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in the Nordic Model

Social Media
in the Middle East

SPRING 2017



EDITOR'S NOTE

True economic insight involves much more than applied mathematics and theorized models. It requires an innovative approach to synthesizing the world as we know it in order to quantify the world's problems and develop practical solutions. While numerous students studying economics, such as myself, are faced with demanding microeconomic and macroeconomic curriculum, we often overlook the relevance economics has to business, politics and society. With economic principles and modeling extending beyond academia, it is important to celebrate its ubiquitous nature in a rapidly changing world. As such, the Duke Business and Economics Review (DBER) aims to flush out the intersect of economics within business activity and management. For this edition, our team of editors at DBER have compiled cutting edge inquiries into topics relevant to workplace motivation, coal & energy, capitalism, quantitative easing, and social media. As a premier publication, we strive to continue educating our readers about cutting-edge techniques and trends found within business and economics.

Sincerely,

Alexander Thompson

DUKE ECONOMICS REVIEW

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THE STATE OF US COAL COMPANIES IN THE ENERGY REVOLUTION

JONATHAN SIROTA, TUFTS UNIVERSITY

EDITING BY ROBERT BAHNER

FOR US STAKEHOLDERS IN COAL, the last five years have been a cause for alarm. In 2015, US coal production reached low levels not seen since 1986, and US coal consumption declined 13.1% from the year prior (EIA, 2016). Consequently, the average number of employees in US coal mines decreased to their lowest levels in nearly forty years. The International Energy Agency has said that over the next five years, U.S. coal companies will continue to cut capacity to battle falling demand, a global oversupply and slumping prices (EIA, 2016). A report by McKinsey & Company is even bleaker, stating, “by 2020...demand for US coal [will be] at least 20 percent below what US mines currently produce” (Rehbach et al, 2015). Since the 2008 peak in coal prices, US demand for coal has decreased by 19% while production capacity has decreased by a smaller but still notable amount, resulting in significant price drops of 20-40% domestically and 60+% in exports (Rehbach et al, 2015). Figure 1 illustrates these decreases in US consumption and production.

While developing nations – such as

India and Indonesia – continue to rely on coal for a larger percentage of their energy use, the US is increasingly seeing a departure from coal in favor of oil, natural gas, and to a lesser degree renewable energy sources. In 2016, natural gas has overtaken coal in terms of domestic consumption for the first time, due to parity in prices from technological advances that have fueled the current boom in the shale industry (EIA, 2016). Most coal executives and investors tend to accept that their industry is a “sunset industry,” although they also generally say that this sunset will not appear until much later in the future (Beukel, 2016). They also tend to concede that, over time, the carbon budget for oil and gas will increase at the expense of coal (Beukel, 2016). ExxonMobile, in its report on energy outlook through 2040, projects zero growth in the use of coal worldwide. It projects the most growth in renewables, although it cites scalability, cost, and geographic dispersion as limiting factors in more expansive growth (ExxonMobile, 2016). Investors are responding to this reality, as evident by plummeting share prices for US market lead-

ers in coal production and energy generation through coal.

Needless to say, these top US coal companies, once kings within the commodities industry, have taken a beating. Indeed, three¹ of the top ten coal-producers have filed for bankruptcy in the last two years. Given the inherent risks of coal exposure — financial risk and environmental risk — some rightfully question if these coal companies are significantly overvalued. This paper will first briefly explain the traditional measures used to value a US coal company. After, it will examine major sources of risk for US coal companies that are usually not – but should be – considered and included in traditional valuations. Furthermore, an analysis of the top US coal-producers and energy generators will evaluate how investors have been responding to efforts by companies to diversify toward less risky renewable sources of energy. This paper will argue that, by ignoring the risks exposed to the coal industry, US coal companies may likely be overvalued. However, increased awareness of

¹ Peabody Energy, Arch Coal, and Alpha Natural Resources



these risks following the financial crisis in 2008-2009 has contributed to the historically low valuations of many of these companies. Additionally, it will argue that, despite the risks mentioned, US coal companies have the capacity to survive, mitigate several sources of risk, and even partially transform their business models in order to thrive in an age of energy transition.

Valuations of Coal Companies

According to Mark Kaiser, an energy specialist, US coal companies are valued based on cash flow and earnings (Kaiser, 2013). These two factors are determined from the quality of coal produced, coal prices, future production potential, and inventory of capital assets (Kaiser, 2013). Kaiser performs his own calculations of US coal company valuations, regressing market capitalization and enterprise value against reserves, reserve to production ratio, debt to equity ratio, and average coal selling price. The following equation illustrates this regression:

$$V = a + bR + c(R/P) + d(D/E) + e(\text{Price})$$

Kaiser's main conclusion is that enterprise value is most positively correlated with reserves and assets, and less so with production (Kaiser, 2013). Figure 2 displays the results of these regression outputs. As one might expect, valuation is positively correlated to reserves, assets, and production. A high reserves-to-production ratio indicates that production and cash flows are weighted to the future, and are thus negatively correlated with value (Kaiser, 2013). Kaiser does admit that his model is limited and that there could be other factors influencing valuation. Kaiser, like many others, considers only the financial status and operations of these companies. Financial risks and non-financial risks are ignored. Ignoring these risk factors has likely resulted in overvaluation of most US coal companies. To better understand how coal companies should be valued, it is necessary to anticipate all types of risk that might directly or indirectly affect the valuation, so that they can be appropriately considered in financial models. The next two sections will identify some of the major sources of financial risk and environmental

risk faced by the US coal industry.

Financial Risk

The most obvious financial risk to US coal companies is the supply/demand issue. This issue is severe and must be addressed if the industry wishes to raise prices, end loss-making operations, and increase profits. An analysis has determined that aligning supply with lower demand would require mine closures across all regions of the US coal industry, with the most closures taking place in the Powder River Basin region (Rehbach et al, 2015). Yet, US coal companies have problems that extend beyond macro-level equilibrium. Many coal companies have liabilities that far surpass assets and equity. Analysts at McKinsey have determined that, even after closing the gap in supply/demand, the coal industry would have remaining liabilities in excess of \$70 billion that would condemn the industry to "decades of loss-making operations" (Rehbach et al, 2015). In other words, current cash margins are unable to pay for today's level of liabilities. Figure 3 illus-

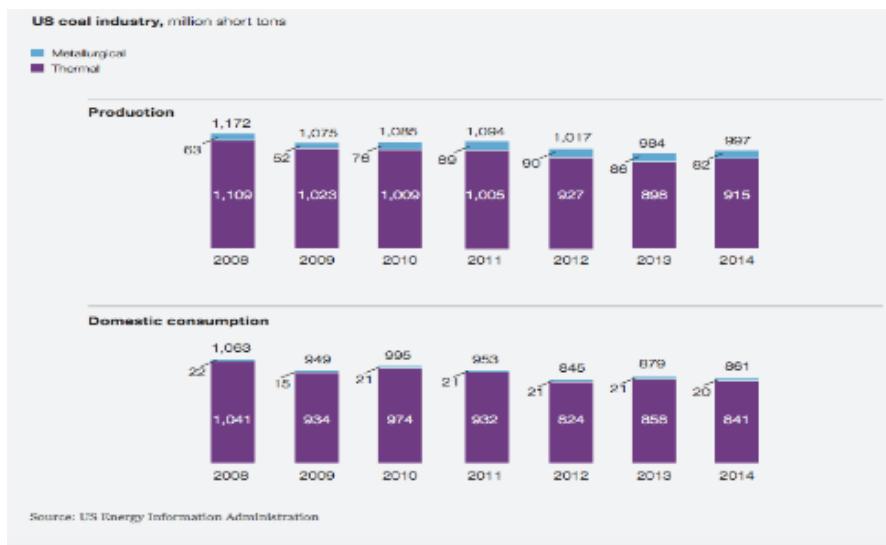


Figure 1: US consumption/production of coal yearly (McKinsey analysis)



trates McKinsey's estimates of the coal industry's liabilities.

Many coal executives may continue in "business-as-usual" mode, hoping that a rebound in the domestic or export market will spur revenues (Rehbach et al, 2015). This is a dangerous assumption to rely on, particularly in the short-term. As previously stated, domestic demand is continuously decreasing and supply is abundant; domestic coal use is unlikely to raise prices. Similarly, short-term US coal prospects in the export market do not look promising. Competitiveness from other exporters, including Indonesia, Russia and Australia, has meant US coal companies have lost market share. Last year, US coal exports fell 23% (EIA, 2016). McKinsey analysts predict an average yearly decrease of 50 million tons in lost seaborne thermal and metallurgical exports (Rehbach et al, 2015). Expectations of future decreases in net exports are widespread. Figure 4 shows the downward trend in US coal exports.

In order to reduce these massive liabilities, a major restructuring effort

would have to occur. This would mean shutting down less-profitable mines. However, most coal companies do not shut down their unprofitable mines because it costs more in the short-term to close a mine than to continue operations (Rehbach et al, 2015). Pressure from bondholders for continued payment on interest prevents coal companies from wanting to take an initial loss that might stress the bondholder (Rehbach et al, 2015). Thus, many mines operated by large US coal companies are "Zombie Mines": mines that "cannot turn a profit but are too costly to close" (Rehbach et al, 2015). As these zombie mines collapse under the weight of company bankruptcy, other parties would be left with the bill. Unable to maintain their soaring liabilities, many more coal companies may file for Chapter 11 bankruptcy, or they may even be liquidated and their creditors wiped out (Rehbach et al, 2015). These zombie mines, if they represent a sizable percent of total assets, may have serious repercussions on the valuation of these companies.

Additionally, there is financial risk

associated with the miscalculation of coal reserves. Coal reserves are often overestimated, due to a failure to "distinguish between physically available coal in the ground (the coal resource) and coal that can profitably and legally be produced and sold with societal acceptance (the coal reserve)" (Grubert, 2012). Not all coal in the ground is suitable for extraction. For example, coal with high sulfur content or coal that is discovered very close to populated communities is generally not extracted, but is still considered in the calculations of proven coal reserves (Grubert, 2012). This situation is not the case for oil and gas, where stringent SEC regulations have forced a "systematic under-reporting" of reserves (Grubert, 2012). The misreporting or inaccurate calculating of coal reserves that are actually suitable for future production has the potential to inflate valuation, depending on the scope of this issue. Indeed, Grubert contends that the political strengths of coal – its domestic abundance and low cost – are inferred from data that is "widely acknowledged to be of low quality" (Grubert, 2012). As

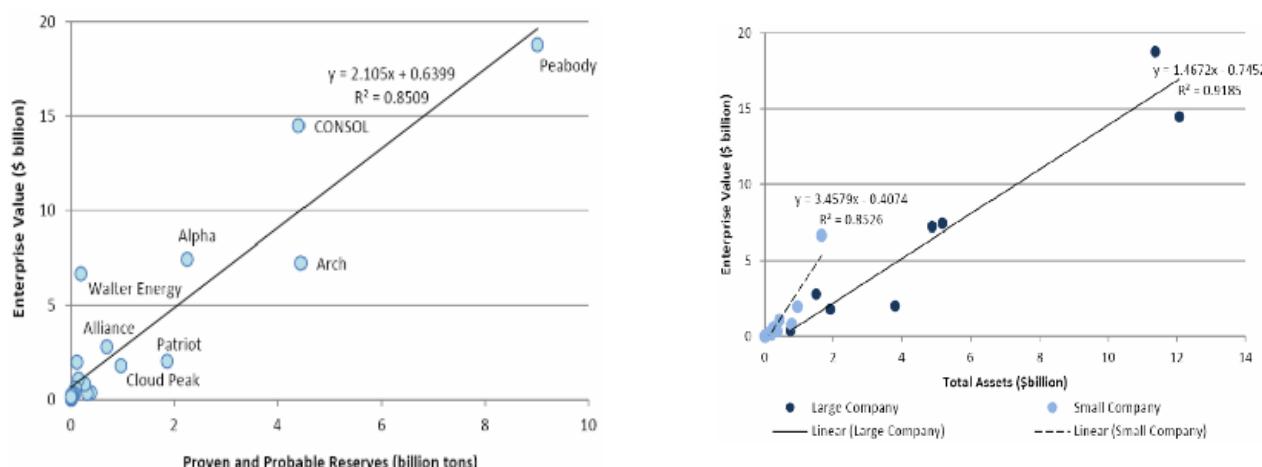


Figure 2: Kaiser's Regression Outputs



the flaws in these data are identified and corrected, it will pose financial risk in the form of decreased valuation to coal companies.

Environmental Risk

It is no surprise that many people tend to associate coal with “dirty” energy that significantly contributes to climate change through the emission of harmful CO₂ into the atmosphere. For years, climate scientists and environmentalists have generally accepted that the human species cannot afford to artificially raise the climate by more than 2 degrees Celsius. Carbon Tracker, an NGO of “financial specialists making carbon investment risk real today in the capital market,” first made this conclusion and it has since gained traction in the mainstream (Carbon Tracker, 2013). Most climate experts have agreed that, in order to achieve this objective, global greenhouse gas emissions have to be reduced by 40-70% by 2050 and carbon neutrality has to be reached by the end of the century (McGlade et al, 2015). According to the EIA, coal emits 2,249 lbs. per MWh of

CO₂ vs. 1,135 lbs. for natural gas and 1,672 for oil (EIA, 2016). Since coal emits the most CO₂ of any fossil fuel, it is naturally the most vilified. This idea alone poses risk to US coal companies as more investors begin to move away from coal investments and more companies pivot toward other sources of energy.

The most debated source of environmental risk for US coal companies among investors has come from the notion of the “stranded asset,” a term coined by the Carbon Tracker Initiative. As defined, a stranded asset is an asset that, for some reason, cannot be utilized. For coal, a stranded asset refers to proven reserves in mines throughout the world that have not yet been extracted and burned. The report, published in 2013, challenged the methodologies of credit agencies and company valuation specialists by arguing that these stranded assets are being hidden from investors and are not appropriately being considered (Carbon Tracker, 2013). It claims that 60-80% of coal reserves of publically listed compa-

nies must be considered “unburnable” if the world is to meet its goal of not exceeding global warming by more than 2 degrees Celsius (Carbon Tracker, 2013). A study by two prominent environmental economists backed the claim in an article in Nature, concluding that 82% of coal reserves must remain unburned in order to prevent catastrophic climate change effects (McGlade et al, 2015).

Many environmentalists, analysts and politicians have accepted the concept of the stranded asset, and have argued that the lack of consideration of stranded assets significantly overvalues a company’s share price. Most notably, President Obama in 2014 stated in an interview with the New York Times, “we are not going to be able to burn it all.” In 2015, the governor of the Bank of England, Mark Carney, told a room of insurance industry executives that most fossil fuel assets would be unrecoverable if the world was serious about limiting warming to two degrees Celsius (The Economist, 2016). If it is the case that a sizable portion of coal

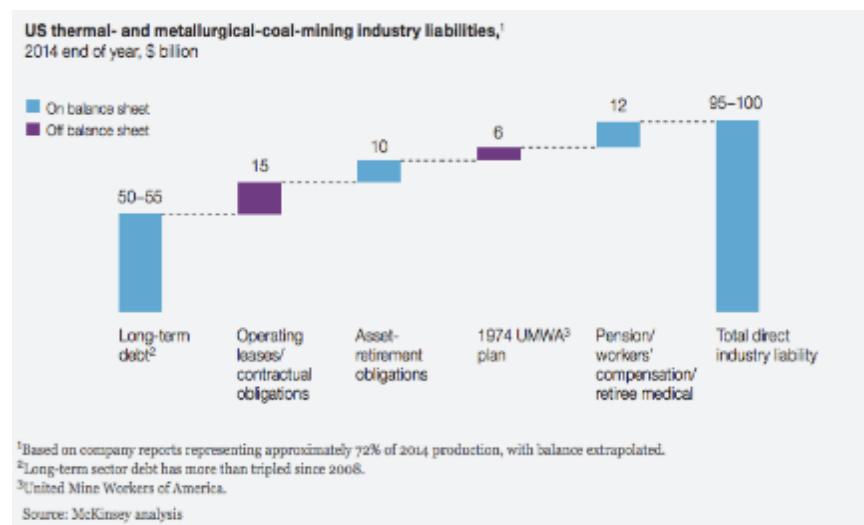


Figure 3: Coal Industry Total Liabilities (Mckinsey analysis)



reserves cannot be burned, it would have significant implications on company valuation, since fossil fuel company share prices are based on their entire proven reserves (Kaiser, 2012). Analysts in support of the stranded asset theory claim that, because stranded assets have not been fully considered in the share prices, US coal companies are particularly overvalued, contributing to a “carbon bubble” (Byrd et al, 2016). Supporters of this theory state that prices for these equities are too high, and that they are bound to collapse as increased awareness of climate change develops and outcomes of climate change are realized. If there is indeed a carbon bubble in prices, it could have disastrous effects for investors; exposure to fossil fuel companies consists of 11-19% of the S&P 500, and as much as 55% of the average pension fund (Byrd et al, 2016).

In response to the threat of a carbon bubble and environmental risk, a sizable divestment movement in the US has emerged, exposing US coal companies to reputational risk (Ansar et al, 2013). Reputational

risk arises as more people associate a company’s image with some negative consequence. In this case, divestments from fossil fuel companies by prominent institutions have led to significant reputational risk that ultimately decrease demand and lower prices. Bill McKibben, the author of the often-cited paper advocating for a major reduction in CO₂ emissions by 2050, has called for a fossil fuel divestment campaign (Ansar et al, 2013). A study, authorized by the Journal of Environmental Investing, sought to quantify reactions from investors about news related to divestment by measuring changes to positions held in fossil fuel companies in major indices (Byrd et al, 2016). It found that, for all fossil fuel companies, coal companies responded most negatively. This indicates a legitimate fear by investors related to reputational risk. This movement has thus far taken place primarily in religious and academic institutions, and has had a relatively small direct financial impact. Should it continue and grow, the movement could transform into direct financial risk as investor positions in the major

US coal equities decline.

According to analysts in the Stranded Asset Programme, divestment has the potential to translate from reputational risk into direct financial risk for coal companies, even if a very small portion of divestible funds is actually withdrawn (Ansar et al, 2013). This can happen through changes to market norms, constrained debt markets, or restrictive legislation. Changes to market norms may result from divestment outflows which “close off channels of previously available money” by influencing lead investors to redirect their money elsewhere (Ansar et al, 2013). This is already happening. JPMorgan Chase, a prominent investment and commercial bank, recently announced it would no longer finance new coal mines or coal-fired power plants. Instead, it is focusing on natural gas exploration and investment in alternative energies (Biesecker, 2016). A constrained debt market may mean a diminishing pool of debt finance and a higher discount rate. This would have a much higher effect on coal companies than on oil or natural gas

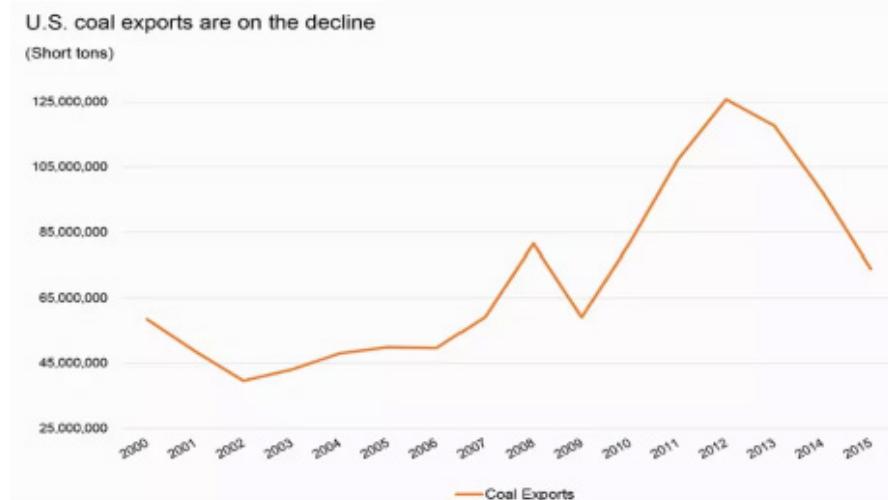


Figure 4: US exports of coal (Brookings analysis)



companies, since the US coal industry is more fragmented and less liquid (Ansar et al, 2013). And of course, stigmatization through reputational risk can often lead to legislation, such as a carbon tax, which would “depress demand...and increase the uncertainty surrounding the future cash flows [of coal companies]” (Ansar et al, 2013).

Understanding the Risks

To get a better understanding of the impact of these risks on the coal industry, this paper analyzes some of the largest US coal companies. This analysis seeks to uncover any commonalities among these largest coal companies between 2011 and 2015, looking at both coal producers and coal utility companies. Specifically, this paper explores whether producers and power companies have attempted to diversify their energy offerings away from coal and toward renewable energy sources in response to the growing risks associated with coal. Those companies that effectively diversify their energy offerings by investing in renewables should experience signifi-

cantly different returns than those that do not because renewables are considered to be relatively risk-free.

