STUDENT ECONOMIC REVIEW 2017

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Prize-Winning Essays of the Student Economic Review 2017

Best Overall Essay: Dermot McAleese Medal

Have Cake and Eat it: A Game Theory Analysis of the Brexit Trade Talks

Théophile Pastré

Best Economic History Essay: Donagh Lynch Medal

Sovereign Debt Markets and Political Stability – Evidence from 19th Century Europe

Christopher Swords

Best Freshman Essay Prize:

Third Level Education: Levelling the Playing Field?

Keelan Beirne

Editors and General Managers of the Student Economic Review, 1987-2017

Year	Editor	General Manager
1987 (Vol. I)	John Fingleton	Paddy Waldron
1988 (Vol. II)	Kevin Carey	Finbar McDonnell
1989 (Vol. III)	Jonathan Wright	Joe Dennehy
1990 (Vol. IV)	Philip Lane	C.J. O'Neill
1991 (Vol. V)	Paul O'Connell	Billy Stamp
1992 (Vol. VI)	Alan White	Addo C. Barrows III
1993 (Vol. VII)	Gareth Davis	David Butler
1994 (Vol. VIII)	Alan Dunne	Donagh Lynch
1995 (Vol. IX)	Fergal Shortall	Myles H. Clarke
1996 (Vol. X)	Geoffrey Gill	Suzanne O'Neill
1997 (Vol. XI)	Sarah Rowell	Carol Newman
1998 (Vol. XII)	Richard Doyle	Charlotte Hess
1999 (Vol. XIII)	Michael McMahon	Niamh McDonagh
2000 (Vol. XIV)	Ana Carrie	Colette Murphy
2001 (Vol. XV)	Ronan Lyons	Charles Larkin

Year	Editor	General Manager
2002 (Vol. XVI)	Ivan McAdam	Janine Boyd-O'Connell
2003 (Vol. XVII)	Rowena Gray	Elaine Doyle
2004 (Vol. XVIII)	Denis Tkatchenko	Tara McIndoe
2005 (Vol. XIX)	Cormac O'Dea	Paul Sammon
2006 (Vol. XX)	Deirdre Reilly	Melinda Simonffy
2007 (Vol. XXI)	Niamh Crilly	Charlie Nolan
2008 (Vol. XXII)	Nathalie Ennis	Kieran Curtis
2009 (Vol. XXIII)	Jean Acheson	James Walsh
2010 (Vol. XXIV)	Jason Somerville	Amandine Lobelle
2011 (Vol. XXV)	Robert Farhat	Áine Ní Shúilleabháin
2012 (Vol. XXVI)	Tony O'Connor	Debbie Blair
2013 (Vol. XXVII)	Brian Higgins	Marielle Grigsby-Rocca
2014 (Vol. XXVIII)	Féidhlim McGowan	Cián Mc Leod
2015 (Vol. XXIX)	Gearóid Gibbs	Michael Mahony
2016 (Vol. XXX)	Gillian O'Connell	Kate Hayes
2017 (Vol. XXXI)	Míde Ní Ghríofa	Alexandru Radu Puiu

Guest Speakers at the Launch of the Student Economic Review, 1990-2017

Year	Speaker	Organisation
1990 (Vol. IV)	Richard Lipsey	Simon Fraser University
1991 (Vol. V)	Charles Goodhart	London School of Economics
1992 (Vol. VI)	Peter Sinclair	Brasenose College, Oxford
1993 (Vol. VII)	David Greenway	Nottingham University
1994 (Vol. VIII)	Hamish McRae	The Independent, London
1995 (Vol. IX)	John Sutton	London School of Economics
1996 (Vol. X)	John Martin	OECD
1997 (Vol. XI)	Alan Tait	IMF
1998 (Vol. XII)	David O'Sullivan	European Commission
1999 (Vol. XIII)	Paula Donovan	World Bank
2000 (Vol. XIV)	Dermot McCarthy	Department of An Taoiseach
2001 (Vol. XV)	Donal Donovan	IMF
2002 (Vol. XVI)	Margaret Doyle	The Economist

