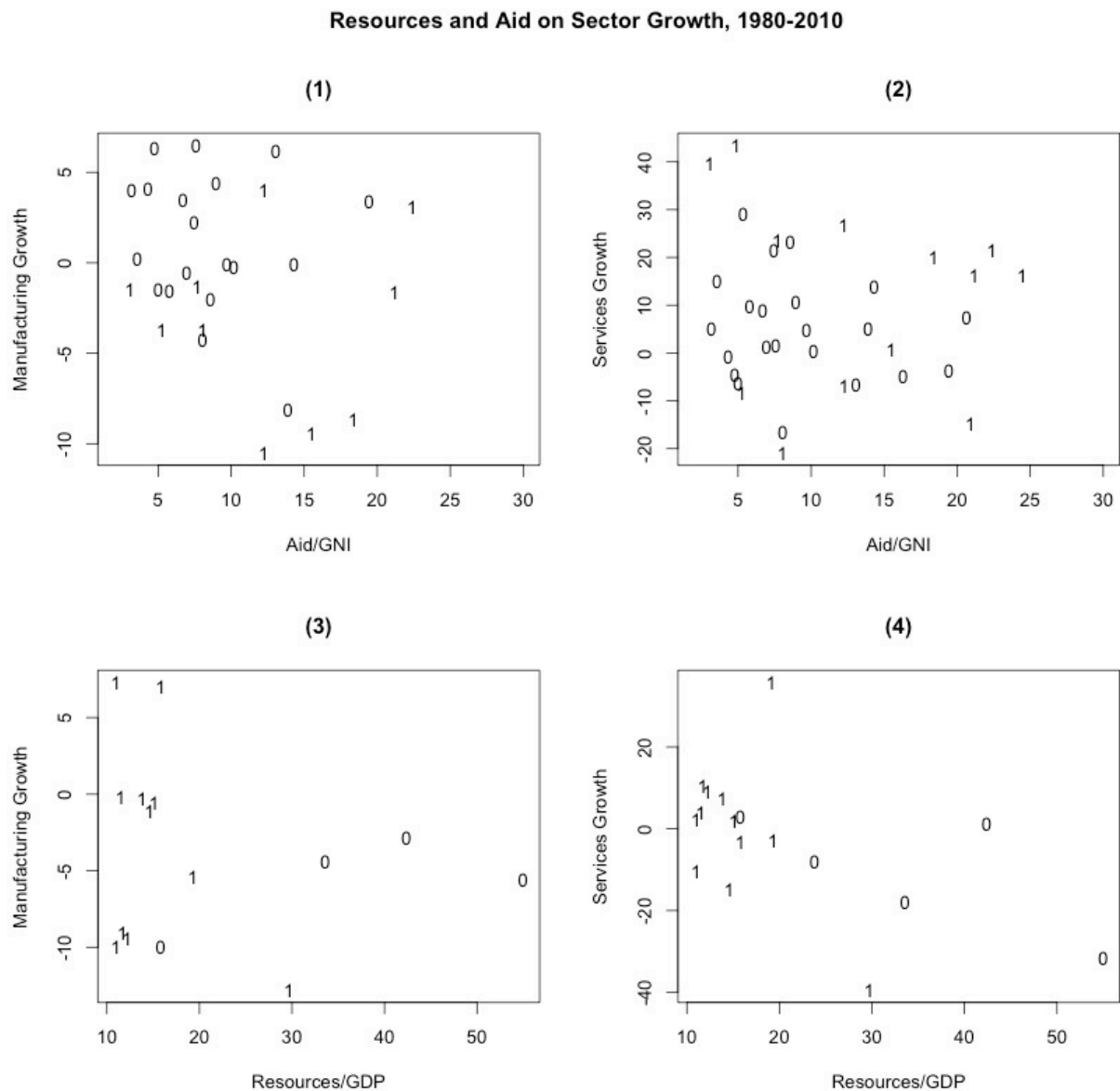
95.6% explained in 1980 but only 91.8% in 2010 (out of the 50 nations with all data for sectors reported).⁴²

Table 2 represents the correlation of average levels of resources as a percentage of GDP and the average level of total Aid as a percentage of GNI, from 1980 to 2010, with changes in both the the manufacturing and service sectors. The purpose of these is to see how increasing levels of aid and resources affect the changing composition of its economy.