To explore this hypothesis, I gathered data on daily-adjusted close prices from Jan 1, 2011 to Jan 1, 2016 from the top eight publicly traded coal-producing companies and from two of the largest power companies with a majority of electricity generation coming from coal. I also gathered data from VanEck Vectors coal ETF (KOL), which “seeks to replicate as closely as possible, before fees and expenses, the price and yield performance of the MVISTM Global Coal Index (MVKOLTR), which is intended to track the overall performance of companies involved in coal operation (production, mining, and cokeries), transportation of coal, from production of coal mining equipment as well as from storage and trade.” For each of these companies and for the KOL ETF, I calculated the average logarithmic daily returns, and average logarithmic daily standard deviation and average logarithmic daily variance in close prices. To test my hypothesis,

I performed a difference-in-means test for each company against KOL. Since KOL’s holdings are meant to mimic the general performance of coal companies, those companies that have diversified their offerings should show a statistically significant positive difference in returns if it is indeed the case that investors see less riskiness — and thus have more confidence — in renewable energy. The results are shown in Figure 5 [note: results from average monthly returns yield similar results].

Of the ten companies in this sample, two can be said to have diversified their energy portfolio by making substantial investments in renewable energies: Duke Energy and American Electric Power. For example, in 2014 Duke Energy shut down two large coal-fired plants and replaced them with solar, wind, and nuclear plants (Hoium, 2016). American Electric Power has followed a similar strategy, investing heavily in nuclear, wind, and hydro technologies. And as the data illustrate, Duke and American Electric Power, despite long being consid-

Company	Average Return	Standard Deviation	Variance	t-value	p-value
Duke Energy	0.000410687	0.009489161	9.00442E-05	3.44323798	0.0006
American Electric Power	0.000548113	0.010499878	0.000110247	3.597246796	0.0003
Peabody Energy	-0.001693203	0.083630647	0.006994085	0.069306614	0.9448
Arch Coal	-0.002698632	0.092203881	0.008501556	0.442750072	0.6580
Cloud Peak Energy	-0.00191834	0.031633163	0.001000657	-0.38436353	0.7008
Alpha Natural Resources	-0.003940479	0.0437743	0.001916189	1.814588661	0.0698
Alliance Resource Partners	-0.000733537	0.018768715	0.000352265	1.093664097	0.2743
Westmoreland Coal	-0.000562848	0.036168541	0.001308163	0.849336512	0.3959
NACCO Industries	-0.000764346	0.038312616	0.001467857	0.640744662	0.5218
Consol Energy	-0.001486309	0.028937274	0.000837366	0.041679874	0.9668

Figure 5: Results from the difference-in-means test for each company against KOL (Sirota analysis)



ered two of the dirtiest power companies in America, have generated positive average daily returns with very low variance during a time period in which US coal company stock prices were nose-diving (Hoium, 2016). The other eight companies in this sample have not invested in renewable energy sources, instead continuing to acquire mines and expand their coal business (Consol Energy and Westmoreland Coal also have sizable natural gas production, so they are somewhat diversified in their energy products. However, natural gas production is subject to many environmental risks as well, including increased methane emissions and land and water contamination. A partial transition to natural gas production is unlikely to significantly change investor sentiments.). As the data show, this strategy has not been kind. These companies have not been able to generate positive returns nor have they been able to differentiate themselves from the declining coal industry as a whole. This preliminary analysis confirms the hypothesis that, even for the dirtiest coal companies that are exposed to many of the risks outlined in this paper, investing in renewables positively impacts returns.

Interestingly, Duke Energy and American Electric Power are both power companies, whereas the other eight companies are coal-producers. It appears that the major US coal-producers are not dedicated to investing in renewable energies, whereas some of the largest US power companies are interested in diversifying. This may have serious implications for the future of the US coal industry. Further analysis should confirm this trend and explore the reasons why the top pro-

ducers are not diversifying.

Addressing and Managing the Risks

Given these risks, one common conclusion is for “fossil fuel companies, particularly in the coal industry, to view their near-term cash flows as an opportunity to transition or diversify away from the assets and activities most at risk” (Ansar et al, 2013). While it is true that coal companies should make it their priority to adapt to the ever-changing environment, it is also worth considering that US coal companies have the capacity to either manage or avoid these major sources of risk, and that the US coal industry can continue to have a future, albeit a future much different than during the peak of mining prosperity.

First, it is necessary to address the financial risk of the company’s balance sheet. In the shorter term, it is likely that crushing liabilities, low demand and negative net exports will result in major financial hardship (Rehbach et al, 2015). However, the coal industry is not going to disappear; environmentalists and climate change advocates must concede that transforming the energy system takes time. ExxonMobile, along with government agencies, NGO’s, and other fossil fuel companies, projects that coal will still represent a sizable chunk of global energy through 2040 (ExxonMobile). Hence, those US coal companies that appropriately restructure and avoid crippling debt should see increased prospects in the longer-term. Although imports in the US are expected to decline, each year through the next decade will still require 665 million tons a year of

thermal domestic coal (Rehbach et al, 2015). And although net exports in the shorter term are expected to decrease, most analysts see net exports increasing by a substantial amount by 2035 (EIA, 2016). This is attributed to two reasons. First, developing nations with rising GDP growth will spur demand for coal. Second, the US will likely attempt to expand its exports of coal to countries with fewer restrictions on consumption as the US limits its own consumption (Riker, 2012). Ideally, this will lessen the negative impact on employment in the US coal sector from declining imports (Riker, 2012).

Second, US coal companies need to adapt to the new norm of decreased coal consumption by “expanding their businesses beyond coal mining into the downstream coal conversion business to include higher-value coal products and by-products” (Ahmed et al, 2014). Coal companies can do this by improving technology that significantly lowers negative environmental effects and improves efficiency. These technologies, already being researched through government-sponsored programs, focus on carbon capture, use and storage, coal gasification, combustion, and carbonization, among others (Ahmed et al, 2014). It is imperative that these companies develop so-called clean coal technology, which has run into several delays and obstacles (Biesecker, 2016). Developing these technologies would demonstrate to investors and the public the prospect for the continued use of coal in the new era of renewable energy.

Third, coal companies, policy-makers, and relevant stakeholders



should engage in honest conversations meant to alleviate environmental risk and address root causes. Data on reserves support the conclusion that “the core threat to the goal of holding anthropogenic temperature increase below the 2 °C target [for private sector activity] is not the exploitation of existing proved reserves, but in the continued exploration for and development of new ones” (Heede et al, 2016). In other words, one huge source of environmental risk for US coal companies is in how they choose to continue to explore for undiscovered reserves elsewhere, not in how they use their current reserves.

Similarly, US coal companies should convene with policy-makers to address a major source of reputational risk. Even though publicly-traded coal companies are most antagonized by the public, US investor-owned coal companies do not actually control most of the world’s coal reserves. An analysis by Heede and Oreskes found that, of the top forty-two investor-owned companies, top twenty-eight state-owned companies, and top eight nation-run industries, the investor-owned companies own only 4.8% of the world’s coal reserves (Heede et al, 2016). Indeed, government-run energy industries, mostly in Russia and China, control 38.9% of the world’s reserves of coal (Heede et al, 2016). To put this in another perspective, that 38.9% of reserves represents 67% of the remaining total carbon budget that climate scientists have determined can be utilized by the end of the century (Heede et al, 2016). Simply put, the largest US investor-owned coal companies are not the main contributors to pollution. Figure 6 confirms that,

compared to the impact of most state-run fossil fuel industries and the impact of most state-owned fossil fuel companies, the impact of investor-owned companies is relatively minor. And although US domestic environmental policy is certainly separate from the affairs of other nations, it is important to recognize that, even if all major US coal companies were to completely stop emitting, climate change issues would not cease; climate change cannot be prevented by focusing on private-sector companies alone.

Finally, more US coal companies should consider investing in renewables. This may take the form of acquiring companies that develop renewables-based technology, merging with major renewable energy developers, or investing in their own research and development. The analysis in this paper finds that US coal companies that invest in renewables can generate positive returns and dull the effects of coal-based risks even in the current anti-coal climate. US investment in renewable energies has outpaced investments in fossil fuels

for the last two years. Even more shocking, many of the largest investors of renewable energies are giant oil and natural gas companies (Biesecker, 2016). Given this trend, it is clear that those coal companies that do not follow the trend will likely be left behind.

Discussion

This paper has contributed to the literature by critiquing traditional valuations of coal companies, providing a condensed summary of the major financial, environmental, and reputational risks involved with the US coal industry, and stipulating some initial hypotheses regarding how US coal companies can combat these risks. Future researchers should attempt to consider these sources of risk in creating new valuation models for coal companies. It may be helpful to use the theoretical fundamental asset pricing model as a way to determine the fundamental value of these companies based on consumption patterns and expectations of future returns. It would also be valuable to expand upon this paper’s independent analysis of US

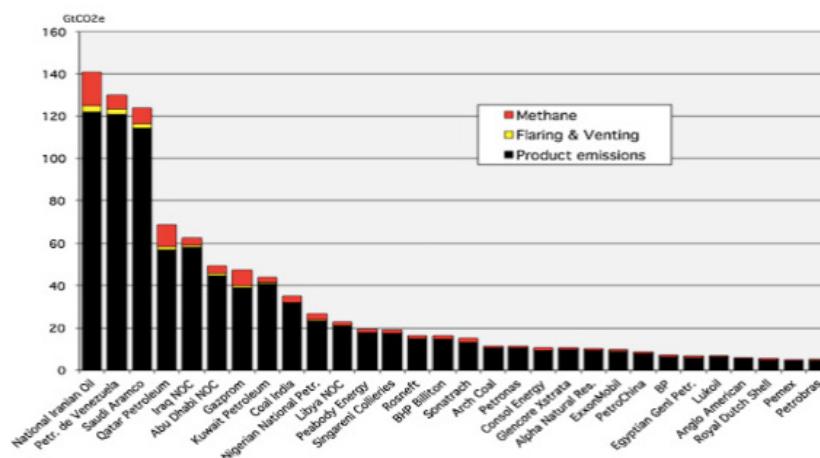


Figure 6: Highest contributors to negative emissions
(Heede et al analysis)



coal companies and further investigate the impact of renewable energy investment.

Valuation models for US coal companies, like the model by Kaiser, are not entirely accurate in that they do not consider all risks inherent in the US coal industry. Given the increasing financial, environmental and reputational risks that US coal companies shoulder, it is plausible to assume that these firms are incorrectly valued. The incorrect calculation of reserves and the lack of accounting for stranded assets could significantly lower current valuations, and current environmental and reputational risks likely place an additional drag on valuations. Yet, these companies are not destined for perpetually low valuations. On the contrary, these firms have the capacity to manage and mitigate risks. Considering the necessity of coal as a resource for the foreseeable future and the opportunity for companies to utilize their capital to make investments in advanced technologies and new sources of energy, there is certainly an argument to be made for these coal companies to restructure and rebound.

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Dan Ariely

How to Maximize your Time, Money, and Health. A Dan Ariely Lesson in Motivation

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EQUILIBRIA SAT DOWN WITH THE JAMES B. DUKE PROFESSOR OF PSYCHOLOGY AND BEHAVIORAL ECONOMICS AS WELL AS BEST-SELLING AUTHOR OF *PREDICTABLY IRRATIONAL* ABOUT HIS NEW BOOK, *PAYOUT*, AN INSIGHT INTO THE MECHANISMS BEHIND MOTIVATION AND WE CAN APPLY HIS INSIGHTS IN OUR EVERYDAY LIFE.

Q: What led to your transition from Predictably Irrational to Payoff? What was the different thought process between writing the two books?

A: Predictably Irrational is book of short stories, where each chapter is its own research based paper. For me, what's interesting about that book, is that even though it's an attempt to write about general social science, it's a very personal book. In it, I write about my injury and my past. Writing Predictably Irrational this way was not easy, because typically, you have a recipe for how to write social science books - distant and heavily research based. It's not like here's the places where it's painful and difficult and complex. I remember one time after Predictably Irrational, I sat on a flight

next to a woman who was so happy to meet me because she was diabetic patient and she had read Predictably Irrational. She told me she was debating with me, in her mind, whether she should install an insulin pump or not and she wanted to tell me her argument and find out whether I agreed with her. That was an incredible experience for me and it allowed me to be even more personal in the next book.

Payoff is a continuation of that personal evolution. I started Payoff not with having the research, but because I wanted to ponder my own peculiarity in a way that I did not know how to do in research. The reason for the whole book is the introductory chapter were I write about the very difficult case with a kid who was injured which was

difficult for me to experience and very difficult to write about. Throughout this process I stared wondering why I would seemingly willing put myself in situations where I suffer a lot and I so I did not know why and I decided to try and understand it. And the book has some research but more of it is contemplation rather than research which is very different for me. Payoff really an attempt to try and understand what are we really trying to accomplish in life. We think about the wright to be happy on one hand but so many of things that we think are meaningful don't fit with pursuing happiness - they fit with pursuing pain and miser and time commitment. So that's the conundrum I am trying to understand.

Q: Do you think ~something like that~



can be understood through research or is based on each individual experience

A: I think we can understand it in research but I think it is a very complex phenomenon so it will have lots of things to understand. If you say what drives us its competition and a sense of meaning, immortality and a sense were helping other people lots of things in motivational life. There is no simply answer like other papers I have delved into. Question of motivation is question of all of human behavior – it's going to be complex and difficult and multi-determined.

Q: How would you define motivation?

A: I think motivation is all the forces that compel us to take an action – it's whatever propels us forward. That for me is motivation. In Payoff, there's lot of things I didn't touch on – like boredom. Not wanting to be bored is really interesting if you think about it. When we think about equilibria, we think about a homostatic end. Boredom is really homostatic in its nature. There's no changes, but we hate it. And we actually want changes and stimulation to feel important. Anything that drives us to change our current state is motivational force.

Q: What do you think the purpose of science is in your work?

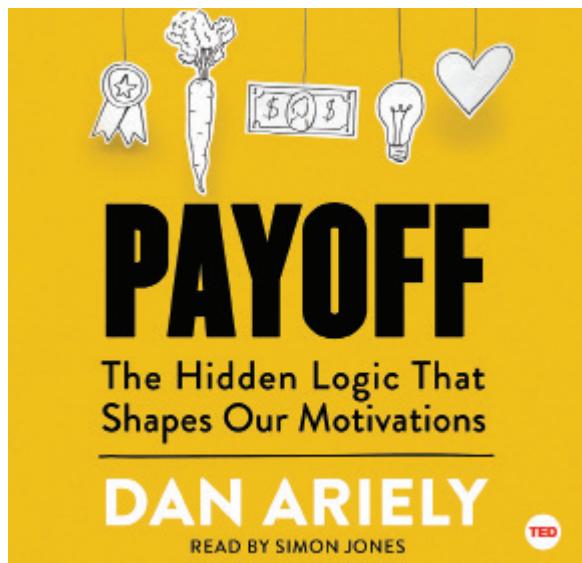
A: There are lots of ways to figure out what science is supposed to do. Part of it is just to understand. But my version of science is the one where you try to understand what we are not doing well in order to fix some-

thing. You look at how we mismanage our health and its very painful to see the human waste there. Motivation is one of those sources of waste. Imagine two universities, in one of them the students are motivated happy and healthy and in the other one there not. In that university the students are getting better achievements, they are learning more, their professors are happier, and their quality of education and impact on society is higher. In the other university, the students, the professors, and the education learnings are miserable. It's not a zero sum game. It's a thing in which everyone can benefit. If we take every situation, and make everyone more motivated, it would just have a tremendous impact on society. Whenever I see people being demotivated, its painful. It's something we should fix. We should first fix what we do to demotivate people. And then then we should to try and figure out how to motivate people. That's what science is to me.

Q: How can you unleash motivation in yourself? For instance, if I am a student, how can I motivate myself to study when there are so many other fun things to do at Duke? How can I choose to study over playing xbox?

A: For the different types of behaviors, different rules apply to. If you think about learning how to read, nobody enjoys the beginning. You just have to plow through it for six months and it gets better and then in a year you start enjoying yourself. If you look at an axis of enjoyment over time, it starts down low and gets worse and then

it starts improving and then at some point you learn how to read. So if you want to deal with reading, you say I should use an external motivation to plow through the first few months. If you talk about the complex issue between Xbox and studying, that's a more complex issue because Xbox will always be more fun. So in that, what you need to do is to find other motivations. So a motivation could be studying with other people. Its incredible how motivated we are by other people. We did a study a while ago in which we measured how easy it is to get people to exercise by meeting other people. You would think people exercise for their own helath. But no. if you made an appointment with another person for a walk you will show up. Our aversion of disappointing other people is more powerful than our interest in our health. So for studying, you could say, let me find group and make a commitment to the group as the motivator. It would not be the studying that leads to a degree and a better job but it will be about not disappointing my friends now. Another thing you could do is to reward yourself. You could say well I really like TV so let me do this: use TV as a reward. For example, I watch TV only when I exercise. Or sometimes I play squash from time to time. Chasing this little ball Is incredibly motivating. It's incredible because you create a challenge and a competition. Another thing you can use are rules. You can say, you wake up every day and for the first hour no email and no Facebook – only work. The rule is like your religion, it becomes structured into your life and you don't have to question yourself. One of the





things I do is when I come to the office is I make myself an espresso, and the first one of the day is extra special. I listen to the sound of the bean being grinded, I smell it and I come to the office and I put it next to my computer. I open the file that I want to work on today – the things I really want to work on. And I don't do anything else till I finish that first coffee. So I basically create a ritual for myself where I say I want to start the day working on the most important thing I want to do and I link it to something that I celebrate and enjoy.

Q: What about Duke makes it so special for you compared to other institutions?

A: So I came from MIT here because I wanted to be in a place that is more collaborative and multidisciplinary and I think were amazing at that. The other thing I love about Duke is that we are happy to explore new things. So we wanted to do this movie on dishonesty and we got full support from the university. We wanted to put a confession booth in the student center and we allowed students to reveal all kinds of things. Some of them, by the way, were just shocking, illegal, or immoral. It was just amazing. But also I'll give you another example. Our research center right now is focusing on how to help people make better financial and health decisions. A couple of years ago we wanted to invite startups to come up and hangout with us for the year. They are startups but they can learn from the research and we can learn from them. It took a couple of days to get it approved. There was basically no red tape and they said try it out. The lawyers by the way worked hard. Duke has a little equity in these companies but they were incredibly easy to work with. People behind the scenes were working very hard to make it work fast. And I really like this. Many years ago there was an ad by Avis, the car company, that says "we're the second, we try harder". And my sense is that Harvard and MIT are so secure in their place that they let the bureaucracy run the place. Whereas here we try new things all the time. Spring Breakthrough for example. What an interesting idea. Let's teach really long classes over six days. And when the provost Sally was proposing it wasn't clear about its nature and structure. We didn't have to submit a syllabus for approval by committee. There's very much the atmosphere here that if something sounds like a good idea, we don't want to commit to it

forever, but we certainly are willing to try it out. I feel tremendous trust and a desire for exploration from the campus.

Q: If you could give a piece of advice to the Dan Ariely that was in college, what would it be?

A: I started college when I was still in the hospital on and off and I had these pressure bandages that covered all my body. I had a on a shirt, gloves, pants, and a mask. The only things you could see were my ears, the holes for my eyes, nostrils - everything else was covered with this brown stuff. And I felt very isolated and uncomfortable with this and I wish I tried to be less alone in those areas on the social side. On the education side, I wish I worked with more faculty. I had one professor that I worked with on a research project but the gap between the student and professor seemed so big. But now, as a professor the gap looks smaller from my side than from the students. I think the professors are much more interested in actually letting students work with them, participate, be in in the lab. From the faculty side its much more of a big brother or parenting relationship than its seems from the student's perspective. So I wish I worked with more people because it's wonderful to go to good classes, but so many of the things you truly understand in a better way come through doing it with a world expert. So every time you're taking a class form a world expert, if you just take the class from them, it's a shame. But if you work in their lab even for just a semester and you learn how they take on the field, it's amazing.

Q: What do you think the next area of study is that you want to delve into?

A: So if I look at waste, and I think of the things we waste - there is of course actual waste like trash - I think we are wasting our time, our money, our health, and our relationships. For me those are the big four wastes outside of the physical waste. In relationships I particularly think about hate. And what I am trying to do - hate I don't know how to solve - but time, money, and health we can make dense into these problems. Can we solve healthcare? Of course not. We all age, there are people who want us to be unhealthy, there are people who want to help us, in short it's a very complex system. But can we improve it? Ab-

solutely. So I have changed my perspective to be about improving rather than solving. There's just lots of room for improvement. I try to improve on waste in both in terms of research and also as an entrepreneur. I previously had one start up that tried to help people manage their time better. We basically created the calendar after people told us what all they wanted to do and we put it in their calendar. Now on the health side we have two companies here that were trying to get people to eat healthy and adhere to their diet regimen in a better way. Most of the research here in the lab is around financial decision making.

Q: What is the next big thing? Are we out of big ideas?