Year	Speaker	Organisation
2003 (Vol. XVII)	Tom Healy	Irish Stock Exchange
2004 (Vol. XVIII)	Gerry Foley	ITV PLC.
2005 (Vol. XIX)	John Fingleton	Competition Authority
2006 (Vol. XX)	Marius Brülhart	HEC University of Lausanne
2007 (Vol. XXI)	Cliff Taylor	Sunday Business Post
2008 (Vol. XXII)	Alan Barrett	ESRI
2009 (Vol. XXIII)	Patricia Callan	Small Firms Association
2010 (Vol. XXIV)	Jane Williams	Forfás
2011 (Vol. XXV)	Tom O'Mahony	Department of Transport
2012 (Vol. XXVI)	Kyran McStay	Key Capital Limited
2013 (Vol. XXVII)	Alan Gray	Indecon Economic Group
2014 (Vol. XXVIII)	Anke Heydenreich	Attestor Capital LLP
2015 (Vol. XXIX)	Declan Sheehan	JP Morgan
2016 (Vol. XXX)	Various Speakers	Past Committee Members
2017 (Vol. XXXI)	Kevin O'Rourke	All Souls College, Oxford

Student Economic Review Debates, 1996-2017

Year	Opposition	Topic	Victor
1996	U.C.D.	Third-Level Fees	Trinity
1998	U.C.D.	EMU Without Britain	Trinity
1999	Oxford	The Euro: The Way Forward?	Oxford
2002	Oxford	Boston or Berlin?	Trinity
2003	Cambridge	The Euro is a Success	Cambridge
2004	U.C.D.	Free Trade and Development	U.C.D
2005	Oxford	Third World Debt	Trinity
2006	Cambridge	Common Agricultural Policy	Trinity
2007	Oxford	Environmental Responsibility	Trinity
2007	Yale	Boston or Berlin?	Trinity
2008	Harvard	Mass Emigration and Labour	Trinity
2008	Cambridge	Britain's Place in Europe	Cambridge
2009	Yale	Boston or Berlin?	Yale
2009	Oxford	Bank Nationalisation	Trinity
2010	Cambridge	Should Ireland Have Joined the Euro?	Trinity
2010	Harvard	The Decline of U.S. Economic Dominance	Harvard

Year	Opposition	Topic	Victor
2011	Oxford	Ireland Owes a Debt of Gratitude to Britain	Oxford
2011	Yale	It's All America's Fault	Trinity
2012	Cambridge	Ireland Should Rejoin the Sterling Area	Trinity
2012	Harvard	The U.S. State Does Not Care for its Sick	Harvard
2013	Oxford	Deserting the Euro	Trinity
2013	Yale	Tax is Theft	Trinity
2014	Cambridge	United States of Europe?	Cambridge
2014	Harvard	U.S. Education System	Trinity
2015	Oxford	100% Inheritance Tax	Trinity
2015	Yale	Opening the Mexican Border	Yale
2016	Cambridge	Will the E.U. Benefit from a Brexit?	Cambridge
2016	Harvard	Should We Be Afraid of Cheap Oil?	Harvard
2017	Oxford	This House Believes the E.U. is Unsustainable	Oxford
2017	Yale	This House Believes Globalisation is Doomed	Yale

ENDORSEMENTS

"The Student Economic Review gives many students their first opportunity to publish a piece of academic written work. it thus supports and promotes the rigorous analysis, excellence in learning and persuasion that are essential building blocks for future careers and broader intellectual contribution. The collected contributions, now reaching into a third decade, constitute an elegant contribution to scholarship and erudition of which Trinity College can be proud."

John Fingleton
DPhil Oxford and former Chief Executive Officer of Fair Trading London
Editor, Ser 1987

"The Student Economic Review is the only student-run economics journal that I know of at any university. It has succeeded beyond anyone's wildest expectations when it first came out, over 20 years ago. As recent events have highlighted, economics is still a young discipline, and the economics profession still has much to learn, but the opportunities and questions are exciting. The Student Economic Review is an unparalleled vehicle for getting students involved in research in economics and related fields."

Jonathan Wright
PhD Yale and former Professor of Economics at John Hopkins University
Editor, Ser 1989

"There's a strange alchemy to the student economic review. It pulls together a diverse community of students to produce a publication like no other. Whether surveying the state of the art, or changing the state, the articles it contains bring out the best in contributor. More than that, though, the final product is greater than the sum of its parts. The ties it forges and the legacy it leaves are unique, as is clear on the faces of students, faculty and guests at each year's launch."