The results show limited support for the theory that high levels of foreign aid can shrink the manufacturing sector of an economy while expanding the service sector. In the first regression of table 2, which regresses manufacturing growth on average aid and the increase dummy, shows that almost no correlation exists between average levels of aid and manufacturing growth. What it does indicate is that, with 95% confidence, increasing levels of aid are correlated with decreasing levels of manufacturing. The second regression tells a similar story with the service sector. Average levels of aid are not significant- and in fact the sign of the average aid coefficient is negative, which runs contrary to the expected results- but the regression expects that countries with increasing levels of aid to experience 8.6 percentage points more service sector growth than countries with decreasing levels. It should be noted that these results are associated by a lower level of significance.

⁴² Rajan and Subramanian (2006) attempt to solve this problem by defining service as the percentage of the economy not explained by Agriculture, Resources, or Manufacturing. I strongly disagree with this approach, as it lumps all the error terms for sectors into the one variable we are trying to explain. Another approach, which is more feasible, would to normalize the percentages by a constant so that they reach 100% exactly. As such, I chose to leave the values be in an attempt to preserve the consistency of the data.

Figure 2.



** The charts above shows sector growth for countries with significant reliance on either aid or natural resource income. '1' refers to a country with an increasing level of Aid or Resource reliance. '0' indicates a decreasing level of reliance

There are many other explanations besides the one outlined by this paper for why these trends appear. The sample size used here is relatively small, with many aid-dependent countries unused purely because of lack of data. Many of these countries

have experienced significant political turbulence in the last 30 years that could explain differences in growth. Furthermore, as discussed previously, there is reason to doubt the integrity of the data presented and there are potentially important variables missing from the regression. Reverse causality could also be driving results, with raising manufacturing levels resulting in lower need for foreign assistance. This being said, the results above suggest that the theory of aid's impact on sector growth is not empirically unfounded, and deserves closer evaluation.

Table 2.

	Aid/Man	Aid/Serv	Oil/Man	Oil/Serv
(Intercept)	1.48 (1.37)	9.01 (4.52)	-4.63 (7.70)	19.31 (16.29)
AIDAVERAGE	-0.03 (0.11)	-0.40 (0.35)		
AIDINCREASE	-4.34* (1.77)	8.64 (5.52)		
RESAVERAVE			-0.03 (0.19)	-0.88 (0.43)
oo\$RINCR			1.95 (5.56)	-5.69 (11.51)
R ²	0.23	0.08	0.04	0.29
Adj. R ²	0.17	0.02	-0.12	0.19
Num. obs.	30	36	15	17

In regressions 3 and 4 of table 3, which present resource driven sector growth, results are not as forthcoming. The regressions indicate that high levels of natural resources inflate the manufacturing sector of the economy while depressing the service sector. Increasing levels of resource dependence act in the opposite direction. While the results have no significant power in regression 3, they are strongly significant in regression 4, with an R² value of 0.29. This result runs directly contrary to the theory presented, which hypothesizes that higher natural resource levels will support a thriving

service sector economy. However, with a sample size of only 17, and with the majority of observations clustered near the origin, it is hard to justify interpreting these results as accurate or significant in any way.

The data are flawed in another key way. While calculating the change in manufacture percentages, great care was taken to make sure that the movement was not directly correlated with movements of natural resources. Thus, manufacturing growth is calculated based on the non-resource sectors of the economy. This prevents a growth in resource wealth from indicating a decrease in all sectors despite none of the other sectors being affected by the shock.

While this precaution ensures that the manufacturing growth variable is not directly compromised by resource shifts, it does not help resources from being affected by manufacturing. A country that has constant resource income but sees an increase in manufacturing will record a decreasing level of natural resource dependence. Hypothesizing that decreasing natural resource levels will lead to higher levels of manufacturing could then be vacuously true, as it can be said to be caused by anomalies in the data. In table 3, I run an iteration of the regressions excluding the dummy variables indicating whether or not natural resources are increasing or decreasing in significance. The variable for average resources draws data from the 30 year period and measures reliance on natural resources with relatively low correlation to other fluctuations in the economy.