A: Are we out of big ideas? I don't think so. I think that as technology changes the questions that come about are different. Texting and driving wasn't a problem ten years ago. Now a huge part of the mortality on the roads is related to texting and driving. We invented a certain technology and now we have to face a new reality that people can't divert their attention to it on the road. So I think as technology moves forward we discover more and more places where we're just not that good and we need to do something about it. There's a group here in the lab working on notifications. We know notifications have a cost but we're trying to understand how to meld them into our lives better. We don't want to eliminate them. So what is a good combination between being connected to the world but not having your attention hijacked continuously?



photo by Brad Montgomery

SPRING 2017 DUKE ECONOMICS REVIEW

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Evaluating Piketty's Laws of Capitalism in the Nordic Model

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"PRACTICAL MEN, WHO BELIEVE THEM-selves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist."

- John Maynard Keynes

ECONOMIC THINKERS ESPousing ALL sorts of ideologies and proposing all sorts of laws and general theories have had their historical highs and lows. Keynes was the leading proponent of big government in the first half of the twentieth century, but his premises collapsed with the stagflation that struck the global economy in the 1970s. After that came the notorious neo-liberals who thrived on the vestiges of botched Keynesianism. Finally, their trickle-down approach was struck a lethal blow with the advent of the 2008 financial crisis, after which both Keynes and Marx were resuscitated from dusty shelves and re-evaluated with a renewed interest. Amidst all this frenzy, one economist who worked diligently amassing data on inequality for years was brought into the limelight. The publication of Capital in the Twenty-First Century in 2012 propelled French economist Thomas Piketty into the center of economic debate. In this book, he develops a theory to explain the staggering rise in inequality since the 1980s. To support his premises, he quite boldly advances three laws of capitalism and gives them

the attribute of fundamental laws. Turning away from their econometric models for just a bit, the academic elite was dismayed at Piketty's audacity. How can we critically assess Piketty's laws of capitalism while taking countries built on the "Nordic model" as a guinea pig? This will be the purpose of this paper: Applying Piketty's so-called fundamental laws to evaluate the economics of the Scandinavian experiment with regards to questions of inequality, distribution, growth etc; and whether his model of inequality serves to paint the full picture or if it is lacking some key elements.

PIKETTY'S FUNDAMENTAL LAWS OF CAPITALISM

In his book, Thomas Piketty endeavors to explain the dynamics of inequality by presenting what he calls *fundamental laws of capitalism*. Piketty's first fundamental law of capitalism is mainly an accounting identity underscoring the importance of capital in a given country:

$$\text{Share of capital in national income} = r \times K/Y$$

Where r is the rate of return on capital and K/Y is the capital/income ratio. It is important to note, even if it might seem tautological, that the higher the share of capital in national income, the lower the labor share, and hence the greater the social di-

vide steered by this force of divergence. A report done jointly by the OECD and the ILO suggests that the labor share in G20 economies has been witnessing a worrisome and unprecedented downward trend, which is indicative of more rapid growth in labor productivity than in average labor compensation, and an increase in returns to capital relative to labor. An interesting case to look at in the Nordic framework is the post-war 'worker-dominated corporatism' in Sweden where prevailed "a cooperative corporatist system in the 1960s, but with a power balance (strong unions, seemingly forever-lasting Social Democratic Government) and distributive outcomes favoring workers over capital, as indicated by the five percentage point increase in labor's share over that decade." (Bengtsson, 2014). Starting 1980s and 1990s, trade union power in Sweden crumbled under the need to liberalize businesses in a globalization race and end the period of profit encroachment by the working class. Consequently, capital incomes and capital gains concentrated to top income earners have increased dramatically (relative to labor incomes) since 1980, contributing to increasing inequality (Bengtsson, 2014).

The second fundamental law of capitalism is a long-run equilibrium condition and relates the capital/income ratio to the ratio between the saving rate and the growth



rate:

$$K/Y = s/g$$

Piketty's premise is that the lower the growth rate and the higher the savings rate, the higher the capital/income ratio. In a slow-growth society, the more the citizens increase their savings, the more capital is accumulated relative to income in the long run, and this has important distributive implications, namely, increase in inequality. Looking at the data for the Nordic countries, we find average GDP growth rate in Denmark equal to 0.35 percent for the period 1991 until 2016 and the saving rate in the economy had an average of -0.4625 percent of household disposable income for the period 2008-2015 according to the OECD database. Following Piketty's logic, Denmark would have a low capital/income ratio (approximately, calculating an exact number would be futile especially that the periods do not fully overlap). In the fourth quarter of 2008, GDP growth in Denmark hit a low of -2.4% and the saving rate was at -3.7% (looks like the Danish population learned its Keynesian lesson and avoided the paradox of thrift?). These numbers would yield a capital/income ratio of 1.54.

In Finland, GDP growth rate averaged 0.52 percent from 1975 until 2016 with a saving rate averaging 1.925% of household disposable income (OECD database, appendix 3). In the first quarter of 2009, Finnish GDP hit a record low of -6.9 percent while saving rate was relatively high, reaching 4.2 percent of household income. A quick look at other G20 economies and their high saving rates would emphasize how low saving rates are in the Nordic countries. That is mainly due to the fact that taxation eats a big part of household income and since governments provide healthcare and education, people can devote a big chunk of their income to consumption since the safety net provided by the welfare state is almost all-encompassing.

According to Piketty, his third law of capitalism, $r > g$, is the central force of divergence explaining inequality in society. The implications of a return on capital greater than the growth rate are simple notion of savers with huge amounts of capital see their wealth increase at a faster rate than the growth of output and wages. This necessarily increases the capital/income ratio

disproportionately, at the expense of the labor share of national income, which is what Piketty's data on the first decade of the twenty-first century suggests. Another key implication of this fundamental law of capitalism is the fact that inherited wealth gains gargantuan proportions and perpetuates a non-meritocratic spiral of social inequality for generations. Whereas Denmark and Finland levy a 15 percent and 19 percent tax on inherited wealth, Sweden abolished its inheritance tax in 2004. Norway as well enjoys a zero percent tax rate on inherited wealth. This could have influenced wealth accumulation and the dynamics of inequality in opposite directions in each pair of Nordic nations. The trend of inequality in the 21st century, however, is upward sloping on a global level. The idea is to be able to pinpoint the causes and nuance between countries instead of falling into hasty generalizations generated by fundamental laws. As Acemoglu and Robinson pointed out: Piketty's laws largely "ignore the central role of political and economic institutions, as well as the endogenous evolution of technology, in shaping the distribution of resources in society" and instead focus on two single variables, the return on capital and the growth rate, and reduce the whole question of inequality to the sign of their difference: $r - g > 0$ is indicative of increasing inequality, $r - g < 0$ is indicative of decreasing inequality. For the rest of our analysis, we will be substituting Piketty's rate of return on capital for the interest rate determined by monetary policy in each of the Nordic countries in question.

Interest rate in Sweden is -0.5 percent for the first quarter of 2016 with a projected GDP growth rate of 2.8%. According to Piketty's fundamental law of $r-g$, Sweden must have low or decreasing inequality. Quite the contrary, according to the recent OECD data, "the growth in inequality [in Sweden] between 1985 and the early 2010s was the largest among all OECD countries, increasing by one third" (OECD, 2015). Norges Bank in Norway let interest rates hit a record low of 0.5 percent in March 2016 while the OECD growth forecast for Norway stands at 1.3 percent. Things aren't very different in Denmark where subzero rates are being used to stimulate growth, which stands low at a 0.4 percent rate.

Bank of Finland set interest rates at zero percent in March 2016 and its growth fore-

cast is expected to be around 1.1 percent GDP growth rate. These numbers, meticulously amassed from Nordic Central Banks and OECD forecasts, clearly point to $g > r$ which is a force of convergence according to Piketty's theory. However, as we have established before, there is a clearly observable global trend towards increased inequality – definitely to a lesser degree in Scandinavia – but one could argue that this is compatible with the Nordic model enjoying the lowest incidences of inequality in the world.

A NOTE ON NEGATIVE INTEREST RATES:

Additionally, it is useful to note that the ECB and national banks in countries outside the Eurozone have been struggling with persistently low levels of inflation threatening price stability and this could be of disastrous consequences for growth if not tackled appropriately and this is why we have witnessed policies of quantitative easing and very low, even negative interest rates. These are unconventional policies because, to put it quite simply, people get paid for borrowing and savers are penalized: in Denmark, households receive checks every month for their mortgages. How much this policy will succeed or fail causing asset bubbles is not within the scope of our analysis.

WHAT DOES THE NORDIC MODEL BRING TO THE TABLE?

A reputed haven for social equality and meritocracy, the Nordic model's success is a strong anti-thesis to Arthur Laffer's "Too much tax kills the tax". The Nordics have proven that the 'nanny state' (as neoclassicals like to call it) can actually succeed in every domain: "On any measure of the health of a society—from economic indicators like productivity and innovation to social ones like inequality and crime—the Nordic countries are gathered near the top" (The Economist, 2013). (See appendix 4). Even though it is notorious for being the offspring of the progressive left, with its big government and cradle-to-grave welfare services, the Nordic model nevertheless combines aspects of competitive capitalism while avoiding its crisis-prone, deleterious aspects. However, it is different from the standard mixed economies because it actually offers a well-functioning, non-bureaucratic public sector, vaccinated against the voracious worm of corruption and vested interests. Indeed, transparency is the key



ingredient in the Nordic recipe: official records are within everyone's reach, thus forcing governments to operate under their electors' careful scrutiny. Denmark, Finland and Sweden were the top three most transparent countries for 2015 according to Transparency International, with Norway coming fifth in the list. Transparency and the non-existence of rent-seeking behavior in government helped establish broad social trust; politicians are rebuked if they trade their bicycles for official limousines. This is to the credit of the Nordic model, because it can impose high taxes without causing tax evasion and capital flight – or at least not enough to break the system. Historically, Scandinavia has enjoyed liberal values early on: Sweden enshrined freedom of press as early as 1766 and starting 1840s worked to institutionalize meritocracy in top government jobs and civil service. A natural and expected corollary to all of this is the observed reduction in social inequality.

A LOOK AT SOME NUMBERS:

Nordic countries all have lower Gini coefficients than the OECD average of 0.31. (Appendix 1) Nevertheless, inequality has been on the rise, and this is apparent even in the reputed egalitarian havens of Scandinavia. A recent OECD data update on Sweden shows us that the richest 1 percent of earners saw their share of total pre-tax income nearly double, from 4% in 1980 to 7% in 2012. Including capital gains, income shares of the top percentile reached 9% in 2012. Obviously, these remain largely benign numbers, in fact they remain the lowest in the world, the Nordic countries do indeed live up to their reputation. It is worth noting, however, that the growth in inequality between 1985 and the early 2010s was the largest among all OECD countries, increasing by one third (Appendix 2).

Piketty's analysis points to a global trend towards deregulation at that time, which increased private wealth considerably, popularized by Thatcherism in the UK and Reaganomics in the USA, and this was a reaction to the stagflation of the 1970s. The fact that Nordic countries seem to follow a similar pattern and increased inequality does not however corroborate Piketty's laws of capitalism. The explanation that fits the Nordic case is partly due to the debt crisis that struck Nordic countries in the late 1980s and early 1990s, and forced governments to undergo financial deregulation to

alleviate the adverse effects of the crisis.

In Capital in the Twenty-First Century, Piketty uses statistical evidence to show that inequality significantly decreased with the advent of the two world wars, which contributed to the destruction of wealth and capital, and this is apparent in a pronounced fall in the capital/income ratio and a global trend towards less inequality. In 2014, Daron Acemoglu and James Robinson looked at the data for Sweden during the interwar and post-war periods and found it quite compatible with Piketty's claims. However, the Swedish fall in inequality cannot be traced back to Piketty's fundamental forces of convergence (namely, a decrease in $r - g$), and the fact that Sweden was neutral during both wars contradicts Piketty's claims. According to the co-authors, "the [Swedish] story of inequality seems related not to supposed general laws of capitalism and changes in r and g , but rather to institutional changes." Indeed, we can link the decrease in inequality in the early twentieth century to an increase in the Swedish government's role in redistribution, from barely any intervention and taxation in the 1910s (Lindert, 1994), to a tremendous rise in top marginal tax rates to 40 percent by 1930 and 60 percent by 1940 (Roine, Valchos and Waldenström, 2009, p. 982). The Leviathan government in the making that had progressive taxation as ammunition definitely had more to do with the decrease in inequality than Piketty's laws would suggest. The important role of labor market institutions in Sweden might have also played a role since, as Acemoglu and Robinson showed as well, union density rose rapidly from around 10 percent of the labor force during World War I to 35 percent by 1930 and over 50 percent by 1940. "Piketty et al. focus on wealth destruction during the wars as a cause of decreased income concentration. But we see the same equalization of incomes after the First World War in non-belligerent Sweden and, as Prados de la Escosura shows, in Spain which also stood outside of the war, and I would argue that the decrease in inequality was rather caused by the labor mobilization and pro-worker reforms of that time rather than by the war itself" (Bengtsson, 2014).

CONCLUDING REMARKS

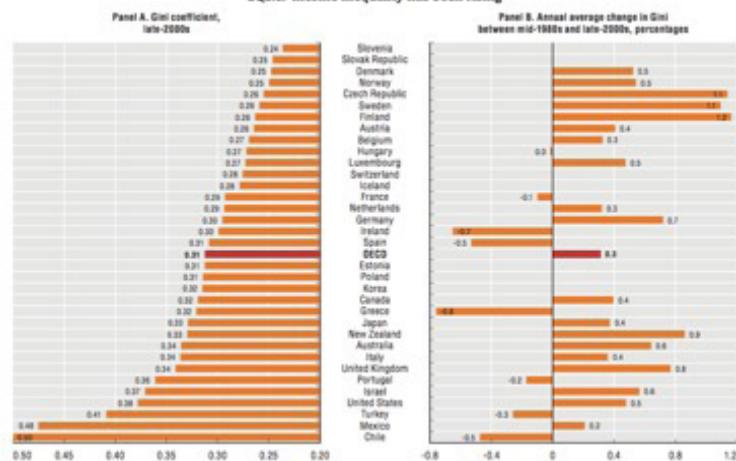
In short, although Piketty's laws have a very appealing theoretical framework, in practice they fail to capture the whole picture

because there are deeper structural factors that account for the tale of inequality than Piketty's reductionism seems to stipulate. In the case of the Nordic model specifically, these countries have a long history with espousing liberal ideals, as well as a very high social trust in institutions and government bodies. In part, this is why their high-tax social welfare model works, and this is why they have some of the lowest Gini coefficients in the world.





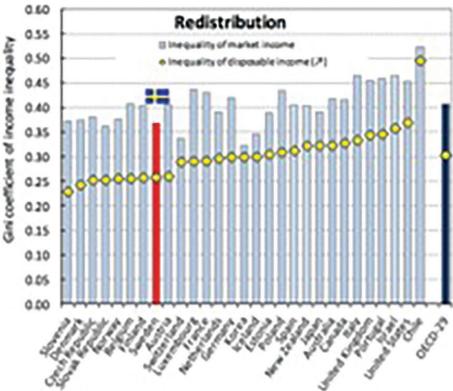
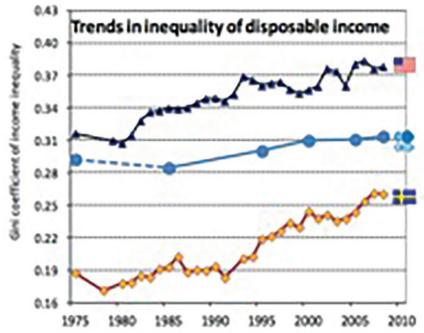
EQ1.3. Income inequality has been rising



APPENDIX 1

Society at a Glance 2011: OECD Social Indicators © OECD 2011

APPENDIX 2



Notes: The Gini coefficient ranges from 0 (when all people have identical incomes) to 1 (when the richest person has all the income). Market incomes are labor earnings, capital incomes and savings. Disposable income is market income plus social transfers less income taxes. Incomes are adjusted for household size. Data refer to the working-age population. Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

APPENDIX 3

Household saving rates - forecasts

Percentage of disposable household income

	2008	2009	2010	2011	2012	2013	2014	2015
Net savings								
Australia	7.0	10.9	10.1	11.8	11.3	12.4	9.8	9.3
Austria	11.5	11.2	8.9	6.7	7.4	6.6	6.7	6.9
Belgium	11.5	13.2	9.9	8.4	9.6	9.9	10.1	10.1
Canada	4.0	5.3	4.3	4.4	5.0	5.2	5.0	5.1
Czech Republic	4.8	6.8	6.2	5.1	5.9	5.9	5.2	6.0
Denmark	-0.7	0.1	0.0	0.7	-0.7	-0.1	-0.2	0.2
Estonia	-4.1	4.7	4.4	6.0	-1.1	-0.5	0.3	0.1
Finland	-0.3	4.2	3.6	1.3	0.9	1.9	2.1	1.7
Germany	11.5	10.9	10.9	10.4	10.3	10.0	9.9	9.7
Hungary	2.7	4.8	5.4	5.4	1.9	4.0	5.4	5.1
Ireland	3.7	9.8	7.0	5.6	5.2	5.1	5.0	5.2
Italy	8.5	7.1	4.9	4.3	3.6	4.9	5.2	5.1
Japan	0.4	2.4	2.0	2.7	1.3	0.9	0.6	0.6
Korea	2.7	4.9	4.7	3.9	3.9	5.1	5.2	5.3
Netherlands	5.9	5.6	3.3	4.9	4.1	5.1	6.0	6.2
New Zealand	-1.9	0.2	1.0	0.4	-0.7	-0.2	0.2	-0.2
Norway	3.7	6.9	5.6	7.2	8.1	8.0	9.2	9.2
Poland	-0.3	6.9	6.1	-0.2	2.6	-0.5	1.6	2.1
Slovak Republic	0.9	1.6	5.3	4.2	3.0	3.0	3.0	3.0
Slovenia	8.6	8.0	6.1	5.2	4.7	7.2	7.2	7.4
Sweden	9.0	11.0	8.3	10.4	12.2	12.2	11.9	11.5
Switzerland	11.7	11.4	11.4	12.8	13.3	13.3	13.1	13.4
United States	5.0	6.1	5.6	5.7	5.6	4.5	4.1	4.0
Euro area (15 countries)	9.3	9.9	8.5	8.0	7.5	7.8	7.9	8.0
Gross savings								
France	15.6	16.4	15.9	16.1	15.6	15.6	15.7	15.6
Portugal	7.1	10.9	10.1	9.7	12.0	12.6	11.3	10.1
Spain	13.7	17.8	13.9	12.7	10.4	12.4	10.7	10.3
United Kingdom	2.2	7.0	7.3	6.7	7.3	5.1	3.9	3.3

Last updated: 4 June 2014; disclaimer: <http://oe.cd/disclaimer>
Note: For more information, see OECD Economic Outlook Sources and Methods (<http://www.oecd.org/eco/sources-and-methods.htm>).
Source: OECD Economic Outlook No. 95 (database)

Top of the class

2012 index rankings

Overall rank*	Country	Global competitiveness	Ease of doing business	Global innovation	Corruption perceptions	Human development†	Prosperity
1	Sweden	4	13	2	4	10	3
2	Denmark	12	5	7	1	16	2
3	Finland	3	11	4	1	22	7
4	Norway	15	6	14	7	1	1
5	Switzerland	1	28	1	6	11	9
6	New Zealand	23	3	13	1	5	5
7	Singapore	2	1	3	5	26	19
8	United States	7	4	10	19	4	12
9	Netherlands	5	31	6	9	3	8
10	Canada	14	17	12	9	6	6
11	Hong Kong	9	2	8	14	13	18
12	Australia	20	10	23	7	2	4
13	Britain	8	7	5	17	28	13
14	Germany	6	20	15	13	9	14
15	Ireland	27	15	9	25	7	10

Sources: World Economic Forum; World Bank; INSEAD and World Intellectual Property Organisation; Transparency International; UNDP; Legatum

*Based on equal weighting of indices †2011 ranking



To Be Made Sick by Medicine

Quantitative Easing and Inequality After the Financial Crisis

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DURING THE GLOBAL FINANCIAL CRISIS, central banks attempted to counter the economic downturn by reinforcing their conventional policy toolset with an extensive range of unconventional monetary policies. Paramount amongst these policies was Quantitative Easing (QE), which involves the creation of electronic money to conduct large-scale asset purchases. QE has been accused of increasing economic inequality from multiple political standpoints. By analytically weighing QE's effects on different groups of households, this paper attempts to establish whether the Federal Reserve System, the European Central Bank and the Bank of England fostered income and wealth inequality during the post-crisis period in the areas under these institutions' purview. Before proceeding with this analysis, this paper also outlines the interplays existing between inequality and conventional monetary policy to counter central bankers' established view that inequality should be considered an irrelevant by-product of their policy choices. When looking at QE, this paper argues that this policy fostered a divergence between the relative performances of financial markets and the rest of the economy, which consequently increased inequality. QE was designed with a bias towards effectively supporting financial markets, on which few wealthy households depend. As the benefits accrued by financial markets did not trick-

le-down; this policy was relatively ineffective at supporting the rest of the economy, on which the majority of households rely.