Paul O'Connell
PhD Harvard and President at FDO Partners Investment Management, Boston
Editor, Ser 1991

THE STUDENT ECONOMIC REVIEW

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The Student Economic Review

Welcome to the Review

On behalf of the committee of the 31st edition, it is my honour and privilege to welcome you to the 2017 Student Economic Review.

The Student Economic Review is the oldest academic journal published by students in the world. Every year since 1987 we have published the work of the brightest economic students in Trinity College Dublin, in order to support and showcase the talent of our peers. Indeed, the essays you will have the opportunity to read in this journal are among the finest economic thought pieces written this year.

Each year, the SER, in conjunction with the College Historical Society and the University Philosophical Society, hosts debates on the most pressing economic issues. This year, we were privileged to have teams from Oxford and Yale to debate on the sustainability of the European Union and the stability of global capitalism. The rhetorical skill of the debaters impressed audiences, who were exposed to thought-provoking and innovative arguments. Overall, we are extremely proud to continue the tradition of organising inspiring debates which will surely leave a lasting impression on attendees. The success of these debates is due to the hard work of our Debates Convener, Ryan Cleary, whom we thank for his dedication towards the SER.

The SER also organises various talks and workshops with the aim of enriching our fellow students' college life. This year, we organised a workshop which featured economists from the Irish Government Economic and Evaluation Service, who provided students with an insightful presentation on how behavioural economics is used to aid policymakers. In addition, we hosted a workshop to assist Junior Freshman students in studying for their scholarship examination.

In 2017, we have had a record number of submissions for our journal. We are grateful to all the people who have taken their time to submit essays for publication. The Editorial Board has had the immensely challenging, yet rewarding task of selecting the articles to be published in the journal. As you will surely notice, the articles selected for this year's Review are of a rare quality. The work of our Editorial team, comprised of Míde Griffin, Grace Beirne and Eimear Flynn ensured the exceptional quality of this year's edition.

We want to thank our patrons, Dr Tara Mitchell, Dr Ronan Lyons and Dr Michael Wycherley for providing us with timely and useful advice. Their guidance was essential for ensuring that all our events went as smoothly as possible. Furthermore, we want to extend our gratitude to all the other staff of the Economics Department and the Alumni Office who have offered their support.

We would like to thank our sponsors for their generous support, without which this journal would not have existed. I would like to thank our chief sponsor, Harry Hartford, for the immense support he has provided over the past ten years. The debates we organised this year were made possible by the generosity of Conor Killeen and Kyran Mcstay, of Key Capital, and Vinay Nair. I would like to extend my sincerest gratitude to Alan Gray and Aoife Cunningham for their support of the SER. As past Economics students of our college, your continuous support for academic endeavours is truly inspirational.

Finally, I would like to thank my fellow committee members. While I have praise for each and every individual, I would like to particularly commend the team effort that enabled us to achieve our goals for this year. I have a deep appreciation for the talent and commitment of everyone on our team.

Our hope is that the 31st edition of the Student Economic Review will meet your high expectations. What I can assure you is that our committee has aimed for excellence and, as a result, we think that you will consider this journal an insightful and exciting read.

Alexandru Radu Puiu

General Manager, Student Economic Review 2017

Letter from the Editor

It is my pleasure to welcome you to the Student Economic Review 2017. In the 31st edition of the Review we hope to continue to provide an opportunity for undergraduate students at Trinity College Dublin to display their engagement with economics and receive recognition outside of the classroom for the high standard of their work.

With an ever-increasing number of submissions, the Review continues to represent students' interest in economics and their motivation to pursue a deeper understand of the subject. The breadth of topics displays the diversity of their interests within the field and we hope that our selection reflects that diversity and engagement. Having an essay published in the review is a great achievement and unfortunately only a limited number of submissions can be included. I would like to thank all those who submitted a paper for their interest in the Review.

This year's edition is divided into six categories which I will briefly outline. The first and largest section is Economic History, opening with an essay on the origins of the sovereign debt market, for which Christopher Swords was awarded the prize for Best Economic History Essay for his insightful analysis of financial markets in the 19th century. Panayotis Gounaris explores innovations in the shipping industry and their impact on trade today. An essay by Thomas Walsh looks at the impacts of the slave trade on trade flows in Africa historically, and its resonance today. Finally, against a backdrop of renewed fear of concern surrounding technology's effect on employment, Peter Wilson examines the historical trends in automation and the labour market.