In table 3, I run regressions to predict changes in the size of the service and manufacturing sectors. Because of suspected endogeneity in the resource dummies, I

run a pair of regressions with and without these variables. The dummies are not significant and do little to alter the results of the equation.

Table 3.

	MAN 1	SERV 1	MAN 2	SERV 2
(Intercept)	18.39*** (1.23)	15.64*** (3.48)	17.91*** (1.24)	6.32*** (3.56)
RESAVG	-0.08 (0.06)	-1.05*** (0.16)	0.05 (0.10)	-1.29*** (0.27)
AIDAVG	-0.29* (0.12)	-0.02 (0.31)	-0.33** (0.12)	0.04 (0.32)
GDP2010	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)
AINCR	-3.04 (2.30)	7.26 (6.45)	-2.11 (2.34)	6.02 (6.48)
ADECR	-3.17 (1.71)	-2.02 (4.81)	-2.67 (1.70)	-2.41 (4.85)
RDECR			-6.91 (3.97)	14.86 (11.18)
RINCR			-0.31 (1.81)	0.67 (5.06)
R ²	0.35	0.42	0.39	0.44
Adj. R ²	0.31	0.37	0.33	0.37
Num. obs.	81	67	81	67

Measuring manufacturing growth, the average level of aid is statistically significant and negatively associated with manufacturing growth while the distinction between increasing or decreasing levels of aid are insignificant. The coefficient of both regressions are negative, showing that significant amounts of aid is associated with lower manufacturing growth. Service sector growth shows the exact opposite significance pattern, with average aid being insignificant but with substantial difference between countries with increasing and decreasing levels of aid. Increasing aid results in estimated service sector growth 7.26 percentage points above countries not receiving

significant amounts of aid. Decreasing aid leads to levels of service sector growth below the expected level of countries without significant levels of aid. This result implies that not only is increasing aid able to accelerate a country's sector growth, decreasing aid does not contribute to service growth. In essence, these figures if accurate indicate that service sector growth created by foreign aid income are not stable, and that the service sector is continually dependent on circulating foreign aid income to support an artificially elevated level of domestic service production. When foreign aid decreases, some of these services are no longer economically feasible.

These results lend cautious credibility to the theory that windfall income supports service sector growth while discouraging manufacturing sector growth. Stronger evidence can surprisingly be found linking aid to sector shifts, yet in previous works it has been the relationship between resource wealth and manufacturing failures that has received so much scholarly attention. Unfortunately, these results also leave me unable to quantifiably compare the natural resource curse and the curse of foreign aid. What I do have is empirical results that weakly show that foreign aid is associated with growth in the service sector while repressing growth in the manufacturing sector. Given the overall quality of the data used, the chaotic nature of the data set, the possibility of reverse causality and the relatively inconclusive results found, this analysis cannot be considered conclusive proof or denial of even a true correlation between aid or oil and sector growth, let alone a windfall income effect on the composition of an economy. Future research should attempt to strengthen these findings and look closer at the effects of foreign aid and natural resources on sector growth over time. Better data and

more stringent empirical analysis could tease out additional answers and strengthen our understanding of how the curse of windfall income functions.

Conclusion

Many economies in today's world are heavily dependent on either inflows of foreign aid or natural resource income. While on the surface such inflows of windfall capital would conceivably help a struggling nation develop, the age-old adage 'Give a man a fish and he will eat for a day; teach a man to fish and he will eat forever' holds. Economies that are reliant on unearned windfall income are constrained from achieving growth.

Windfall capital can have negative effects through both political and economic mechanisms. Politically, windfall income distorts political incentives and can cause the deterioration of democratic institutions. In other cases, windfall income can destabilize nations and increase the chance of civil wars. While the severity of these effects is heavily dependent on pre-existing institutions, they can have serious negative effects on the quality of governance. Poor governance has the ability to constrain economic growth.