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I. Introduction

"There are 1011 stars in the galaxy. That used to be a huge number. But it's only a hundred billion. It's less than the national deficit! We used to call them astronomical numbers. Now we should call them economical numbers".

- Richard Feynman – Nobel Prize in Physics (*The Economist* 2011)

One may not have to search afar to find examples revealing the monumental scales to which economists have become accustomed. Beyond national deficits, the

cumulative number of United States (US) dollars, pounds and euros injected into financial markets by the Federal Reserve System (Fed), the European Central Bank (ECB) and the Bank of England (BoE) to revive their respective economies following the Global Financial Crisis was on the scale of trillions, thus 1012. Amidst the crisis, central banks reacted rapidly to counter the downturn by utilizing a wide range of conventional and unconventional monetary policy (UMP) tools. In turn, the three central banks under study established two historical records: one for reaching their lowest interest rate levels and the second for expanding their balance sheets in previously unseen ways in absolute terms (Haldane 2014:3). The principal cause of the second record and the most noteworthy policy carried out by central banks during this period has been the so-called Quantitative Easing (QE); a perplexingly cryptic term commonly defined as central banks' creation of electronic money to conduct large-scale asset purchases within financial markets (Bean 2014:2). The rationale for QE's implementation was that markets needed to be stimulated further relative to what could be achieved by using solely conventional monetary policy, which, as Section III will explain, had become almost impotent when interest rates approached the zero boundary.

While QE was intended to spur economic



growth and inflation, its implementation has sparked numerous fears. Amongst these, inequality has gained a prominent stance as central bankers have been challenged for potently intruding into the world of redistributive policies, theoretically confined to democratically appointed fiscal policymakers (The Economist 2015b). Critics from a wide political and national spectrum have blamed the officials at the helm of central banks of unintentionally, yet decisively enhancing the pre-existent historical trend of rising inequality by favouring the recovery of financial markets and by failing to generate an inclusive growth path (Bernanke 2015; Wolf 2014:375). QE's disparate opponents have included central bankers such as Kevin Warsh who has accused the Fed of operating a "reverse Robin Hood" policy to enrich wealthy financial asset owners, left-wing politicians such as Jeremy Corbyn who has campaigned for a more egalitarian form of QE in the United Kingdom (UK), as well as right-wing politicians such as Mitt Romney who has argued for an auditing process to reconsider central banks' independence (Bivens 2015b:2; The Economist 2015b).

As Atkinson (2015:1) explains, the topic of inequality has been "at the forefront of public debates", while also gaining a "priority" status within the agendas of policymakers in most developed countries. One should note that inequality is a broad concept whose relevance varies according to the ways it is defined and measured (Wilkinson and Pickett 2010:17). Nonetheless, inequality has been pushed at the centre-stage of policymakers' agenda, especially in the US and UK, due to its dramatic rise since the 1980s in terms of the two most widely used metrics: income and wealth inequality (Giles 2015; Wilkinson and Pickett 2010:239). The former looks at the distribution of incomes and the latter at the distribution of assets within a population (IPS 2016). Income inequality in the US, for instance, has reached unprecedented levels since its first known records, as the richest one percent have accrued sixty percent of the total increase in gross domestic product (GDP) between 1977 and 2007, while leaving approximately ninety per cent of the population with close to stagnant wages (Piketty 2014:297; Stiglitz 2013:4).

Despite inequality's rise, economists have generally ignored this topic in studies conducted during the second half of the twen-

tieth-century (Atkinson 2015:15; Rajan 2010:18). As Bauman (2011:9) declares in his book *Collateral Damage*, inequality has repeatedly been "relegated to the status of 'collaterality'", implying that this phenomenon is considered a marginal side effect of achieving the relatively more important ends which monopolize economists' mental bandwidth. Amongst these, economic growth has dominated to the extent that, according to Kuznets's theory, income inequality was expected to decrease as a country reached its later stages of development where "growth is a rising tide that lifts all boats" (Piketty 2014:16). Furthermore, economists have faithfully upheld the view that efficiency and equality are mutually exclusive, and hence attempting to resolve inequality through redistributive policies would necessarily require sacrificing the efficient outcome generated by the market, while also altering individuals' future incentives (Claeys et al. 2015:2). However, in the past few decades, Kuznets's predictions have failed to materialize and the trade-off between equity and efficiency has been deemed less straightforward as empirical research has demonstrated that high levels of inequality may in fact cripple efficiency and, more decisively, economic growth (Deaton 2015:966). Additionally, the list of adverse consequences of this phenomenon has drastically extended to include a variety of social backlashes such as higher levels of crime, a lack of social cohesion and a greater incidence of health-related problems (Wilkinson and Pickett 2010:4). More recently, as this paper will observe in Section II, inequality has been rounded up in the lengthy line-up of factors accused of provoking the Global Financial Crisis (Blyth 2015:22).

In turn, this paper analyses whether QE's attempt to inhibit the crisis played a role in increasing inequality. This paper focuses on both wealth and income inequality, and these two concepts are used interchangeably due to the presence of a strong overlap between QE's effects on income streams and asset prices. To begin with, Section II of the paper delineates the age-old debate on the relationship between conventional monetary policy and inequality to establish whether there is a relevant interplay between the two. Section III then proceeds to explain the underlying problems that led to the implementation of UMPs and outline QE's core characteristics. Section IV

disentangles the complexity behind QE's processes to determine whether this policy has been a "reverse Robin Hood" privileging wealthy financial asset owners over the rest of society. This paper argues that QE's bias towards supporting financial markets relative to the rest of the economy determined its responsibility in increasing inequality during the post-crisis period and eclipsed the offsetting impacts of its weak equalizing channels. Additionally, as the Fed, ECB and BoE have implemented different forms of QE in different economic environments, Section V adds to scholarly work on the topic by explicitly comparing how these differences shaped inequality in unique ways. Finally, Section VI briefly underlines the potential alternatives to QE.

II. Interplays between Inequality and Conventional Monetary Policy

A. Narrow Mandates

During the past few decades, independent central banks pursuing price stability have become globally pervasive. Central banks' independence originates from the theoretical understanding that politicians have a tendency to have time-inconsistent preferences due to their inability to commit to a firm policy stance. Consequently, this unreliability engenders markets' mistrust and an inflationary bias, which may only be contained by a politically sheltered technocratic authority (Barro and Gordon 1983; Kydland and Prescott 1977; Rogoff 1985). While empirical studies demonstrate the presence of a strong negative correlation between the degree of central bank independence and average inflation, in a field antipathetic to silver bullets, the separation between politics and monetary policy is a necessary, yet insufficient, condition for price stability, and even less so for growth (Jàcome and Mancini-Griffoli 2014). In fact, central banks' own credibility also decisively defines the markets' expectations. As argued by Jacomè and Mancini-Griffoli (2014), this credibility stems from three essential qualities: "a clear monetary framework", "central banks' successful track record" and "accountability". Since the early 1990s, the prioritization of these qualities has culminated in the widespread adoption of explicit inflation targets (Roger 2010). Within this framework, medium-term inflation targets concede a degree of flexibility allowing for the promotion of growth in



the short-term (Meyer 2001). Nevertheless, central banks' actions are predominantly restricted by their legal commitment to undertake a hierarchical mandate within which inflation has an absolute priority, or a dual mandate, as in the Fed's case, which implies that both maximum employment and inflation are targeted. The confinement of central banks' objectives to narrow targets lessens the arduousness of achieving credibility in the face of trade-offs, competing governmental institutions and limited policy tools (Meyer 2001). As narrowness and credibility remain interconnected, central bankers have been unwilling to broaden their targets beyond inflation and unemployment (Georgsson et al. 2015:24).

While reductionism is a central trait of neoclassical economic thought, inflation's close to absolute monopoly has repeatedly been challenged for being characterized by a narrowness bordering on a counterproductive insularity. Blinder (1988:51), for instance, explains that "inflation, like every teen-ager, is greatly misunderstood" as its sacred status emanates from the scars of past hyperinflations, which may be deemed archaic and unsubstantiated in the face of the relevant setbacks that low inflation policies may generate for variables ranging from unemployment to growth and, as this paper will argue, inequality. Similarly, Stiglitz (2013:257) argues that the adherence to the price stability creed derives from Milton Friedman's powerful monetarist ideology delineating monetary policy's inability to boost growth in the long run. Even though monetarist mandates have perished, this creed has persisted thanks to an amalgamation of factors including the financial sector's "obsession with inflation" and its ability to foster policymakers' own distaste of this phenomenon through a methodical "cognitive capture" (Stiglitz 2013:261). The exposure of these fault lines, amongst others, has sparked a set of proposals to alter policy mandates through measures ranging from a confined modification of the target itself by allowing for higher inflation levels to a complete reconfiguration of their nature by using nominal GDP targets (Ball 2014; Cooper 2014).

This fresh breeze of change has rarely entered inequality's domain, as central bankers have customarily taken cover by neglecting equity concerns to remain in line with their mandates' rigid narrowness (Mersch 2014).

To understand central bankers' claim of alleged objectivity in the face of inequality, it is essential to distinguish between policies operating through inter-temporal and intra-temporal redistributions. Modern central banks' conventional policies affect the economy by adjusting short-term interest rates, which in turn determine the incentives to save, borrow and invest. Lowering short-term interest rates, for example, promotes a substitution of future spending for current spending by increasing the markets' incentive to borrow and decreasing their incentive to save, thus generating an inter-temporal or so-called "vertical" redistribution through time (Cœuré 2013). As Cœuré (2013) explains, the intra-temporal or "horizontal" distribution of income between individuals at a fixed period, on which inequality depends, is currently labelled as "a side effect of a strategy which aims at ensuring price stability". Consequently, progressing into a discussion on QE and inequality would be classified as a relatively futile task according to this "collateral damage" criterion. Nonetheless, this paper will begin by presenting a case for the relevance of inequality in monetary policy debates by demonstrating that there exists a strong interplay between inequality and monetary policy since not only do central bankers' goals influence inequality, but also inequality may powerfully challenge the attainment of these same goals.

B. Inequality's Impact on Monetary Policy

The relationship between monetary policy and inequality has visibly resurfaced as a theme of speeches given by renowned central bankers such as Cœuré (2013), Mersch (2014), Haldane (2014), Carney (2014), Yellen (2014) and Bullard (2014). This apparent craze has not only been driven by the rise of intranational inequality *per se*, but rather, this concept has surfaced in central bankers' conscience due to mounting evidence of a positive correlation between crises and inequality (Moss 2010). Rajan (2010:9), for instance, anecdotally argues that stagnant wages amongst lower-income households have repeatedly encouraged governments' conscious or unconscious support of mortgage markets as a form of bipartisan redistribution, consequently generating perilous credit booms. Additionally, transcending potential accusations of illusory correlation, Kumhof and Rancière (2010:3) empirically test Rajan's hypothesis

by looking at the pre-crisis period and confirm that feeble wage growth amongst the lowest income deciles of the US forced certain households to increase their exposure to debt to unsustainable levels to keep their consumption paths stable. Consequently, as many central banks have acquired more explicit responsibilities to sustain financial stability following a set of post-crisis reforms, monitoring inequality has become part of their own interests (White 2012:36).

Beyond its implications on financial stability, inequality has also been burdened with a plethora of other economic responsibilities specifically relevant to monetary policy. With multiple caveats, an abridged list includes factors such as weaker growth, higher inflation levels, even in the face of independent central banks, as well as the extreme responsibility of causing a loss of cognitive power amongst poorer households, with implications on economic productivity (Cingano 2014; Dolmas et al. 1997; Haldane 2014:6). Conforming to its pariah status, as Raskin (2013) argues, inequality may also have "clogged some of the channels through which monetary policy traditionally works" by depressing demand when central banks may want to foster it, as low-income households, who tend to spend relatively more than high-income households, have lost ground (Skidelsky 2011:11). Therefore, the vast array of economic consequences of inequality intrude within central bankers' mandates both by altering their tools' effectiveness and by directly shaping their objectives. In turn, as this paper has argued that inequality is relevant to monetary policy, it is crucial to determine if the opposite case also holds.

C. Conventional Monetary Policy's Impact on Inequality

When discrediting the common economic modelling assumption that individuals' wealth and incomes are identical across an economy, monetary policy's transmission mechanism may enhance or constrict inequality through five distinct channels: the income composition channel, the financial segmentation channel, the portfolio channel, the savings redistribution channel and the earnings heterogeneity channel (Mersch 2014). First, the income composition channel distinguishes between households whose total revenues are composed by diverse shares of wages,



government transfers, as well as business and financial income (Airaudo and Bossi 2014:3). As shown in Table 1, the bottom twenty per cent (1st wealth quintile) in the US gain 78.9 per cent of their income through wages. Meanwhile, the top twenty per cent earn only 51.4 per cent of their income through this same source and compensate with a larger share of business and financial income, which largely depends on companies' profits (Nakajima 2015:14). A hypothetical expansionary policy, thus lowering interest rates, would only maintain inequality constant if all sources of income were equally affected or, in a simplified exposition, if wages and profits increased symmetrically. Overall, generalizations on the consequences of an expansionary policy on this channel are difficult. This complexity is epitomized by the fact that while medium-income households tend to own a disproportionate share of their wealth in the housing sector, which benefits from lower interest rates, they are also relatively more exposed to the potential losses in the inflation-fearful manufacturing sector and to a shrink in governmental transfer payments that generally follows an expansionary policy (Romer and Romer 1998:23).

Second, as changes in the money supply are enforced through financial intermediaries, the financial segmentation channel underlines that households with a higher level of interaction with financial markets are more directly exposed to changes in monetary policy (Prasad 2013). Therefore, during a monetary expansion, as households have different levels of participation in financial markets, inequality only remains constant in a system that allows an equal permeation of the increase in the money supply throughout the economy. In reality though, ambitions of perfect permeation encounter a Kafkaesque castle, and as Ledoit (2011:1) explains, "the agent closest to the location where money is injected is better off", thus generally favouring households who interact more frequently with financial institutions. Nonetheless, this channel is also not characterized by a definite straightforwardness as different types of financial assets have divergent movements following an increase in the supply of money induced by a fall in interest rates (Cœuré 2013). Third, the *portfolio channel* underlines the difference arising between households with assets protected from expected inflation from those who hold mostly unin-

dexed assets that loose value as inflation increases (Coibion et al. 2012:2). Table 2 demonstrates that lower-income households' relative exclusion from financial markets in the US has decisive implications on their bias towards holding a large portion of their wealth in inflation-sensitive cash (Erosa and Ventura 2002; Nakajima 2015:13). In a scenario where a central bank conducts an expansionary monetary policy with inflationary consequences, lower-income households holding cash will suffer relative to higher-income households with greater access to assets protected from inflation (Nakajima 2015:12).

Nevertheless, the effects of an expansionary monetary policy on inequality are ambiguous as the remaining two channels suggest a direct and positive relationship between inequality and interest rates, which runs contrary to the previously introduced channel (Coibion et al. 2012:3). The savings redistribution channel observes the impact of changes in interest rates and unexpected inflation on nominal contracts between borrowers and savers (Plihon 2015:4). On average, inflation makes borrowers better off by decreasing the value of their loan repayments relative to their inflated incomes, while savers become worse off as the amounts of goods that they can purchase with a fixed amount of savings decreases as goods become more expensive. Table 3 shows that, on average, low and middle-income households in the US are relatively more likely to borrow, thus benefiting more from unexpected inflation and lower interest rates compared to wealthier households who are more likely to save (Doepke and Schneider 2006; Nakajima 2015:12). Finally, the earnings heterogeneity channel underlines that certain households are more exposed to fluctuations in the economy's performance, which in turn is influenced by changes in interest rates (Cœuré 2013). As unemployment is more volatile for low-skilled and hence poorer households, an expansionary monetary policy decreasing unemployment may be relatively more beneficial for these groups (Blinder 1988:36).

Overall, the literature analysing the short-term relationship between conventional monetary policies and inequality has converged towards overweighting the importance of the savings redistribution and the earnings heterogeneity channels relative to the other channels (Romer and Romer

1998:23). This overweighting stems from the fact that interest rates have a decisive and straightforward impact on the relative stance of savers, borrowers, and the unemployed. In line with the prioritization of these channels, multiple studies have demonstrated a short-term positive correlation between interest rates and inequality, or inversely, that expansionary policies decrease inequality (Coibion et al. 2012; Fouda Ekobena 2014). Airaudo and Bossi (2014:2), for instance, confirm the existence of a relationship between contractionary policies and inequality by showing that a one per cent increase in interest rates increases the Gini coefficient by about 0.08 percentage points. These figures reveal that monetary policy can be a decisive causal factor exacerbating inequality and, in turn, challenge central bankers' current strategy of overlooking this issue in their decision-making processes.

When looking at economists' archetypal distinction between short-run and long-run periods, monetary policy's effects on inequality diverge through time. While in the short run conducting an expansionary monetary policy may be a viable path to counter inequality, the same policy is considered a Sisyphean effort over the long run (Stiglitz 2013:257). Romer and Romer (1998:31), for instance, claim that expansionary "policy has had no impact on the average level of poverty; it has only rearranged its timing". This discrepancy originates from neoclassical economists' faith in money neutrality, which implies that expansionary monetary policies attempting to push unemployment levels below an imaginary boundary defined as the "natural rate" will only generate temporary booms at the cost of permanently higher inflation levels that contractionary policies will have to tame (Romer and Romer 1998:38). As expansions are doomed to be offset by contractions, one could argue that the optimal policy outcome involves creating a stable environment with low inflation levels, which consequently favours capital accumulation, and hence growth (Albanesi 2007; Eastery and Fischer 2001; Nakajima 2015:9).

On the other hand, this line of reasoning controversially presumes the existence and relevance of a so-called long-run period, while also indirectly basing the belief of a cancelling out of opposite policies on the presence of a historically absent symmetry between the lengths of booms and



busts (Nakajima 2015:10). Boom and bust cycles do not necessarily cancel out, as contractionary policies, on average, have been more prolonged or intense. This asymmetry between contractionary and expansionary policies stems from the fact that the former have generally been less effective at taming inflation than expansionary policies have been at generating it (Shi et al. 2007:1213). In turn, Coibion et al. (2012:3), for example, question the current mantras of monetary policy by demonstrating that, as a permanently low inflation target has to be sustained with a recurrent use of contractionary policies, these policies have increased inequality in the US throughout multiple boom and bust cycles from the 1990s. As they explain, “monetary policy shocks can account for a surprising amount of historical cyclical changes in income and consumption inequality (...) the contribution of monetary policy shocks to the variance of these variables is also in the 10-20% range for most forecasting horizons” within the US (Coibion et al. 2012:23). Overall, one should note that blaming central bankers for intentionally creating a framework destined to spur inequality would be unsound. Nonetheless, inequality’s paramount importance in terms of monetary policy and financial stability should lead one to challenge central bankers’ decision not to acknowledge and monitor the distributional consequences of their choices. In turn, this paper will outline how the nature and intensity of monetary policy was reconfigured during the Global Financial Crisis and the effects these adjustments had on inequality.

III. What is QE?

At the onset of the financial crisis, central banks were challenged by an unconventional scenario urging them to react in unconventional ways. As shown in figure 1, when the crisis directed the US, the European Union (EU) and the UK towards a state of economic disarray, central banks attempted to alleviate the downturn by slashing interest rates to record-low levels close to zero (Dobbs et al. 2013:6). In this scenario, central banks could have continued their interest rate descent below zero by imposing negative interest rates on bank reserves. Negative interest rates imply that banks have to compensate a central bank with interest payments for holding reserves, which in theory should spur lending

as banks want to minimize these payments by diminishing their reserves. Nonetheless, having banks pay central banks for holding reserves was deemed ineffective due to the formers’ ability to escape interest payments by transforming deposits into currency, which is not liable to interest payments, and hence constrains central banks’ ability to influence a banks’ use of money (Haldane 2015). The need for further action generated by the prospect of deflation in a crippled market and the constrained efficacy of conventional monetary policy in the face of a zero lower bound (ZLB) forced central banks to augment their range of tools by venturing into the domain of UMPs (Benford et al. 2009:90; Fawley and Juvenal 2012). As a report by the International Monetary Fund (2013:1) explains, central banks implemented UMPs with two related goals: “restore the functioning of financial markets” and “provide further monetary policy accommodation at the ZLB”. To achieve the first goal central banks aggressively expanded their lending operations, provided liquidity insurance, purchased targeted private assets as a means to avoid fire sales or borrowing cost spikes and focused the early stages of QE on generating liquidity (IMF 2013:1; Joyce et al. 2010:10).