The essays in Economic Policy highlight areas of importance to students and policy makers alike. In an essay on policies concerning single parents on low incomes, Annabel O'Rourke provides an insight into the challenges facing the state in supporting this vulnerable group. Keelan Beirne was awarded Best Freshman Prize for his essay which provides an insightful overview of the role of the market and the state in providing accessible and high quality tertiary education. This section concludes with an essay by Mark Finn, which presents a balanced argument on the role of corporation tax in attracting foreign direct investment.

The third section of the Review is dedicated to Applied Economics and displays game theory analysis applied to current topics, as well as an essay on academic macroeconomics applied to the financial crisis and secular stagnation by Christopher Swords. Théophile Pastre wins the prize for Best Overall Essay for an in-depth analysis of the strategies Britain is likely to pursue in negotiating a Brexit arrangement with the EU. In a similar vein, Jake MccGuire presents a comprehensive analysis of the choices facing China and the Trump administration in trade talks, which are likely to play out over the coming months. While the Greek crisis has been overshadowed by events in the UK and US, it still presents a challenge to the EU today. An insightful examination of bailout negotiations is presented by Stephen Garavan.

This year's section on European Economy displays the broad range of topics that can be analysed under this lens. It begins with a comprehensive overview of EU cohesion policy by Emily Waters, highlighting the challenges the EU faces in narrowing the gap between the EU's richest and poorest regions, at a time when the EU seems more under threat than ever before. Patrick Lavelle explores the possibilities for a financial transaction tax in the EU and, in the field of competition policy, Charlotte O'Neill presents a thorough analysis of the EU's decision in the case of Apple in Ireland.

Urban Economics is a field of increasing interest, reflected in the high number of submissions received in this area. In an analysis of Hyde Park, Chicago, Conor Bolger highlights the university's historical and current role in shaping this area and Finn McLaughlin examines the phenomenon of urban rioting and its effect on house prices.
Economic Research is the sixth and final section of the Review, consisting of econometric analysis of three very different topics. Tackling issues with important policy implications, Sarah McDowell examines the relationship between income and mental health, and Gillian O'Connell investigates attitudes towards sexism in the US context. The Review is concluded by an investigation of the relationship between growth and unemployment by Stephen Garavan in the EU during the years surrounding the financial crisis.

I would like to extend my heartfelt thanks to my fellow members of the Editorial Team, Eimear and Grace, for their tireless work in selecting and editing the essays. It was a pleasure to work with both of them on what was a challenging but thoroughly rewarding process. I hope that the Review reflects our enjoyment of working together on a project from which we have learnt much.

I would also like to thank the Managerial Team for their hard work. Alex, our General Manager, helped hugely to make the editorial process run smoothly and Mark, our Productions Manager, has put in great effort to make sure the Review is the highest standard possible. I am also very grateful for Grace's work in organising a variety of interesting workshops and to Ryan for coordinating the debates. Saoirse and Shane, as Finance and Launch Managers respectively, have worked throughout the year to make the launch and all our events as successful as possible. I have thoroughly enjoying working with this committee and hope that the 2017 Edition reflects their efforts.

Finally, I would like to take this opportunity to thank the Economics Department for their support of this publication. Special thanks are due to Dr Mitchell, Dr Wycherley and Dr Lyons for their invaluable advice and their help throughout the year. We very much appreciate how they have facilitated us to produce this year's Review.

I now invite you to begin reading the diverse selection of essays in this edition of the Student Economic Review and hope that you enjoy these papers as much as I have.

Míde Ní Ghríofa

Editor, Student Economic Review 2017

WORKSHOPS

The student economic review organises workshops to generate excitement for economics outside of the lecture theatre, with the workshops we sim to inspire and encourage students to submit to the review. During the 2016-2017 academic year, the student economic review organised three workshops. Early in the first term we hosted the 'schols' workshop, to help Senior Freshman students prepare for the Foundation Scholarship exams. On the 30th of January, with the deadline for submissions approaching we hosted a workshop in which students who had previously written for the journal explained the tips and tricks for writing a successful economics paper. Finally, on the 23rd of February we were pleased to welcome Tina Hayes and Karl Purcell form The Irish Government Economic and Evaluation Service (IGEES), who spoke about career opportunities with IGEES and some of the work they've accomplished in behavioural economics.