While political effects are substantial, it is economic mechanisms that provide the negative externality capable of explaining the ubiquitous failures of both aid and resources to create growth. Both aid inflows and resource income induce Dutch Disease in economies. Excess capital artificially elevates the value of a country's currency and overvaluation makes export sectors less competitive and destroys manufacturing jobs. Dutch Disease narrows the scope of an economy and makes the

economy even more dependent on the the supply of windfall income. Empirical results offer limited support for this hypothesis, finding that average levels of aid are significant in determining manufacturing sector growth and that movement in the levels of foreign aid receives significantly impacts the growth of the service sector. While the results are too weak to be considered conclusive, they do lend some credibility to the theory of a windfall income curse.

In looking at remedies for Dutch Disease and other harmful side-effects of foreign aid and natural resource dependence, researchers should note that both diseases stem from the same root cause- reliance on windfall income. The curse of windfall income incorporates both the resource curse and the curse of aid.

This analysis leaves interesting questions regarding how best to manage an economy that is dependent on windfall income. Many countries caught in traps of windfall income dependence could see substantial benefits if they were able to institute reforms that could alleviate the effects of Dutch Disease.

First, the theory eliminates the feasibility of a 'big push' solution such as proposed by Jeffrey Sachs. Sachs calls for a large increase in aid to create conditions where recipients reach a critical point at which consumption is satiated and is used for investment. Sachs' concept, which William Easterly also criticizes, would likely have the effect of destroying manufacturing jobs in recipient countries and making the country more dependent on future aid without actually contributing towards growth.⁴³

Many previous efforts have been made to counter the resource curse with monetary policy that depreciates the value of a currency and maintains the

⁴³ Sachs, Common Wealth, 2008

competitiveness of non-resource sector products at home and abroad. Good governance and fiscal responsibility by the government is needed to accomplish this goal. Even when good governance is present, monetary policy can still fail to make the manufacturing industry profitable. Resource-rich countries have aimed to use their vast oil revenues to finance diversified investments and to kickstart industrial development. Venezuelans referred to this “sowing the seeds of oil revenues.” In Venezuela, policies had little effect, and the government ended up effectively buying unproductive companies to keep them from going out of business. While economies can try to reform to avoid Dutch Disease, very few have been successful. Countries should consider either cutting back on resource dependence or focusing efforts on investing in goods that take high levels of capital to complete, such as research and development projects.

Aid dependent economies have a more straightforward verdict. Donors should focus on aid that will not contribute to Dutch Disease. Aid flows that will not induce a Dutch Disease mechanism include projects that employ factors of production that are not in scarce supply, such as unskilled labor. Another innocuous aid flow exists in capital goods, which can provide incentives for investment in economies but will not destroy competitiveness. Because they do not induce domestic fiscal expansions, they will not cause prices to be bid up and the currency exchange rate will not appreciate.⁴⁴

For countries that are highly dependent on windfall income, kicking dependency is likely to be a costly and unpredictable process. For many aid-dependent countries, donors slowly pull back funding to encourage countries to become independent.

⁴⁴ Berg et al (2005)

However, as foreign aid inflows often have the effect of making countries more dependent, not less, on aid, this could have jarring effects.

In the future, as technology shocks either lower global demand for oil or when oil reserves begin to run out, expect to see high levels of turbulence in oil economies. The economy will be forced to quickly transition from being completely reliant on aid to suddenly having to develop legitimate non-resource export sectors. As it stands, such shocks would cripple a state's service sector, which is usually heavily reliant on oil wealth to pay wages. Countries should implement policies to try to at least marginally diversify the economy and create viable production outside of the resource sector to mitigate potentially disastrous consequences in the future.

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Appendix

Table 4.