Nevertheless, QE’s implementation was largely justified by the attempt to achieve the second objective: enhancing monetary easing (Joyce et al. 2012:274). QE is a process whereby a central bank conducts large-scale purchases of private and public sector securities acquired predominantly from non-bank companies such as pension funds (Benford et al. 2009:91; The Economist 2015d). More specifically, central banks generate new electronic money, which they channel into financial markets to alter the overall quantity of money in the economy. Central banks were not novice practitioners of financial asset purchases as their ability to set interest rates or the so-called price of money had previously relied on open market operations, which as Breedon et al. (2012:704) explain involved a “swap of central bank money for privately held assets”. However, the size and focus of the purchases conducted through QE was unprecedented. Traditionally, open market operations were devised to have a limited influence on the prices of financial assets, whereas QE’s benefits largely relied on snowballing increases in financial asset prices through targeted and vigorous

rounds of purchases (Gagnon et al. 2010:7). Additionally, while conventional monetary policy had considered the quantity of money in the market an indirect by-product of the movements in the price of money generated by altering interest rates, QE added a new dimension to central banks’ tools by making both the price and quantity of money direct means of stimulating the economy (Benford et al. 2009:90). The quantity component of QE is manifestly visible in figures 2 to 4, which depict the drastic expansion of the assets on central banks’ balance sheets since the onset of the financial crisis (Fawley and Neely 2013:66-68).

IV. QE and Inequality

A. Financial Asset Prices

As Benford et al. (2009:91) explain, central banks expected this monetary injection to “ultimately lead to an increase in asset prices and spending, and therefore bring inflation back to target” in the medium term. This paper will analyse the channels depicted in figure 5 through which QE theoretically furthers its expansionary aims. Amidst these channels, the portfolio-rebalancing channel, the liquidity channel and the macro-news channel operated by pushing financial asset prices upward.

Firstly, the portfolio-rebalancing channel potently spurred financial asset prices by relying on their imperfect substitutability. When central banks conduct asset purchases, they increase the sellers’ holdings of money, and consequently alter the portfolio composition of banks and non-banks (Green and Lavery 2015:899). If money and the financial assets purchased by the central bank are not perfectly substitutable from the sellers’ point of view, the seller uses the newly acquired money to purchase financial assets that are more in line with the expected risk and return of the previously owned ones. Especially in the US and UK, central banks purchased high-yielding financial assets, which were less likely to be substitutable with money, whose yield is generally close to non-existent. Consequently, sellers’ need to rebalance their portfolios to their prior composition fostered an escalating rise in financial asset prices across the markets where substitute assets were searched for (Benford et al. 2009:92).

Figure 5 also portrays the fact that QE



targets financial asset prices to bolster spending in two additional ways. First, by becoming large and ready asset buyers, central banks rehabilitated the ailing levels of liquidity that commonly characterized the markets in QE's early stages (Gagnon et al. 2010:5). Consequently, the liquidity premium expected by investors for holding the risk of being unable to sell financial assets decreased together with these assets' yield, and inversely to their rising price (Bowdler and Radia 2012:611). Secondly, QE announcements spurred financial asset prices by providing reliable information about the future stance of both monetary policy and the economy. As Krishnamurthy and Vissing-Jorgensen (2011:4) argue, a central bank's "willingness to undertake unconventional policy like QE indicates that it will be willing to hold its policy rate low for an extended period". This signal strengthens the markets' confidence in a recovery, thus lowering multiple risk premia demanded by investors, and consequently pushing financial asset prices upward (Joyce et al. 2010:7).

Consequently, QE's implementation has generated a pattern of increasing asset prices within multiple financial markets (Brown 2015:1; Koo 2014:76). While certainty in terms of magnitude is not a defining feature of the empirical studies on QE, there exists a shared tendency for these undertakings to demonstrate that QE had statistically relevant effects on a wide range of asset categories in the financial markets of the three areas under scrutiny (Williams 2014:10). Empirical research by the BoE, for instance, finds that the first round of QE may have raised equity prices in the UK by approximately twenty per cent (Ryan-Collins et al. 2013:21). QE's potency is also epitomized in a survey conducted by UBS's asset management division, which demonstrates that a wide-range of asset managers thought that QE was the "number one driver of asset price movements" in multiple markets for a few consecutive years following the crisis (Custard 2015:2).

The most prominent case for QE's responsibility in worsening inequality stems from the implications of financial assets' price appreciation on households' wealth. Although ownership rates of financial assets are not easily comparable across countries, high-income households in the US, EU and UK share a general tendency to own more, and rely more on financial assets than

middle and low-income households (BoE 2012:10; Claeys et al. 2015:4; Yellen 2014). In the UK, for example, the wealthiest five percent own forty per cent of the overall financial wealth of households in the country (Forbes 2015:16). Middle-income households are in fact less able to afford sophisticated financial services and are relatively more fearful of financial market risk (Forbes 2015:16). Therefore, on average, they are less likely to hold financial assets and more likely to hold interest-bearing savings, which lost out as central banks cut interest rates (Montecino and Epstein 2015:2). Meanwhile, low-income households have an infinitesimally small or non-existent financial asset ownership rate, with the caveat that they are indirectly exposed to these assets through pensions, which, on average, remained unchanged. Higher financial asset prices in fact increased the value of pension pots, yet, the gains generated by this rise were offset, or occasionally outbalanced by the losses households faced due to a fall in their income streams from annuities (Haldane 2014:4). Annuity rates are directly related to bond yields, which, as previously explained, QE lowers through its targeted asset purchases. Therefore, other things being equal, as QE increases financial asset prices, it improves the stance of the wealthiest relative to the rest (Bowdler and Radia 2012:613). In the UK's case, for instance, the BoE (2012:258) crudely estimates that QE's impact on financial asset prices led to an average increase of wealth of £10,000 per household when assuming a homogenous ownership rate of financial assets across households. Meanwhile, according to Green and Lavery (2015:9), when taking into account the disparities in ownership rates existing between households, the wealthiest ten per cent of households may have gained between £128,000 and £322,000, contrary to the majority who compensated for this disproportionate rise by gaining far less than the £10,000 average.

There are two caveats one should note. First, low interest rates and forward guidance also played a decisive role in lifting financial asset prices in ways that complicate the task of disentangling QE's sole responsibility (Dobbs et al. 2013:25). Second, QE theoretically only increases financial asset prices in the short run, while over the long run, it loses its relevance because central banks may have to reverse their stimulus and rational investors determine financial

asset prices by looking at so-called "real forces", such as the constancy of economic growth and companies' profitability, which QE cannot determine sustainably (Bivens 2015b:18). As Bernanke (2015) argues, "the Fed's actions have not led to permanent increases in stock prices, but instead have returned them to trend". In turn, this would imply that QE did not increase inequality in the long run, but only re-established the pre-crisis levels of inequality by normalizing financial asset prices, and by reversing the fall in inequality that, all else being equal, the crisis generated by enfeebling financial asset owners relative to the rest.

Central bankers have repeatedly taken refuge against accusations of fomenting inequality by hiding behind this line of reasoning, which is backed by the fact that in the post-crisis period financial markets in the US, EU and UK have not decisively surpassed their historical averages for a range of ratios used by analysts to calculate assets' valuations (Claeys et al. 2015:3). Nevertheless, as is often the case, not all things are equal, and the crisis's crippling effects transcended financial markets and spread to other sectors of the economy, thus harming households across a wider spectrum. QE's objective was to follow a similar path as the crisis, from financial markets to the wider economy, yet, it aimed to prop up the former to reinvigorate the latter. Overall, central banks utilized a so-called financialised demand strategy, thus their actions were heavily biased towards supporting financial markets, with the hope that the benefits reaped by these markets would trickle-down into the broader economy (Watkins 2014:438). Under certain conditions, higher financial asset prices would have boosted spending by reducing borrowing costs and by increasing financial asset owners' wealth (Joyce et al. 2010:6). As Joyce et al. (2011:202) show in figure 6, following QE's initial "impact phase", the "stimulus from asset purchases works through the economy" in a so-called "adjustment phase" where asset prices normalize, while real GDP and inflation rise through time until the economy returns to an equilibrium level. If QE failed to transmit its stimulus beyond financial markets, its biased procedures may be blamed for having privileged wealthy financial asset owners' recovery, while leaving the rest of the economy behind, at least in the short run when financial asset prices do not necessarily adjust with the



rest of the economy's inferior performance.

Nonetheless, as Section II underlines, one should always be critical of economists' archetypal distinction between the short run and the long run. Divergences between financial markets and the economy do not necessarily extinguish over time, and the increased levels of inequality arising from financial asset owners' privileged position may persist for a longer period than the one subtly suggested by the term "short run". Financial markets' rally relative to the rest of the economy, for instance, may be prolonged by the fact that the finance industry *per se* composes an important portion of developed economies' total economic output (London Economics 2009). In turn, this industry's superior performance may partially offset financial asset prices' theoretical convergence with the potentially inferior performance of the rest of the economy. Additionally, central bankers' ingrained financial market bias may lead them to postpone a long-run convergence towards a lower performance by extending asset purchases even further or by never reversing past QE purchases. Consequently, this paper will look at QE's effects on the economy as a whole to understand whether a divergence between financial markets and the rest of the economy materialized. However, before proceeding into an economy-wide analysis of QE's implications, this paper will first note that QE may also have shaped inequality by lowering mortgage costs and by reflating house prices.

B. Mortgages and House Prices

QE also intended to foster lending, or at least reduce debtors' burden, by directly lowering borrowing costs. More specifically, targeted purchases of debt-related assets reassured lenders, and consequently decreased mortgage rates. In the UK, for instance, these rates dropped by 322 points between 2007 and 2012 thanks to the conjunct efforts of QE and conventional monetary policy (Lund et al. 2013:30). In turn, as Bernanke (2015) argues, "debtors are generally poorer than creditors, so on this count easier monetary policy again reduces inequality". This statement though is far too simplistic when applied to the US, or when stretched beyond Bernanke's intended remit by looking at the EU and UK. In the US, for instance, while low-income households have a higher exposure to

debt as a percentage of their total income relative to their wealthier peers, they are also largely unable to benefit from lower mortgage rates (Doepke et al. 2015). This is caused by the fact that the vast majority of mortgage contracts in the US have a fixed rate (Fuster 2015). In turn, the rate is determined at the time of signing the contract with a lender and does not adapt to changes in mortgage markets. Therefore, fixed-rate mortgage owners do not directly benefit from lower rates, but rather have to get a new mortgage to refinance their existing one, and hence reap the benefits of lower rates (Fuster 2015). Nonetheless, following the crisis, regulators and lenders jointly tightened the equity and income requirements that borrowers have to fulfil to obtain a mortgage, thus strongly favouring wealthier households who are more likely to satisfy the stricter set of criteria (Beraja et al. 2015:28). Beraja et al. (2015), for instance, demonstrate that mortgage refinancing occurred to a greater extent in wealthier areas of the US relative to poorer ones and, in turn, this difference visibly increased consumption inequality following QE's implementation.

Meanwhile, the UK differs from the US both for the fact that its higher and middle-income households are relatively more exposed to debt than low-income ones and because its households predominantly use adjustable-rate mortgages, implying that they directly benefit from lower rates (Anderson et al. 2014:431; Tracy and Wright 2012). As upper and middle-income households are proportionally more exposed to debt, they are the major beneficiaries of the lower mortgage rates generated by QE. On the other hand, in the EU, households with lower-incomes are typically more exposed to debt relative to the rest, yet generalizations on the effects of lower borrowing costs on inequality in the EU are rendered complex by the diverse levels of usage of variable and fixed-rate mortgages in different European states (Claeys et al. 2015:7; Panetta 2015:5). Overall, QE's implications on inequality through mortgage rates lack the straightforwardness necessary to counter QE's impact on inequality through financial asset prices, and, instead, may occasionally heighten these asset prices' effects by also favouring the wealthy over the poor.

Historically, falls in mortgage rates have been closely correlated with higher house prices, and hence an appreciation of property wealth, which, as Figure 7 shows, composes one of the largest sources of households' total wealth in the US, EU and UK (Lund et al. 2013:28). In the UK, for instance, research conducted by the BoE demonstrates that the low mortgage rates induced by both QE and conventional monetary policy reflated house prices by between fifteen and twenty percent, thus cancelling the fall in prices provoked by the crisis (Bivens 2015a). Additionally, in the UK, houses are a "democratically" held asset, as they compose a larger percentage of total income for low and middle-income households relative to households in the highest echelons of the income distribution (Bivens 2015b:14; ONS 2014:12). Therefore, higher house prices should theoretically have equalizing effects. Nonetheless, as figure 8 demonstrates, when decomposing home-ownership rates even further, one can see that property wealth amongst the lowest income quintile is heavily skewed towards a small minority, as more than half of this group is property-less, and hence, exposed to the higher private sector rents fostered by rising house prices (ONS 2014:12; The Economist 2014). One should also note that house prices are not uniformly affected by QE, as tighter credit constraints impede many low and middle-income households from taking out a mortgage, thus choking the demand pressure on the lower and middle-quality houses owned by these households. As Doepke et al. (2015:5) explain, credit constraints may counter the equalizing effect of higher house prices by generating a scenario where "the price of relatively high-quality houses increases, whereas the price of mid-level houses remains essentially unchanged". On the other hand, in the US and EU, while property wealth does compose a larger proportion of the total wealth of middle-class households relative to the wealthiest ones, poorer households are close to property-less and do not benefit from higher house prices (Bernoth et al. 2015:13; Bivens 2015b:16). Furthermore, contrary to the UK, house prices in the US and EU have remained sluggish by failing to recover to their pre-crisis levels as an oversupply of housing and elevated levels of household indebtedness played



a crucial role in constraining price pressures within these markets (Lund et al. 2013:29; *The Economist* 2015a). Once again, while QE may have played a role in spurring asset prices that are not decisively relevant to the wealthiest households in society, the implications of this effect for low and middle-income households do not point towards a clear equalizing effect capable of countering the impact of financial asset prices on inequality.

C. Trickle-Down Economics: From Financial Markets to the Rest

In Piketty's magnum opus *Capital in the Twenty-First Century*, a grand theory on the principal cause of inequality is derived by looking at the difference between the rate of return of capital "r" and economic growth "g". Piketty (2014:245) shows that the ownership of capital, which is used interchangeably with the concept of wealth, is more concentrated amongst the richest cohorts of society than the distribution of labour incomes. Consequently, Piketty (2014:424) argues that when " $r > g$ ", there will be an increase in inequality as the capital owned by wealthy households grows at a faster pace than labour incomes, which depend on economic growth (Atkinson 2015:158). Piketty's central finding is that the rate of return on capital, on average, has surpassed the rate of growth in the past decades, thus contributing to the sustained increases in wealth inequality experienced in most developed countries. One should note that Piketty's (2014:358) definition of capital extends beyond financial assets to include factors ranging from rents to profits; nonetheless, he acknowledges that in the twenty-first century, financial capital has composed a very large portion of total capital. Ultimately, when looking at QE through Piketty's lenses, establishing whether this policy increased or decreased inequality largely depends on whether its benefits spread beyond financial markets to reach the rest of the economy, on which a wider range of households rely. As previously explained, low and middle-income households obtain a larger percentage of their income from wages relative to financial and business income (Claeys 2015:9). Additionally, poorer households are more susceptible to business cycles, thus they are far more likely to become

unemployed during a downturn than wealthier households are, and inversely, as unemployment falls thanks to a stimulus, these same households will, on average, face a faster level of wage growth (Bivens 2015b:29). Therefore, if QE revitalized the wider economy by decreasing unemployment and by raising wages, it may have had equalizing effects, as these two variables determine a large fraction of the welfare of poor and middle-income households, when compared to wealthier ones (Bernanke 2015; Panetta 2015:4). Nonetheless, recoveries in the US, EU and UK have largely been characterized by delayed rises in employment levels, by slow reinstatements of the pre-crisis output growth trends and by stagnant real wages (Chen et al. 2011:2; Koo 2014:4; Montecino and Epstein 2015:4; Wolf 2014:264). It is important to note that adequately assessing QE's effects on the economy requires one to compare the current scenario with QE to a theoretical counterfactual or base scenario without QE (Panetta 2015:4). QE's benefits have in fact been partially hidden by the recession. More specifically, while this policy did not necessarily increase wages or decrease unemployment levels, it may have played a subtle role in preventing a greater collapse of these figures (BoE 2012:256). Nonetheless, when considering counterfactual scenarios, as figure 9 shows, for instance, the US's recovery would have been slower, yet only slightly so, if the Fed had not implemented QE (Blinder and Zandi 2015; Sandbu 2015). More generally, the jury is still out on QE's impact on GDP, wages and unemployment (Conaghan 2012:231). Empirical studies on these variables have in fact largely failed to reach a consensus, while instead producing a set of approximations fluctuating on a relatively wide spectrum (Martin and Milas 2012). Overall, QE's effectiveness has been less pronounced and certain in terms of real economy indicators than in the domain of financial asset prices. Ryan-Collins et al. (2013:1), for instance, argue that QE "inflates the price of such (financial) assets, and enriches the assets' owners, with minimal positive impact on the real economy". Although QE cannot be held accountable for singlehandedly spurring this divergence, in the UK, for instance, the real output of the business and financial services industry relative to the real

output of the construction and manufacturing industries, as well as the performance of overall GDP, have visibly differed following the crisis (Ryan-Collins et al. 2013:7). Backing the interpretation that QE played a role in this divergence, Watkins (2014:431) contentiously states that QE "represents the triumph of pecuniary values over service, financial interests over industrial interests and asset holders over income earners". Similarly, yet from a moderate stance, a group of 19 renowned economists notably published a letter on the *Financial Times* asking the ECB to recognize that QE had been "an unreliable tool for boosting GDP or unemployment", and hence had to be substituted with a new expansionary approach devised to "bypass the financial system" (Chick et al. 2015). To comprehend the foundations of these arguments one has to observe QE's transmission mechanism. As Irwin (2014) explains, the divergence appearing between the superior performance of financial markets and the relative feebleness of the rest of the economy originates from a "paradox" at the core of central banks' foundation: the mandates focus on real economy indicators, whereas their transmission channels largely rely on financial markets. As Figure 5 shows, QE furthered its expansionary aims indirectly by operating through financial markets, and more specifically, three out of its four central channels revolved around increasing financial asset prices. Nonetheless, trickle-down economics, which is the idea that enriching the wealthy eventually generates benefits for the whole of society, faced a renewed setback (Chang 2011:137; Stiglitz 2013:6). Financial markets and their wealthy participants in fact largely retained the benefits accrued from QE, as the decisive expansion in central banks' balance sheets failed to revive the wider economy, yet succeeded in increasing financial asset prices. In turn, when looking at QE from Piketty's perspective, as QE fostered financial capital returns and failed to bolster economic growth, it enhanced the pre-existing divergence between " r " and " g ", and hence increased inequality.





Part D: The Bank Lending Channel

Figure 5 also shows that QE theoretically could have boosted the wider economy directly, thus without necessarily relying on a trickle-down effect from higher financial asset prices. This process should have occurred through the bank lending channel. In practice, the electronic money created by QE generated large bank deposits as the vast majority of financial assets purchased were owned by non-bank companies but were transacted through banks (Butt et al. 2015). Deposits are an inexpensive source of funding and the increase in deposits largely exceeded banks' demand for liquidity, hence, this increase should have fostered an expansion of lending (Benford et al. 2009:93). Nonetheless, despite the spikes in banks' excess reserves, a combination of factors constrained banks' incentive to lend and the markets' incentive to borrow to the extent that academics have repeatedly classified this channel with the label of irrelevance (Butt et al. 2015). Figures 10 to 12 elucidate this trend by demonstrating a visible and rare divergence between the rise in the overall money in the economy or so-called broad money generated by QE's liquidity injections and the far lower levels of credit creation (Koo 2014:6-8). In the UK's case, for example, the moribund levels of credit creation prompted the BoE to incentivize lending further through the Funding for Lending scheme, which prizes banks according to their lending performance (BoE 2015).

There are multiple culprits generating feeble levels of bank lending. Koo (2014:16) has argued that during a balance sheet recession characterized by a collapse in asset prices, it is common for the private sector to "switch from maximising profit to minimizing debt". Counterintuitively, low rates and elevated liquidity levels do not always entice borrowers as saving and repaying loans become prevalent attitudes that critically inhibit the relevance of an expansionary monetary policy (Koo 2014:14). Accompanying low borrowing demand, banks created supply-side deficiencies as their confidence to lend decreased in line with the anaemic post-crisis recoveries and with the convergence of the gap existing between long and short-term rates, on which their lending profitability relies (Goodhart and Ashworth 2012:666). Additionally, Butt et al. (2015) argue that the ir-

relevance of the bank lending channel may depend on the fact that the large deposits created by QE cannot be used as stable sources of funds due to the recurrent rebalancing of portfolios towards higher yields throughout the banking system, which consequently renders the nature of deposits excessively "flighty" for profitable lending to occur. As argued by Ryan-Collins et al. (2013:31), "bank lending is a key driver of nominal GDP", and hence the feebleness of this channel played a decisive role in constraining QE's efficacy on the wider economy. Consequently, even though this channel was meant to stimulate the economy directly, due to its weakness, it failed to contrast the divergence between the relative performances of financial markets and the wider economy.

V. Comparing Different QE Formats

While until now this paper has referred to a broad notion of QE, when looking at figures 2 to 4 one notes that the timings, intensities and compositions of QE varied in the US, EU and UK, thus generating different implications for inequality (Fawley and Neely 2013:66-68). Central banks' idiosyncratic choices were shaped by the differences in the structures of the financial systems, the nature of the recessions, the political pressures and the pre-existing legal constraints faced by these institutions (Hausken and Ncube 2013:65). The ECB's implementation of QE, for instance, has differed in two visible ways from the QE programmes executed in the US and UK, which are more akin to each other. First, as shown in Table 4, the size of the ECB's QE programme relative to GDP remained relatively small during the first years of the post-crisis period (Fawley and Neely 2013:77; Szczerbowicz and Valla 2015). The ECB's restrained stance largely stemmed from its previously more optimistic assessment of the crisis and from the legal challenges imposed by the Maastricht Treaty (Kang et al. 2016; Klyuev et al. 2009:17). Second, as banks are the most important source of funding in Europe, the ECB attempted to encourage bank lending by focusing its purchases on refinancing banks to decrease their fear of engaging in this activity (Wyplosz 2014). Consequently, the ECB's initial indecisiveness and its focus on bank lending at a time with low demand for loans severely constrained QE's effectiveness in Europe when compared to the US and UK. This ineffectiveness may

have played a role in generating the relatively slower economic recovery that characterized the EU in the post-crisis period (Hausken and Ncube 2013:65; Wyplosz 2014). Nonetheless, one should not be led to conclude that this slower recovery generated higher levels of inequality, as QE's relative inefficacy was also experienced by European financial markets, which recovered at a slower pace than the ones in the US and UK (Middeldorp and Wood 2016).

One may also compare the Fed's QE programme with the one conducted by the BoE. The former's focus on purchasing risky mortgage-backed securities to support the heavily hit housing market has in fact been deemed more effective at boosting economic growth when compared to the latter's programme, which is relatively more centred on safer government bond purchases (Szczerbowicz and Valla 2015). Overall though, as QE is a somewhat new and unfamiliar policy, the literature comparing different QE formats remains very limited. In turn, asserting whether a divergence between the performances of financial markets and the rest of the economy has been more visible in one of the areas under study would lead one to reach faulty conclusions. Therefore, discerning how different configurations of QE affect inequality in different ways is a task that calls for future research to allow policymakers to design their policies in more optimal ways.

VI. Alternatives

During the past few decades, the collapse of average long-term rates has increased the likelihood of central banks having to face deflation traps at the ZLB (Haldane 2015). In turn, as conventional monetary policies remain feeble in these scenarios, QE is likely to gain a prominent stance in future policymaking. Nonetheless, together with inequality, QE poses a plethora of relevant threats as its implementation may delay structural reforms, distort financial market signals, undermine central bank's independence and compromise the future potency of conventional monetary policy (Joyce 2012:54; Koo 2014:100). Compounding these risks, the consequences of reversing QE policies remain close to untested, and hence central banks' exit strategies are currently surrounded by perilous levels of uncertainty (Marron 2013; Treanor 2013).



These risks have encouraged a search for alternative policies that may halt QE's entry into the realm of conventionality. Amongst central bankers, proposals to revamp monetary policies have ranged from moderate plans to test negative interest rates, to more extreme proposals to increase inflation targets or abolish paper currency altogether (Haldane 2015; The Economist 2016b; Wolf 2016). On the other hand, outside of central bankers' sphere, support for a policy proposal named "QE for the people", a variant of Friedman's "helicopter money", has gathered momentum (Blyth and Lonergan 2014). This policy involves having central banks electronically create money to be distributed directly and irreversibly to households rather than to financial markets (Blyth and Lonergan 2014). Whether the distribution is conducted by the central bank or in conjunction with a government, this policy has been deemed more likely to increase spending in the economy than QE. Money handouts, for instance, may be designed in a way that favours low and middle-income households who are proportionally greater spenders than their wealthier peers are (Blyth and Lonergan 2014). Nonetheless, this policy's short-term effectiveness is eclipsed by its long-term risks, as its implementation could undermine the public's faith in the currency and in central banks' commitment to price stability (Cumming 2015). Ideological concerns on the ethicality of handouts and central bankers' straitjacketed dependence on maintaining an allegedly apolitical and credible stance are also likely to trump this policy's future (Muellbauer 2014; The Economist 2015c). Overall, while this policy is unlikely to gain traction within central bankers' circles, its radical essence and the impetus of its backers reveal the elevated levels of discontent towards monetary policy's current response to the crisis.

The acknowledgement that central banks' tools have been blunted by the weight of the crisis also reinforces the case for addressing the imbalance between the use of fiscal and monetary policies that has characterized the post-crisis period. As Bivens (2015b:23) demonstrates in figure 13, for instance, in the most recent recession, "total government expenditures have risen more slowly than during any other post World War II business cycle" in the US. To different extents, partisan divisions and budget stringencies have stifled the use of fiscal policies

in the US, EU and UK, thus leaving a large demand for expansionary stimulus to be supplied by the more expedited decisions taken by central bankers (Blyth and Lonergan 2014). Although one may not clearly establish the extent to which fiscal policy's relative lethargy determined monetary policy's need to redefine its boundaries, the latter's venturesome stance may partially originate from the need to complement or even substitute the former's role (Bernanke 2002; Bivens 2015b:24). To counter this process, the Bank for International Settlements (2012:3), amongst others, has called for greater caution when using UMPs, while also advocating for governments to support central banks with fiscal policies, as the latter risk being overburdened by market expectations that far exceed UMPs' uncertain potential. More importantly, as elected officials design fiscal policies, they are arguably more likely to take into account, and be held accountable for the distributional implications of their decisions than central bankers are (Green and Lavery 2015:10).

VII. Conclusion

Within many developed economies, increasing levels of inequality have opened a number of fault lines threatening the sustenance of economic growth, social cohesion and democracy (Deaton 2015:978; Mote-sharrei et al. 2014:99). This paper does not argue that monetary policy should be directly responsible for addressing this overall rise in inequality. However, as inequality affects central bankers' objectives and monetary policy intrinsically has distributional implications, central bankers should acknowledge, monitor and mitigate their role in shaping this trend.

This paper cannot provide an indication of the extent to which QE caused inequality, as the outcomes of the empirical literature attempting to measure QE's impacts remain diverse and uncertain. Nonetheless, this paper argues that QE's design shaped the direction of its effects on inequality. More specifically, central bankers structured this policy with a bias towards supporting financial markets relative to the rest of the economy. This bias originates from the central role played by financial asset prices in QE's transmission mechanism and it is reinforced by the weakness of the bank lending channel. As the gains received by financial markets failed to spread to-

wards the rest of the economy, QE favoured wealthy households who are more reliant on financial asset prices relative to low and middle-income households. Furthermore, this paper notes that QE may theoretically have had some equalizing effects by lowering borrowing costs and by reflating house prices. Nevertheless, these equalizing effects are relatively ambiguous and weak when compared to QE's dis-equalizing effects through financial asset prices. To sum up, when adjoining these findings with Section II's conclusion that contractionary monetary policies generally increase inequality, middle and low-income households find themselves in a paradoxical scenario where, as Montecino and Epstein (2015:25) explain, "given the current structure of the economy and monetary policy strategies, both loose and tight monetary policy are likely to be dis-equalizing". In turn, if further expansionary policies are needed at the ZLB, central bankers should counter this paradox by re-designing or substituting QE with mechanisms reflecting a greater awareness of the distributional consequences of their choices.

When looking beyond the scope of this paper, QE's relative novelty provides a fertile ground for future research. Research investigating QE's role in altering intergenerational and international inequality, for instance, is virtually absent. Nonetheless, the arguments in favour of the current pertinence of these issues are compelling. In terms of intergenerational inequality, for instance, the elevated concentration of financial asset holdings amongst older households has guided the preliminary hypothesis that QE may have potently disadvantaged younger households (BoE 2012:259). Meanwhile, in terms of international inequality, QE's intent of favouring growth in the US, EU and UK has eerily revived memories of the devaluation policies that followed the 1929 Great Depression, as countries implementing QE have transferred some of the post-crisis readjustment costs on emerging economies by making the latter's exports relatively less attractive (Eichengreen 2013:4). In turn, alarming calls that QE may fuel a so-called "currency war" have become common within academia, finance ministries and G7 summits (Rickards 2011:124). Flattening the meaningful risks posed by these forms of inequality is a task that will have to rely on more in-depth research investigating QE's



potent distributional effects. Additionally, while this paper has focused exclusively on QE, future research should also look at the interaction between inequality and other UMPs implemented by central banks during the post-crisis period.

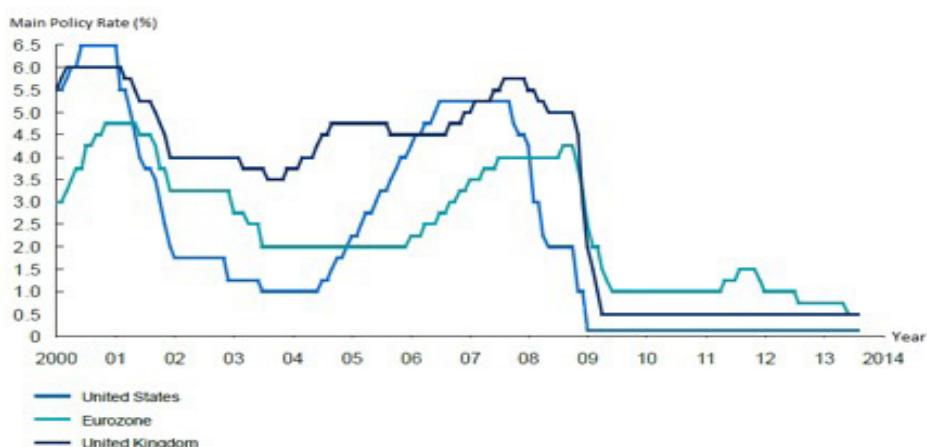


Figure 1: Central Banks' Policy Rates, Source: (Dobbs et al. 2013:6)

Figure 2: Balance Sheet of the Federal Reserve System, Source: (Fawley and Neely 2013:66)

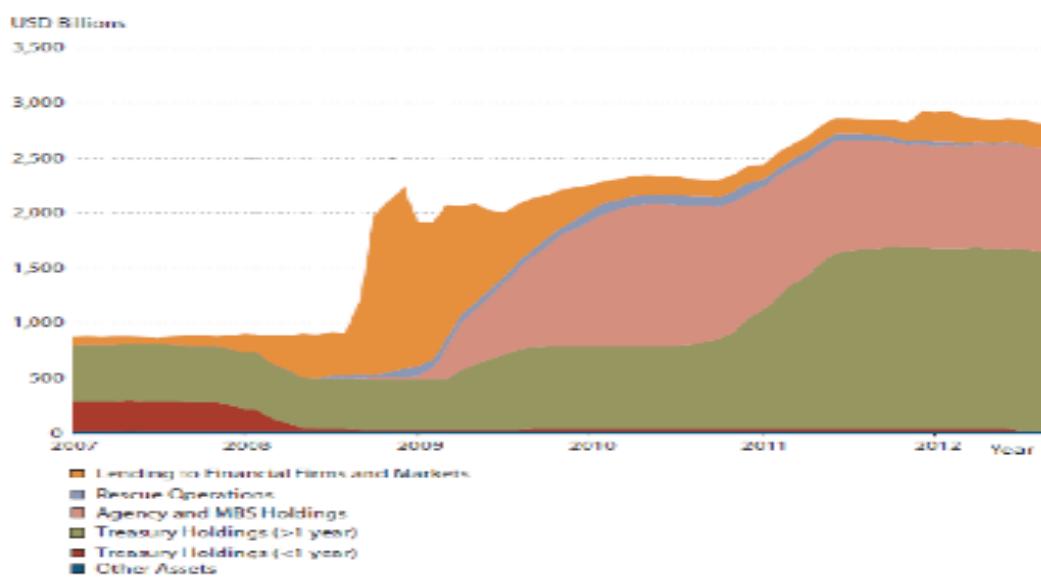
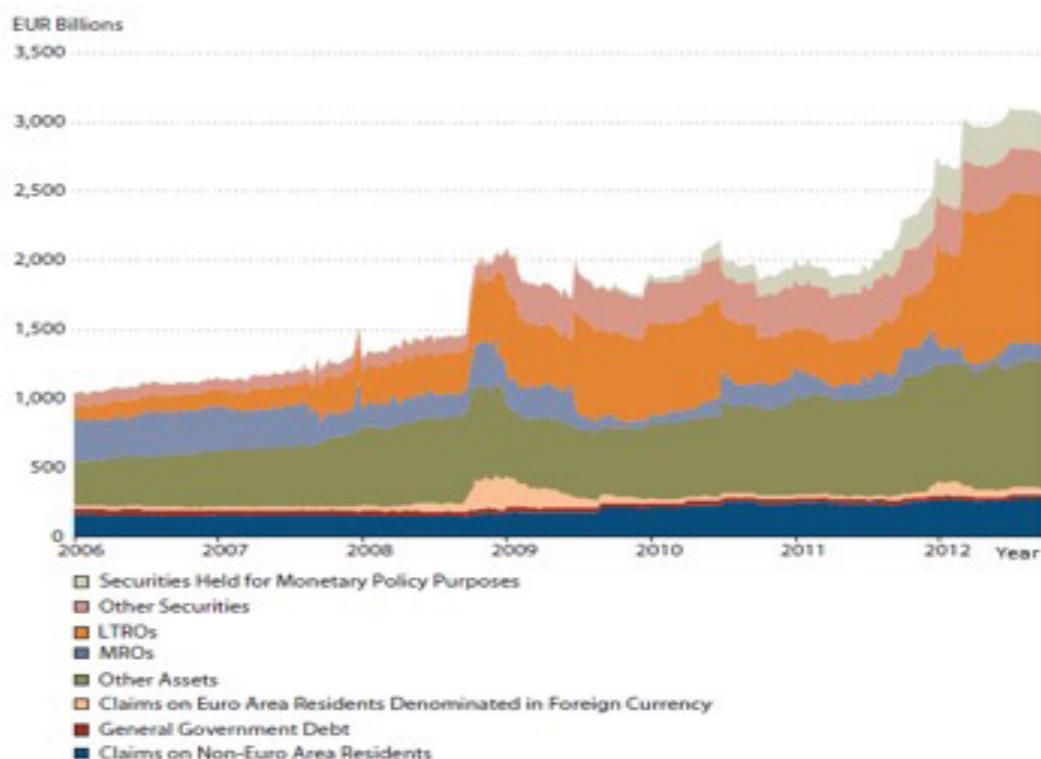


Figure 3: Balance Sheet of the European Central Bank, Source: (Fawley and Neely 2013:67)



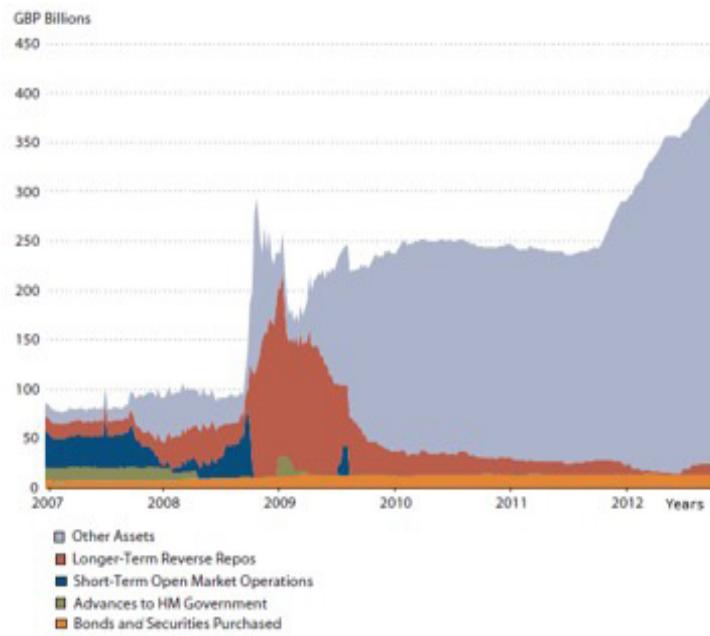


Figure 5: Quantitative Easing's Channels, Source: Adapted from (Benford et al. 2009:93)

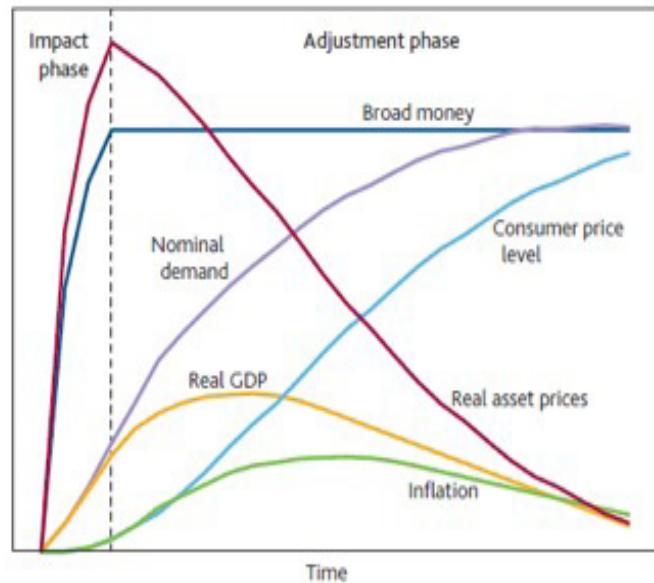
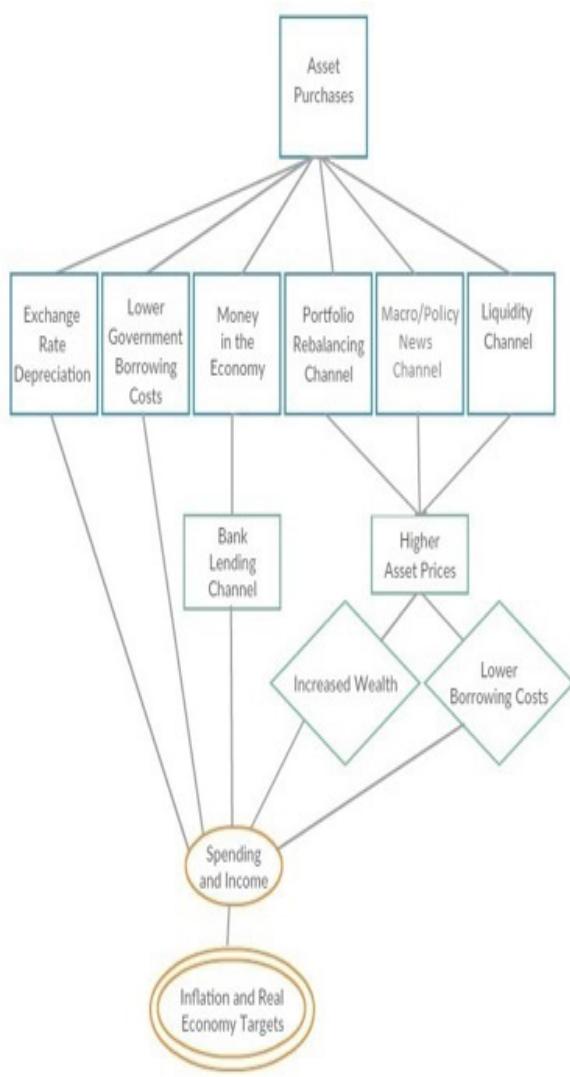
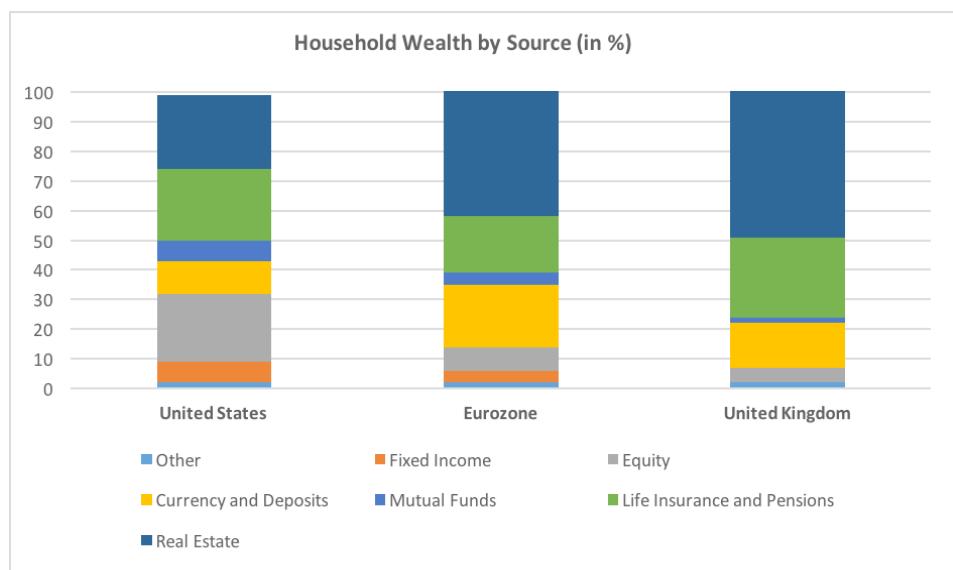