Variable	Description
Agriculture	Livestock and crop production, as well as forestry, fishing, and hunting.
Manufacturing	A subset of the industrial sector, manufacturing encompasses all exportable goods that a country produces.
Services	Value added in wholesale and retail trade, transport, government, financial, professional, and personal services such as education, health care, and real estate services, imputed bank service charges, and import duties
Natural Resources	Value added by all oil, natural gas, mineral, coal, and forestry rents. Excludes mining.
Aid/GNI	Total aid dollars from all sources over Gross Natural Income
Average Aid	The total amount of aid the country received from 1980 to 2010, over the total GNI from the same period (weighted by annual GNI)
Aid Increase	A dummy variable signifying significant amounts of aid (Average Aid > 3%, with the average of the 1980 -1990 observations less than the average of the 2000-2010 observations.
Aid Decrease	A dummy variable signifying significant amounts of aid (Average Aid > 3%, with the average of the 1980 -1990 observations higher than the average of the 2000-2010 observations.
Average Resources	The total amount of natural resources the economy produced from 1980 to 2010, over the total GDP from the same period.
Resource Increase	A dummy variable signifying significant amounts of resource (Average Resource > 10%, with the average of the 1980 -1990 observations less than the average of the 2000-2010 observations.
Resource Decrease	A dummy variable signifying significant amounts of resource (Average Resource > 10%, with the average of the 1980 -1990 observations greater than the average of the 2000-2010 observations.
GDP	Country GDP
Manufacturing Growth	The percent portion of the manufacturing sector of an economy in 2010 less the percentage share in 1980. When measured in conjuncture with Natural Resources, the change of the share of the economy excluding Natural Resources is used in order to avoid direct endogeneity.
Services Growth	The percent portion of the service sector of an economy in 2010 less the percentage share in 1980. When measured in conjuncture with Natural Resources, the change of the share of the economy excluding Natural Resources is used in order to avoid direct endogeneity.

** All data from the World Data Bank

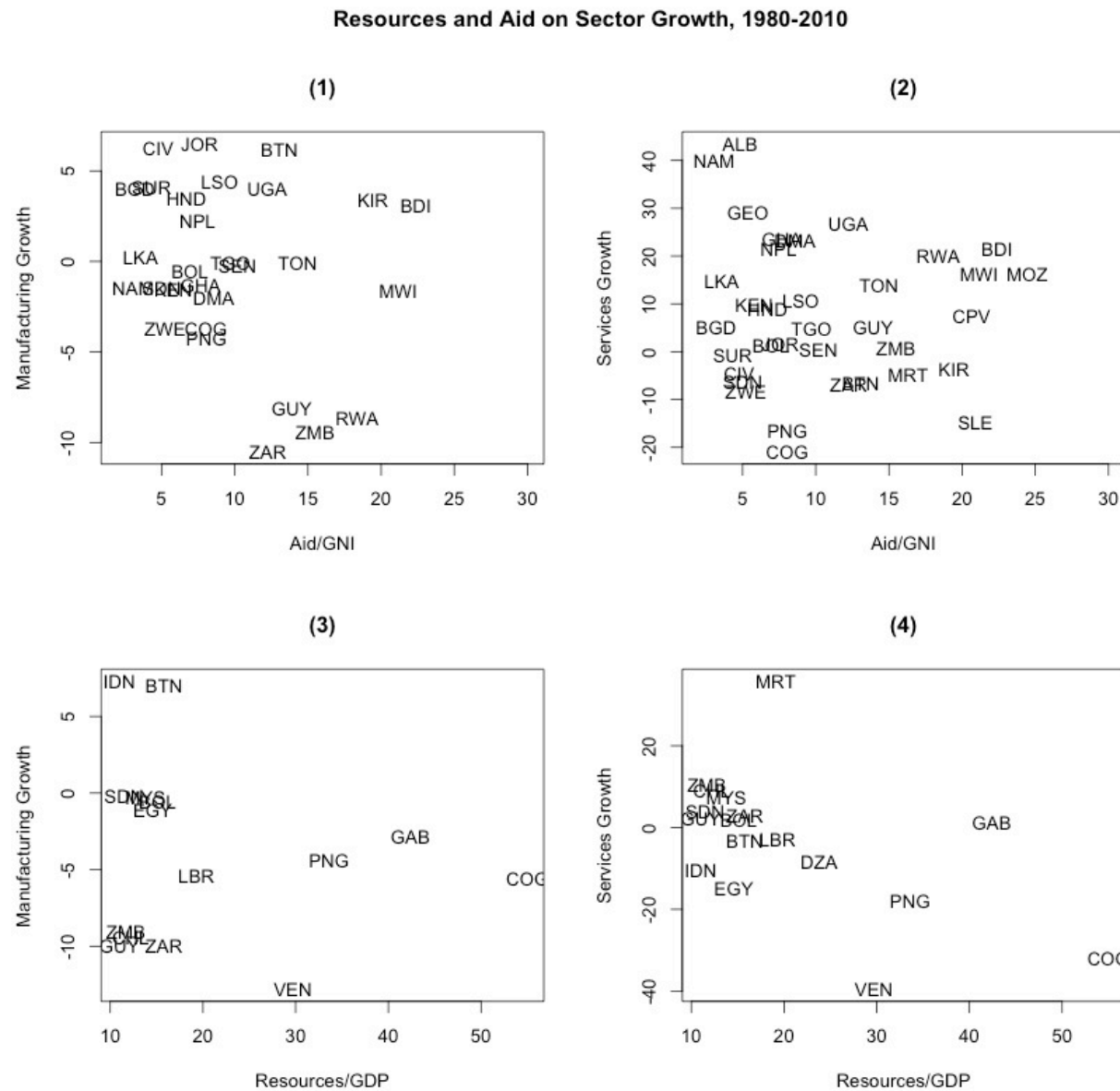
Table 5. Aid Dependent Countries, 1980-2010

<u>Country</u>	<u>Avg. Aid</u>	<u>Increase</u>	<u>Country</u>	<u>Avg. Aid</u>	<u>Increase</u>
Liberia	40.11	1	Togo	9.71	0
Guinea-Bissau	31.68	0	Guinea	9.37	1
Mozambique	24.45	1	Kyrgyz Republic	9.02	0
Burundi	22.38	1	Lesotho	8.97	0
Malawi	21.16	1	Dominica	8.58	0
Sierra Leone	20.91	1	Papua New Guinea	8.06	0
Cape Verde	20.64	0	Congo, Rep.	8.04	1
Kiribati	19.45	0	Ghana	7.68	1
Rwanda	18.36	1	Jordan	7.59	0
Vanuatu	17.59	0	Nepal	7.46	0
Mauritania	16.31	0	Tajikistan	7.27	0
Comoros	15.64	0	Bolivia	6.95	0
Zambia	15.49	1	Honduras	6.70	0
Mali	15.13	0	Mongolia	6.13	1
Tanzania	14.43	1	Kenya	5.80	0
Tonga	14.31	0	Armenia	5.59	0
Niger	14.01	0	Georgia	5.36	0
Guyana	13.91	0	Zimbabwe	5.24	1
Burkina Faso	13.39	0	Sudan	5.01	0
Bhutan	13.07	0	Albania	4.84	1
Central African Republic	12.31	0	Cote d'Ivoire	4.77	0
Congo, Dem. Rep.	12.25	1	Cameroon	4.49	0
Uganda	12.23	1	Suriname	4.32	0
Lao PDR	11.10	1	Vietnam	3.75	1
Ethiopia	10.96	1	Sri Lanka	3.57	0
Madagascar	10.82	1	Belize	3.35	0
Benin	10.29	0	Bangladesh	3.19	0
Senegal	10.19	0	Macedonia, FYR	3.11	0
Chad	10.05	0	Namibia	3.06	1