Figure 7: Household Wealth by Source in 2012, Source: (Dobbs et al. 2013:28)



(Note to reader: numbers do not sum up to 100% due to rounding)

Figure 8: Distribution of Household Net Property Wealth, by Total Household Income Quintile: Great Britain, 2010-12
Source: (ONS 2014:12)

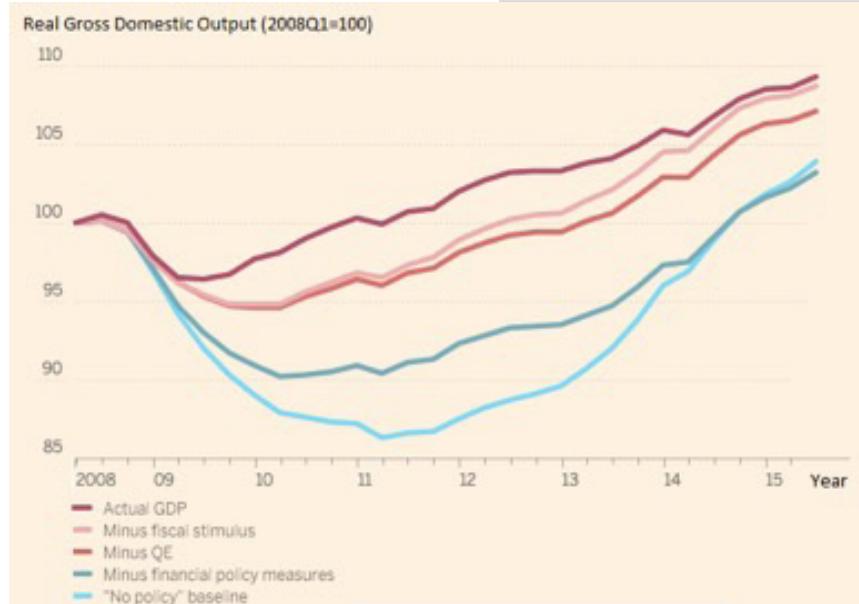
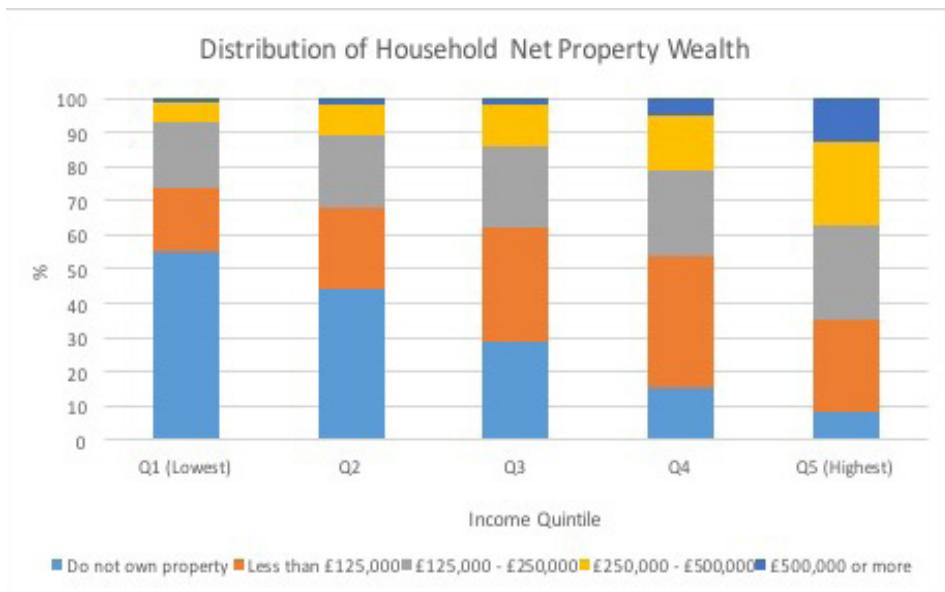


Figure 9: Effect of the Post-Crisis Policies Implemented in the United States
Source: (Blinder and Zandi 2015; Sandbu 2015)



Figure 10: Credit Creation and the Monetary Base in the United States, Source: (Koo 2014:6)

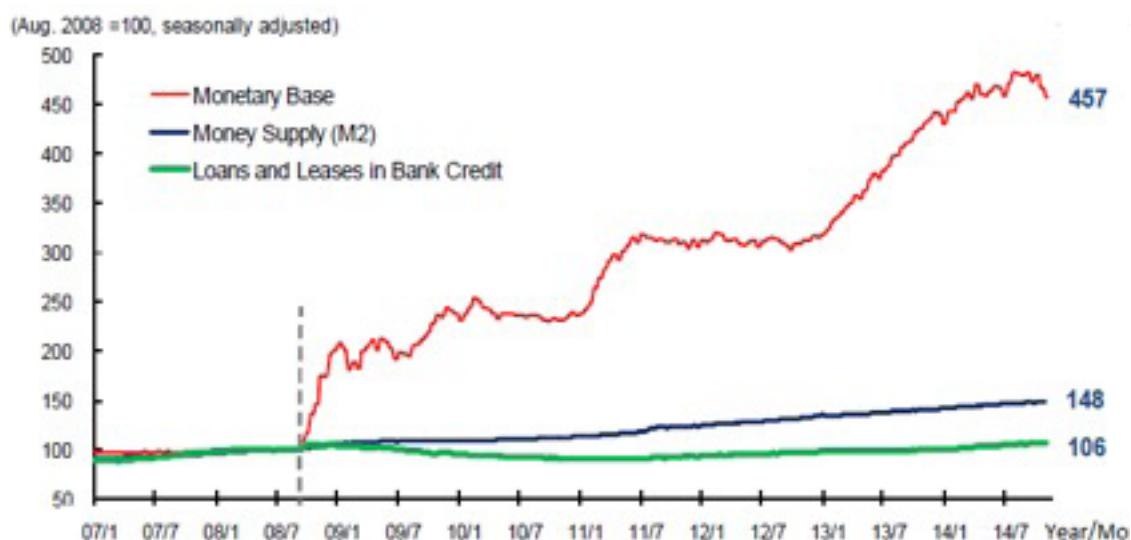


Figure 11: Credit Creation and the Monetary Base in the European Union, Source: (Koo 2014:7)

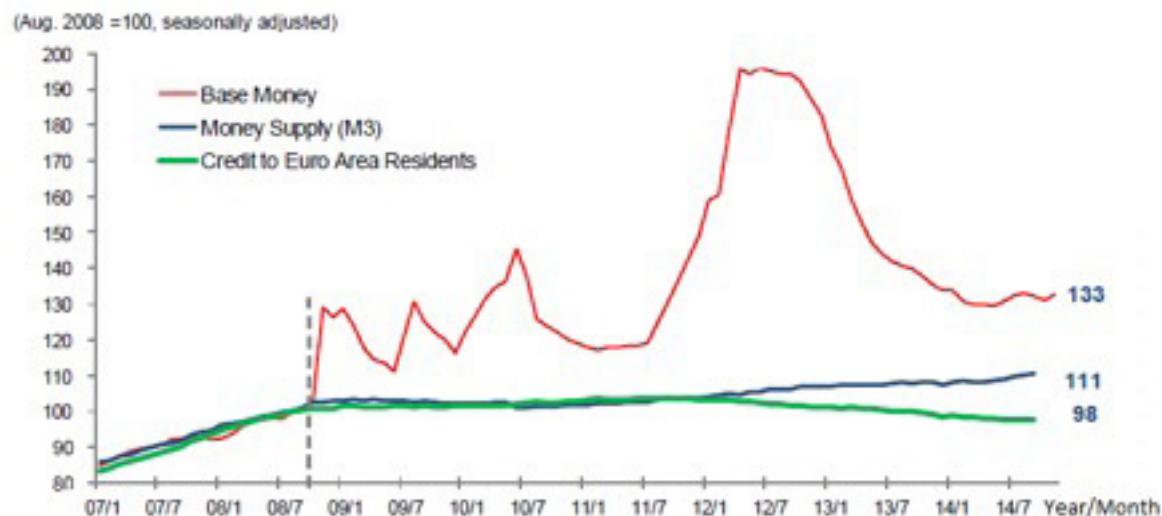


Figure 12: Credit Creation and the Monetary Base in the United Kingdom, Source: (Koo 2014:8)

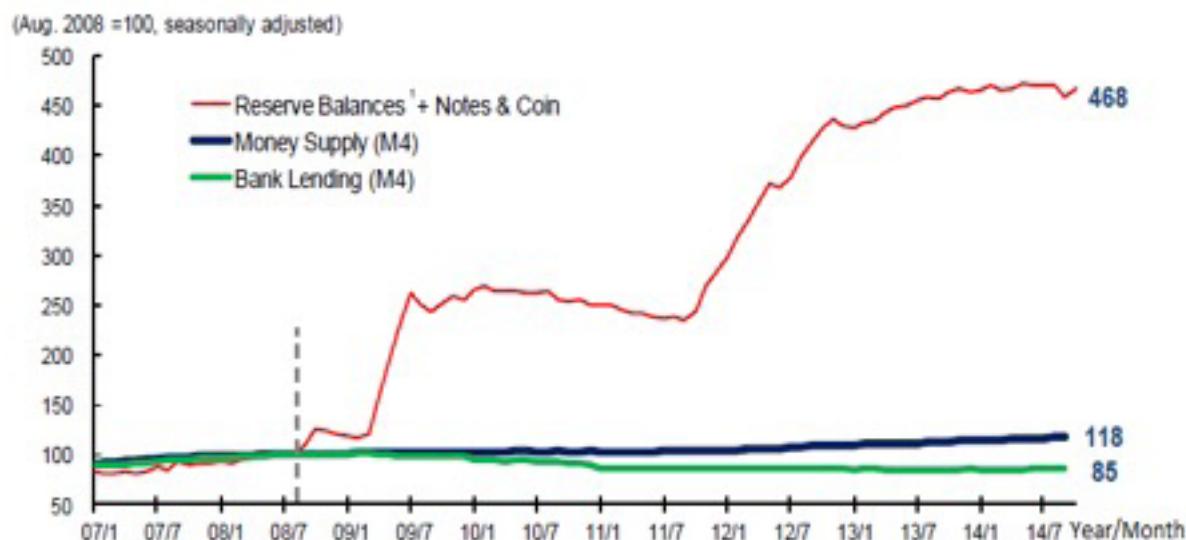




Figure 12: Credit Creation and the Monetary Base in the United Kingdom, Source: (Koo 2014:8)

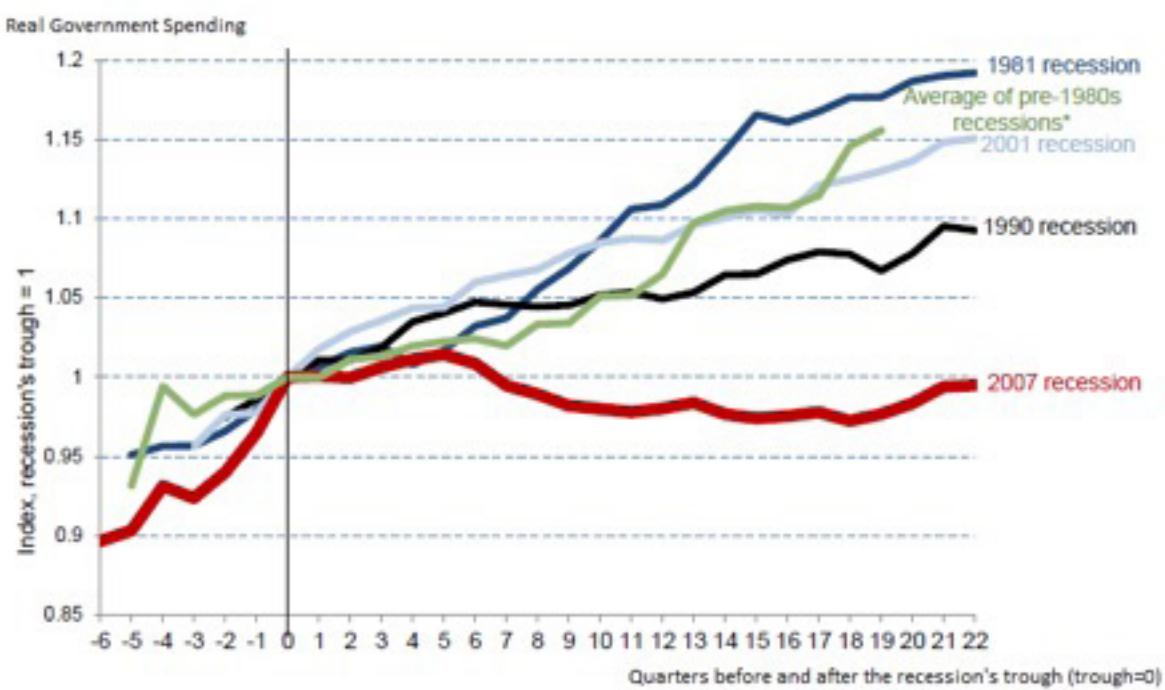


Table 1: Sources of Income and Wealth in the United States in 2007

	Wealth Quintiles					Top 1%
	1st	2nd	3rd	4th	5th	
Composition of Income (in %)						
Labor Income (from wages)	78.9	81.2	78.6	77.1	51.4	30.2
Financial Income (from capital and business interests)	2	4.7	7.2	10.2	39.7	65.7
Transfer income (from government programs)	15.5	12	12.4	12.1	8.2	3.6

Table 2: Inflation Sensitivity in the United States in 2014

Household Income (in \$)	Percent (%) of expenditures paid for with:			
	Cash	Debit Cards	Credit Cards	Other
Less than 25,000	55	31	5	9
25,000-49,999	29	51	15	5
50,000-74,999	22	49	24	5
75,000-99,999	16	46	35	3
100,000-124,999	16	43	37	4
125,000-199,000	14	40	37	9
200,000 and above	10	15	66	9

Source: (Nakajima 2015:13)

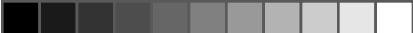


Table 3: Net Nominal Position as a Percentage of Net Worth in the United States in 1989

	Net Nominal Position as a Percentage (%) of Net Worth						
Age of head of household	0 - 35	36 - 45	46 - 55	56 - 65	66 - 75	>75	Unweighted Average (all ages)
By household income							
All income levels	-42.6	-10.1	2.3	15.2	19.4	30.6	
Poor (bottom 20%)	-36.6	-33.8	-5.5	7.5	17.5	26.4	-4.08333
Middle-class (middle 70%)	-114	-31.6	-4.8	14	25.2	38.1	-12.1833
Rich (top 10%)	-14	3.8	6.6	16.3	16.7	27.5	9.483333

Source: (Nakajima 2015:11)

Table 4: Sizes of the Asset Purchase Programmes up to December 2012

Central Bank	Programme	Assets Purchased	Peak Size (Billion)	Peak Size (Billion USD)	2008 GDP (Billion)	Share of the Economy (%)
Fed	QE1	GSE Agency Debt	\$175		\$1,4292	1.2
		MBS	\$1250			8.7
		Treasuries	\$300			2.1
	QE2	Treasuries	\$600			4.2
		Maturity Extension Programme	\$667			4.7
	QE3	MBS	\$160			1.1
		Treasuries	0			0
BoE	APF	Gils	£375	£590	£1,441	26
		Commercial Paper	£1.97	£3.1		0.1
		Corporate Bonds	£1.60	£2.52		0.1
ECB	CBPP	Covered Bonds	€ 60	€81	€ 9,219	0.7
		Euro Area Sovereign Debt	€ 220	€297		2.4
	CBPP2	Covered Bonds	€ 40	€54		0.4
Fed Total			\$3152	\$3153		22.1
BoE Total			£379	£596		26.3
ECB Total			€320	€432		3.5

Source: (Fawley and Neely 2013:77)



THE EFFECT OF SOCIAL MEDIA USAGE ON DEMOCRATIZATION IN THE MIDDLE EAST

By ALLISON HUBERT

photo by National Geographic

EVER SINCE SIX DEGREES, THE FIRST social media site allowing Internet users to communicate online, was created in 1997, the prevalence and importance of social media in everyday life has accelerated around the world. In democratic countries, citizens of all backgrounds have been gaining increasing access and opportunity to share their thoughts with individuals, groups, or the general public (Open Net Initiative). The internet, specifically social media, has given marginalized groups access to voice their opinions and a means for the entire country to hear them, thereby cultivating higher levels of democracy; considering every citizen's opinions when governing is the definition of democracy, and social media provides a wider range of citizens a platform to voice their opinions.

There are a plethora of examples demonstrating how social media has further democratized previously democratic countries. For instance, in Finland the government uses government official social media pages to communicate directly with citizens via surveys and/or forums. Before social media, the government's perception of public opinion was shaped through lobbyists who usually represent extreme viewpoints and surveys that were criticized for having significant selection bias. The increase in internal communication provides the government with a more accurate representation of public opinion on any

given issue. Furthermore, social media has increased Finland's external communication as well; instead of primarily interacting with countries in which Finland has an official embassy, the Finnish Foreign Ministry interacts via social media with international governments, companies, and other organizations via social media (Ferdinand, 2000). The United States also uses social media to promote democracy by improving law enforcement and promoting the sharing of thoughts and ideas no matter how popular or unpopular. When a crime is committed and the police need to contact a town about the incident, the police department may send alerts or request information from town residents within seconds via social media; the increased efficiency and wider contact enhances the efficacy of law enforcement significantly. In terms of promoting idea exchanges, every citizen has the option of voicing their opinion on social media, leading to a gargantuan increase in political debates by politicians as well as voters (Gueorguieva, 2008). The fostering of debate is a core component of deliberative democracy; politicians and voters can more easily and more accessibly debate and decide public policy via direct interactions on the Internet.

On the contrary, the Middle East is commonly criticized, among other things, for limited freedom of speech. Within the past five years BBC, New York Times, Wash-

ington Post, and other top news sources have published pieces criticizing countries in the Middle East for imprisoning or killing journalists who published truthful pieces about world events that went against the government's false/biased narrative of the event. Within the region, there is significant variance of accessibility and quality of Internet and social media sites. While some countries embrace technological innovation and grant free access of the latest technologies to the masses, other countries censor and/or outlaw certain media outlets and social media websites: emergency laws, technical filtering, surveillance, and penal codes are just some of the techniques used by Middle Eastern governments to limit freedom of internet usage (Freedom House, 2014). Figure 1 demonstrates the Middle East lagging behind North America and the European Union (democratic regions) in terms of percentage of the population on Facebook, the world's leading social media website (Internet World Statistics, 2014).

Due in part to the limited freedom of speech, the Middle East is the least democratic region in the world. Corruption, discrimination, and intimidation are prevalent in Middle Eastern governments, so naturally there has been lots of talk about how to improve the governance and overall quality of life in the region. While some journalists say Middle Easterners-particularly devout Muslims who want Islam to



remain an integral part of government-do not desire democracy, this is not true (Tessler, 2011). According to Figure 2, 85.8% of Middle Easterners strongly want democracy. Furthermore, those who believe Islam and politics should be separated or should be mixed have similar rates of desiring democracy: the general consensus in the Middle East is the common people overwhelmingly want democracy.

As demonstrated by the Finland and United States examples previously discussed, there is clearly a connection between increased free social media usage and democratization. However, the direction of causation is ambiguous. Because there are so many complicating factors other than social media usage freedom that affect democratization, it is difficult to establish a causal effect with certainty. Furthermore every country is unique with different cultures, economies, and governments; the same increase in social media freedom will have different results in different countries, making it even harder to interpret the causes of democratization and determine causation across multiple nations and cultures. Understanding these limitations, this paper will examine the relationship between social media and democracy in the Middle East.

Percentage of Population on Facebook	
North America	87.7%
European Union	78.5%
Middle East	48.1%

Figure 1: Facebook Penetration by Region

Data collected from Internet World Statistics: Usage and Population Statistics (2014)

Islam and Politics (→)	Should Be Separated	Should Not Be Separated
Support for Democracy (▼)		
Weak	6.3%	7.9%
Strong	44.4%	41.4%

Figure 2: The Relationship between Attitudes towards Democracy and Islam

Data collected from (Tessler, 2011)

SOCIAL MEDIA USAGE AND DEMOCRATIZATION IN THE MIDDLE EAST: THEORY

From observing the etiology of democratization throughout history in currently democratic countries, two main trends seem to emerge in the transition from a natural state to an open-access state (North & Weingast, 2009). The first is movement from personal to impersonal relationships, particularly among the elite. The less personal elites' relationships are, the less likely the elites will be swayed to act in the best interest of a faction with

which they have a close relationship with instead of the best interest of the entire country. The second trend is the government allowing citizens to form organizations independent of the government; independent organizations foster political action. In any society, there is a spectrum of how inclined people are to participate in politics. The extremely inclined will demonstrate their passion no matter what the cost: independent organizations have no impact on their participation. However, independent organizations allow for the extremely inclined to recruit those who are slightly less inclined to join the movement. Then the organization targets those who are slightly less inclined than the newest members, and the cycle continues until political participation is considered the norm-a prerequisite for democracy (Wellman et al., 2001). In addition to the ripple effect, independent organizations make political participation more visible to the public. If one person protests a policy, that is not significant. However if multiple organizations protest a policy, then that may be significant enough to gain national attention (Pollock, 1982). Because impersonal relationships encourage the government

causes an increase (decrease) in democratization.