Table 6. Resource Dependent Countries, 1980-2010

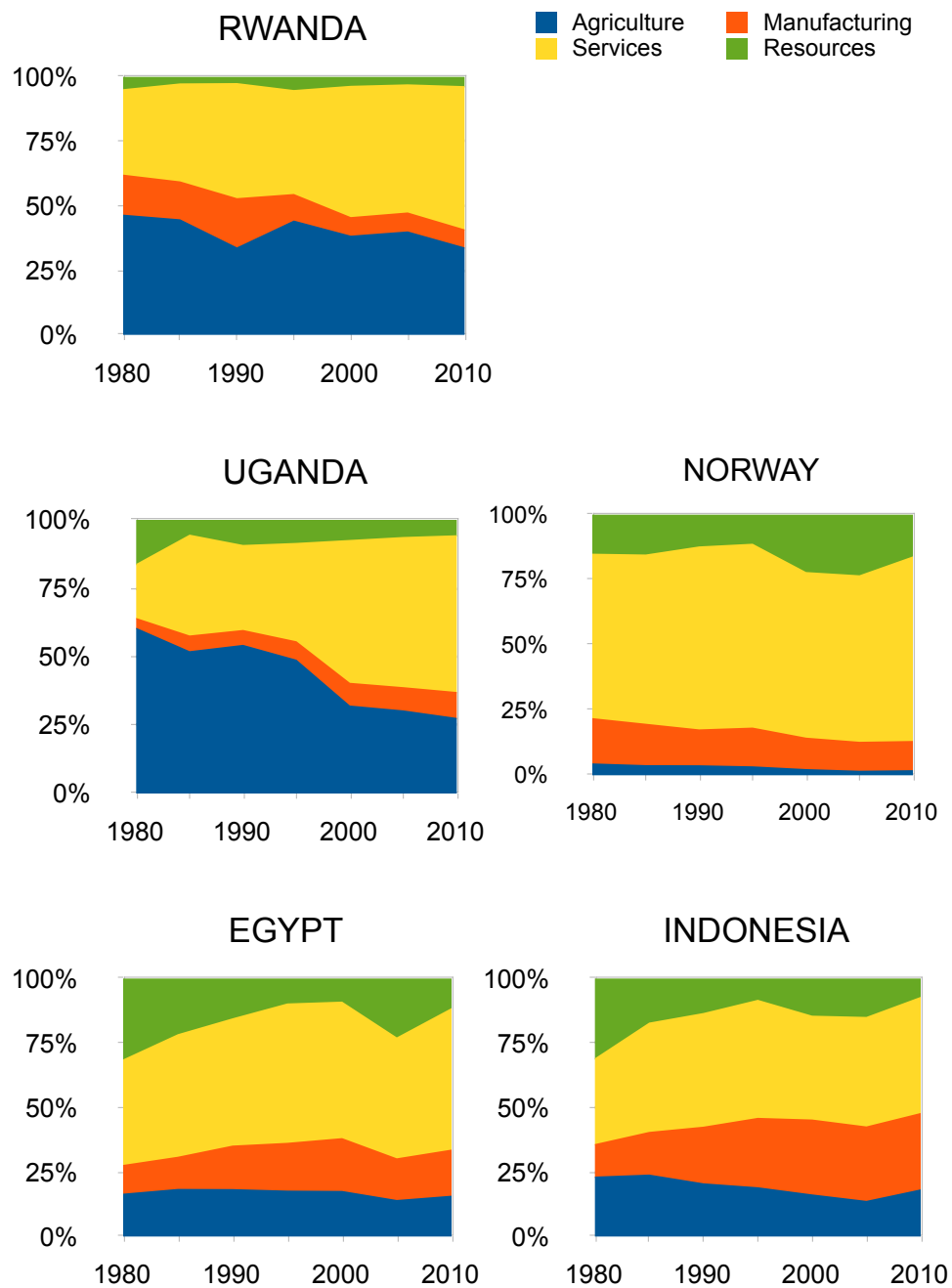
<u>Country</u>	<u>Res/GDP</u>	<u>Increase</u>	<u>Country</u>	<u>RES/GDP</u>	<u>Increase</u>
Congo, Rep.	55.0	0	Bhutan	15.8	1
Angola	47.1	0	Bolivia	15.1	1
Azerbaijan	46.5	0	Egypt, Arab Rep.	14.6	1
Saudi Arabia	44.4	1	Guinea	13.9	0
Gabon	42.4	0	Malaysia	13.8	1
Papua New Guinea	33.6	0	Mongolia	12.7	1
Venezuela, RB	29.7	1	Chile	12.2	1
Yemen, Rep.	29.6	0	Zambia	11.7	1
Iran, Islamic Rep.	29.3	0	Sudan	11.5	1
Chad	24.6	0	Guyana	11.0	1
Algeria	23.8	0	Indonesia	11.0	1
Syrian Arab Republic	21.6	0	Cameroon	10.8	1
Liberia	19.3	1	Vietnam	10.5	1
Mauritania	19.1	1	Burundi	10.0	1
Congo, Dem. Rep.	15.8	0			

Figure 3.



**Chart identical to Figure 3 displaying data points as country codes for country identification.

Figure 4.



** These charts illustrate sector movement across time (sectors normalized to add to 100%). Egypt and Indonesia both have solid manufacturing growth. Uganda has marginal manufacturing growth, but large service sector growth. Rwanda's growth is almost all attributed to services, what tiny portion of manufactures it did have has shrunk. Norway is a fully developed economy with a large service sector and significant resource levels.