SOCIAL MEDIA AND DEMOCRATIZATION IN THE MIDDLE EAST: REAL-LIFE COMPLICATING FACTORS

Recognizing an increase or decrease in social media liberties in the real world is not as simple as it may seem. While a government might implement a law that would seem to increase Internet freedom of speech on a surface level, such as legalizing a social media website, that doesn't necessarily imply a legitimate increase in social media liberty. Throughout the past and the present Middle East governments have passed policies that in writing sound pro freedom of speech, but in reality complicating factors such as government surveillance or penal codes inhibit freedom of expression.

Before Six Degrees (the first social media website) was even created in 1997, the vast majority of Middle Eastern countries were inhibiting freedom of speech. One American reporter for Newsweek, Richard Smith, described his experience reporting in the Middle East about the Yom Kippur War as spending most of his energy dealing with "government harassment, stiff restrictions on access to the front, and pervasive censorship" rather than journalism (Smith, 1974). Furthermore, Richard Smith was shocked at the accounts of the war in both government reports and local newspapers; the "information [that] was passed along by official spokesman on both sides turned out to be pure misinformation" (Smith, 1974). While most journalists followed the government's wishes, a few resisted and wrote articles that went against what the government said or against the government itself. Dissenters were punished with fines, time in prison, or in extreme cases death. The threat of these severe punishments dissuaded most future journalists from publishing anything anti-government.

Over the past decade while social media has been slowly introduced to Middle Eastern culture, there has been uncertainty over what is acceptable to post online by the governments' standards. Some people have feared punishment by the government and have not written anything controversial, while others have taken advantage of the platform to voice their opinion and have written anti-government statements. At first, government did not have the resources to monitor thousands of citizens, but after

to instill democracy and independent organizations encourage citizens to participate in democracy, their combination leads to democratization.

HYPOTHESIS

Because social media cultivates impersonal relationships and government-independent organizations (the two prerequisites for democracy), the direction of causation between social media and democracy should be that an increase (decrease) in legitimate social media freedom



anti-government opinions were becoming prevalent the governments quickly implemented technical filtering, emergency laws, internet surveillance, penal codes, press laws, and more (Tessler, 2012). Presently, most Middle East countries have regained control over the media and social media: bloggers and cyber-dissidents are subject to the same rules and punishments as professional journalists. Unlike in the late 1990s, the governments' threats are now credible: the governments have the technology to monitor online interactions. As proof, over a dozen Middle Eastern bloggers have been caught and executed since 2000 for posting anti-government material online. As a result, in 2009 the International Federation of Journalists called for massive reforms on Middle Eastern media laws (Open Net Initiative: Middle East). Discouraging and criminalizing expressing oneself leads to an established culture, both explicit and implicit, of conformity. Citizens' obeying a government's desires contradicts democracy: governments are supposed to be guided by the wishes of its citizens.

INCREASES IN SOCIAL MEDIA USE CAUSE DEMOCRATIZATION: BREAKDOWN BY COUNTRY

Considering all the complicating issues discussed above, the next step in examining whether or not increases in free social media use causes democratization is looking at real-world scenarios, specifically countries in the Middle East, and determining if in fact an increase (decrease) in free social media usage causes an increase (decrease) in democratization. Egypt and Bahrain will be analyzed because they both have experienced significant fluctuation in their social media policies and level of democratization.

EGYPT

LEAD-UP

In 2008, the April 6th youth movement, an anti-labor party movement was the first group to use social media to organize and protest. They had a few hundred followers on Facebook, and they managed to gather less than 1,000 peaceful protesters in Tahrir Square. Facebook existed in Egypt, but it was not a common feature of Egyptian culture. Within a year, the movement regressed into insignificance (Lotan, 2011).

In April 2009, Mark Zuckerberg launched Arab Facebook. Within six

months, the number of Facebook users increased from less than a million users to over 5 million users. Not only did the number of Facebook users increase dramatically, but so did the average number of posts per user (Wright, 2011). Twitter became popular in the Middle East around the same time. Clearly, social media use started increasing dramatically in the second half of 2009.

In June 2010, Khaled Said, an Egyptian civilian, was dragged out of an Internet café by the Egyptian police and tortured until he died gasping for breath in between lashes. The Egyptian government denied unjustified use of force, but bystanders posted gruesome photos and videos to Facebook and Twitter. The Egyptian people were outraged. Within hours of the incident, Wael Ghonim created the Facebook group "We are all Khaled Said"—the largest political dissent online group ever in the Middle East (Lim, 2012). This group wanted justice for Khaled and his family, namely arresting the police officers responsible for the attack. The group expanded from wanting justice for this one incident to wanting justice for all Egyptians: the group took a stand against government corruption, mistreatment of laborers, religious discrimination, and Egypt's emergency laws that allowed the government to make false statements and prevented journalists from criticizing the government account of events or the government itself in any way. Outside of the Facebook group, Egyptian were taking action: new blogs such as "Egyptian Awareness" and "Egyptians Against Torture" were being created daily, further increasing the anti-government sentiment (Lim, 2012).

Within six months, Wael Ghonim organized and mobilized a critical mass to hold a demonstration. On January 25, 2011, over 80,000 peaceful protesters stood in Tahrir Square voicing anti-government sentiment. This became known as the Egyptian Revolution (Lim, 2012).¹

ROLE OF SOCIAL MEDIA

The Committee to Protect Jour-

nalists (CPJ) has deemed Egypt one of the world's worst places to be a journalist in the 21st century; freedom of speech is atrocious. Emergency laws have been in place since 1967, giving the Egyptian government the ability to detain anyone who it deems as having anti-government views. Equally as important, there has been an informal norm in Egypt that the Egyptian government should never receive bad press, known as the cleric-government informal allegiance. This unspoken agreement between the Grand Imam of Al-Azhar (Muhammad Sayyid Tantawy: held position from 1996-2010) and the president (Hosni Mubarak: held position from 1981-2011) implied that neither leader would publish bad press about the other. For example, Tantawy would not discuss Mubarak's ostentatious palace and in return Mubarak would not criticize the harassment of non-orthodox Muslims. The cleric-government informal alliance worsened the quality of public information, so many citizens were ignorant about the corruption occurring in Egypt. Obviously if the public is not informed about an injustice, the public cannot react to it (Nassif, 2013).

Emergency laws and the unspoken corruption in the Egyptian government had been present since 1967, so why did the Egyptian Revolution occur in 2011? Social media is a huge part of the answer why.

In 2009 when Arab Facebook was launched and Twitter became popular, the political culture changed. The emergency laws and informal alliance remained, but citizens had more power. After the Khaled Said tragedy, citizens had the power to publish the truth about what happened. The truth circulated within hours of the incident, the fastest spread of information ever in Egypt. An overlooked importance of Facebook and Twitter is how they allowed people to form an emotional and personal attachment to the cause. Egyptians had heard many incidents of gruesome deaths and tragedies for over 40 years, but seeing the photos of Khaled and hearing personal anecdotes about him-thanks to Facebook and Twitter-made people care enough to act. Organizing support for Khaled's family happened at an unprecedented rate because of the Facebook group and re-Tweets. Facebook allowed for Wael Ghonim and colleagues to advertise to the masses and reach people they would have never been able to contact in person. Following the ripple effect principle, Wael Ghonim asked political

¹ From 2007-2011, there were no significant changes in freedom of speech or freedom of social media usage in Egypt. Because there were no significant changes in freedom of speech/social media usage and the prevalence of social media usage increased from 2009-2011, Figure 3 shows "Free Social Media Usage" as increasing from 2009-2011



activists to join the Facebook group, who then asked others they knew were inclined to join, and the cycle continued until taxi drivers and soccer fans (some of the least inclined people to protest) joined the cause (Enjolras, Johnsen & Wollebaek, 2012). Before social media, there was no realistic way to contact and organize people from so many different spheres of life. Once the group had organized and gained a critical mass, mobilizing was easy: post the date and time in the Facebook group or on Twitter and people will participate.

THE EGYPTIAN REVOLUTION

The Egyptian Revolution of 2011 officially lasted from January 25–February 11. On January 25, the anti-Mubarak peaceful protesters were met by the Egyptian police and military. As days passed, chaos and violence ensued. On February 1, Mubarak publicly offered concessions to the protesters, but they were not sufficient to appease them. Finally on February 11, Mubarak resigned and the Supreme Council of Egyptian Armed Forces (SCAF) took power (Dalakoura, 2012).

POST-REVOLUTION EGYPT

On February 13, 2011, The Supreme Council suspended Egypt's Constitution and announced that in six months the country would have fair, democratic elections for a new government. A temporary constitution was drafted and approved by referendum on March 19. Egypt seemed to be making democratic strides. However, on March 23 the Egyptian Cabinet re-enforced the infamous emergency laws criminalizing protests. Protests started again in Tahrir Square. In June of 2012, SCAF organized a somewhat democratic election and Mohamed Morsi, the Muslim Brotherhood candidate, prevailed. In June he preached that his power comes from the people, indicating democratic notions and eliciting great support from the West. By June 2013, many Egyptians were dissatisfied and protested in Tahrir Square again. On July 3, Morsi was involuntarily removed from office by a coup d'état led by the armed forces. On July 4, Adly Mansour was appointed interim president. Morsi vowed to regain power and many Morsi supporters vocalized their support, but the military shut down pro-Morsi protests. These demonstrations turned violent, resulting in the Rabaa massacre where over 1,000 protesters were killed in August 2013. In 2014, elec-

tions were held and former military leader Abdel Fattah-el Sisi won. Clearly instability plagued Egypt and despite glimpses of hope for democratic advancement, the country is becoming less democratic² (Cafiero, 2013).

SOCIAL MEDIA CAUSES DEMOCRATIZATION IN EGYPT

In order to determine a causal relationship between two variables, one variable must precede the other. Said differently, a change in the independent variable in time "t" must effect a change in the dependent variable in time "t+1". Figure 3 shows that Free Social Media Usage (the independent variable) in time "t" causes a change in democratization (the dependent variable) in time "t+1". Free Social Media Usage increased from 2008–2011, causing democratization to increase from 2010–2012. Then Free Social Media Usage decreased from 2011–2014, causing democratization to decrease from 2012–2014. In fact in 2014, The Economist Intelligence Unit downgraded Egypt from a hybrid regime to an authoritarian regime.

BAHRAIN

IMPORTANT NOTE

It is incredibly difficult to find reliable articles on social media usage in Bahrain, and on Bahrain in general. There is extreme censorship and so little transparency in Bahrain that scholars are forced to use sources that may not be fully credible. The coverage of the 2011 revolution is particularly questionable: in 2011 and 2012 media outlets such as BBC, Al Jazeera, CNN, and Al Arabiya all published articles about the revolution that created significant international controversy. Some news

and biases in the original article. Given the circumstances, I have done my best to gather the most accurate information.

LEAD-UP

Bahrain differs from most Middle Eastern countries in that its population is predominantly Shia, while the government is primarily Sunni. Historically (and presently) this has been (and is) an acute cause of conflict in Bahrain. Other sources of discontent include media censorship, religious discrimination, maltreatment of women, unfair wages and unhealthy working conditions for blue-collar workers, and more.

In terms of Internet and social media usage, Bahrain was one of the first Middle Eastern countries to incorporate (its very limited version of) Internet and social media into its culture. Therefore unlike Egypt, from 2007 to 2014 there was no significant increase in social media usage in Bahrain (Open Net Initiative: Bahrain).

Before 2011, Bahrain was relatively stable in its freedom of social media. Social media use was incredibly restricted: the 2002 Press Law restricted discussion about controversial topics and banned journalists from voicing any opinion threatening to the government. The Bahrain Internet Society, a government run organization, periodically chooses its favorite article published by a citizen and circulates it nationwide. In other words, the government controls what the public reads. The telecom market is heavily regulated, and the government has unchecked power to block any website or ISP it wants. A small amendment to the 2002 Press law was passed in 2008 eliminating imprisonment for journalists. While on the

	Free Social Media Usage	Democratization
2007	Baseline	3.90
2008	Similar to 2007	3.89
2009	Large increase since 2008	---
2010	Increase	3.07
2011	Increase	3.95
2012	Decrease	4.56
2013	Decrease	3.27
2014	Decrease	3.16

sources, particularly BBC, had to release pages of apologies citing misinformation

² Because of the general instability, decreased freedom of speech, and increased government censorship on social media, Figure 3 shows "Free Social Media Usage" decreasing from 2012–2014

surface that seems like an increase in



freedom of social media usage, journalists could still be imprisoned under the anti-terrorism laws, so there was no significant effect of this amendment¹ (Open Net Initiative: Bahrain).

Inspired by the Tunisian and Egyptian protests, Bahraini activists wanted a stop to censorship, torture, discrimination, and inequality. The Shiites emphasized the injustice component, heavily lobbying for more Shiite representation in government.

In early January 2011, political activists started communicating about planning protests via Twitter and Facebook. The plan, set for February 14, was to protest peacefully, demanding that the government respond to the people's desires.

Anticipating the protests, in late January the government proposed changes to public policy such as increasing spending that helps the unemployed/poor and releasing children from prison who did not deserve to be incarcerated. These concessions were not sufficient to soothe protesters: small groups of activists protested in early February. Hoping to appease the public, King Hamad surprisingly announced that he will give every Bahraini family 1,000 dinars (Bahraini currency). Once again, this tactic did not work (Husayn, 2015).

BAHRANI REVOLUTION

On February 14, 2011 the revolution officially began. However, the military was well prepared and stationed to quell the protests as quickly as possible. Almost immediately Bahrain's armed forces starting using force to suppress any sign of protest. Dozens of civilians were injured and one person died. The next day, a funeral was held for the man who died. The security forces open-fired on the peaceful mourners and one griever died. Demonstrators then walked to Manama. The police followed, arming Manama and once again using force to harm civilians. By February 25, almost 40% of Bahrainis were present at a protest, double the percent in mid-February. As time went on, King Hamad was forced to offer more appealing concessions, but protesters were so outraged with the government's reaction to activists that no amount of concessions short of King Hamad's resignation would have satisfied

¹ Because there was no significant variation in social media policy and no significant change in social media prevalence from 2007 to 2010, Figure 4 shows "Free Social Media Usage" as staying constant from 2009-2010

them. Sunni-Shiite conflicts emerged, and the state of Bahrain was chaotic. Saudi Arabia and United Arab Emirate agreed to help the Bahraini government and send backup troops into Bahrain (Zunes, 2013).

On March 15, King Hamad declared a state of emergency and ramped up the subjugating efforts. On March 16, Bahraini security increased its level of violence, attacking Manama and killing multiple people. By the start of April, King Hamad and his government regained control of Bahrain and started aggressively identifying and punishing protesters, most notably political adversaries.

In early April, the government destroyed dozens of Shiite mosques as a symbol of power and a warning to the Shiites to never insult the Bahraini government again. Throughout April and May anti-government campaigners were imprisoned, tortured, or even murdered, although intense international pressure prevented the Bahraini government from punishing most activists as harshly as it would have liked.

On June 1, immediately after the state of emergency had officially ended, Shia communities protested demanding the termination of martial law. The government silenced those protests and started the trials of doctors who had saved injured protesters' lives (Zunes, 2013).

ROLE OF SOCIAL MEDIA

In comparison to the Middle East, Bahrain has a high percentage of Internet users. However due to severe restriction of social media websites, relatively few interactions occur compared to the high percentage of Internet. However, during the revolution Facebook and Twitter were instrumental in organizing and mobilizing citizens in a similar fashion to the Egyptian Revolution. The one critical difference between the role of social media in the Egyptian and Bahraini revolution is the use of social media during the actual protests. Because the Bahraini protesters were met with military aggression and resistance, people were tweeting and posting to Facebook during the protests informing peers of escape routes, where/when the next protests would be held, and other useful information. In fact, the government figured out the Bahrainis were trying to organize a protest at a politician's home so the government blocked Google Earth. Media restrictions became so strict that nobody knows the full truth of what happened in 2011 rev-

olution. Esteemed news sources such as the New York Times and the Wall Street Journal were denied entry to Bahrain. The few journalists that were allowed entry reported conflicting stories—most notably the Al Jazeera and Al Arabiya conflicting accounts of the same protests. Four CNN reporters were detained and one was expelled from Bahrain for no legitimate reason. A bystander posted video footage to YouTube of one unarmed, peaceful protester being shot by a soldier² (Zunes, 2013).

POST-REVOLUTION BAHRAIN

It is difficult to define an exact end to the Bahrain revolution because there were so many scattered protests and violent incidents that proceeded for years. In 2012 Nabeel Hal Hamer, King Hamad's media advisor, announced that he would host discussion between the opposition and his government via Twitter. In addition the Bahrain Debate—a government-independent, nonpartisan organization that brings the youth of Bahrain together to discuss intellectual and social issues—was allowed to convene and debate.³

Although freedom of social media and speech increased in 2012, it was still remarkably poor—one of the worst in the world. In March 2012, hundreds of thousands of protesters demanded that King Hamad resign and that political leaders who were incarcerated in the original protests be released. The government stopped this protest peacefully. Throughout March and April there were interspersed bomb explosions set off by angry protesters (Zunes, 2013). Even today, occasional incidents like these occur in Bahrain.⁴

SOCIAL MEDIA CAUSES DEMOCRATIZATION IN BAHRAIN

Figure 4 shows once again that Free Social Media Usage causes a change in democratization, although the findings are not as apparent as Egypt's case. Free Social Media Usage remained constant from

² Because the government used social media surveillance/restriction to incarcerate many prominent protesters, Free Social Media Usage decreased significantly from 2010-2011 in Figure 4

³ Because the government reactivated some social media websites and encouraged the sharing/debating of ideas, Free Social Media Usage increased from 2011-2012 in Figure 4

⁴ Because the government has not changed its social media policy much since 2012 and social media use hasn't changed significantly since 2012, Free Social Media Usage stayed the same from 2012 to 2014 in Figure 4



2007-2010, just as democratization level remained relatively constant with the exception of an incredibly minor 0.04 point decrease from 2007-2008. Then Free Social Media Usage plummeted from 2010-2011, just as Bahrain became significantly less democratic. From 2007-2010, only a positive correlation can be shown between free social media usage and democratization because changes in free social media usage and democratization are occurring simultaneously. After 2010 is when the causation becomes more apparent.

From 2011-2012, free social media usage increased, affecting an increase in democratization from 2012 to 2013. Similarly, free social media usage remained constant from 2012 to 2014, affecting a stable level of democratization from 2013 to 2014.

WHY THE RESULTS ARE IMPORTANT

Because an increase (decrease) in free social media usage in time "t" results an increase (decrease) in democratization in time "t+1", it is logical to conclude that an increase (decrease) in free social media usage causes an increase (decrease) in democratization.

Referring back to Figure 2, the vast majority of Middle Eastern inhabitants (85.8%) strongly want the region to democratize. The Middle East is currently the least democratic region in the world, so significant progress must occur in order for the region to democratize. Therefore, research and review papers like this one must

factors that lead to free social media usage) will help the Middle East democratize faster. Of course how to convince the government to permit free social media usage is a puzzling question. While there is no one direct answer to that question (every country is unique so every country's course of freeing personal expression will be slightly different), it seems as if the only way to permanently liberalize social media is if it is in the government's best interest to allow for freedom. Egyptian and Bahraini protesters, among other nationalities in the Middle East, have devoted so much time and effort to fighting for free speech, but each time the government resorts to its familiar, oppressive tactics because there was no institutional change.

While so many of today's efforts are focused on politically pressuring the Middle East to adapt democratic values, a better approach might be to change the incentives for the elites in the government so that their best interest and the citizens' best interests align. For example, promoting economic development through online communication and cooperation is beneficial to the citizens because they gain access to new markets and can communicate with customers and/or business partners whom they would have never interacted with if not for social media. From the government's viewpoint, a thriving economy is always a positive way to retain power, the goal of many Middle East governments. Therefore, introducing websites such as

	Free Social Media Usage	Democratization
2007	Baseline	3.53
2008	Same as 2007	3.49
2009	Same as 2008	---
2010	Same as 2009	3.49
2011	Huge decrease from 2010	2.92
2012	Increase from 2011	2.53
2013	Same as 2012	2.87
2014	Same as 2013	2.87

be conducted to better understand the democratization process, hopefully kindling ideas about how the Middle East can ignite or accelerate (depending on which sub-region you are considering) the democratization process.

Since it is established that free social media usage increases democratic ideals in the Middle East, fostering an increase in social media prevalence and reducing restrictions on social media (the two main

LinkedIn, eBay, or Yelp to the Middle East could help align the government's and citizens' best interests so that both parties reap benefits and freedom of speech is improved, leading to democratization.

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