"Schols" Workshop

1st November 2016

This annual workshop hosted by the Student Economic Review is a long running tradition which has become a crucial aspect of Senior Freshman student's preparation for the Foundation Scholarship exams. The best preparation for these exams is speaking to students who have previously sat these exams.

Current scholars spoke through the content of the Economics, Business, Political Science, Sociology and Philosophy papers, giving students a fantastic insight into the preparation process for these notoriously difficult exams. The advice given by the speakers followed by the Q&A session proved a successful source of guidance for students.

This workshop, like the Review itself, aims to encourage students to engage with the subject of their degree beyond lecture material. Working on a submission for the Student Economic Review is a great way for Senior Freshman students to prepare for the Foundation Scholarship economics papers. The prospective opportunity to get published is an additional motivation for students to engage in economics material outside of their coursework.

Submissions Workshop

30th January 2017

This year, the review hosted our first workshop based around advice for submitting to the Review. Students who had their works published in the previous years Review gave advice on how to write a successful submission. Elizabeth O'Higgins spoke about her European economy paper: Cheese, Chocolate and Cuckoo Clocks: The Swiss Model for the 65 United Kingdom. Patrick McDonagh spoke about his economic history paper: God's

Economists: Economic Thought in the Sixteenth Century, and Rory McStay spoke about his applied economics paper: A Theoretical Analysis of the Mechanisms of Competition in the Gambling Market.

This workshop gave students an opportunity to discuss the ideas for their papers and ask questions directly to this years editors and last years writers. The event had a successful turnout and was an invaluable opportunity for students to learn more about how and what to submit. The success of the event was evident in the large number and high standard of the submissions we received this year.

IGEES talk

23rd February 2017

On the 23rd of February, the Student economic review hosted two speakers from IGEES. The Irish Government Economic and Evaluation Service is an integrated cross-Government service to enhance the role of economics and value for money analysis in public policy making. Established in 2012, the Service demonstrates the strong commitment of the Government to a high and consistent standard of policy evaluation and economic analysis throughout the Irish Civil Service. IGEES has an important role to play in the reform and strengthening of the Civil Service and in supporting the Government in progressing major cross-cutting policy challenges such as economic growth, social exclusion, enhance service delivery and better policy design.

The first speaker, Tina Hayes, spoke on the role of IGEES and the functions it carries out in government. IGEES is a key part of driving evidence based policy making in the civil service. Support better policy formulation & implementation in the civil service through economic analysis and evaluation. Established in 2012 – approximately 80 economists and evaluators in all Departments. Regular recruitment has taken place to build capacity – recruiting graduates and targeting experienced economists

The second speaker, Karl Purcell, spoke about the intersection of behavioural economics and policy making and how behavioural, a field still in its infancy in Ireland, is already being used to shape better policies and improve government programme efficiency. Purcell spoke about his work and his accomplishments in behavioural economic with IGEES.

The speech opened with the posing of a very broad question: "What is behavioural economics or behavioural science?" As he felt that the field was best described using an example, he went on to talk about Loss Aversion, which is how people will feel a loss much more than they feel a gain of the same amount. For this reason, behavioural economists working in policy are able to begin constructing policies around this loss aversion: such as telling people that not insulating their homes costs them €500 a year, as opposed to telling them that insulating their homes saves them €500. The simple rephrasing, because of loss aversion, has a powerful impact and more people will take action under the first example even though the consequences are the same.

He talked about the serious policy implications of behavioural economics. He went through how these policy things would work and the role that behavioural economics plays in the decision making process of policy makers.

The event concluded with an enthusiastic Q&A session in which students gave their views on some of the behavioural economics theories Purcell introduced. The event was very interactive and was a great introduction to practical applications of theories students are familiar with and potential economic career paths.

I'd like to extend my personal thanks to all who helped with these events, primarily the speakers, including all of the current Trinity students who helped out by giving talks as well as our two guest speakers from IGEES; Karl Purcell and Tina Hayes. I would also like to express my gratitude to the rest of the SER committee, for their help and support with organising these workshops. An additional thank you to Dr. Michael Wycherley for his help with these events, and to the rest of the economics department for their help and support.

GRACE BEIRNE
Assistant Editor & Workshop Convenor, Student Economic Review 2017

The SER Debates

As with every year, the Student Economic Review shows that it is more than simply just an annual journal in the events it hosts. In the years since they began, these events have grown and developed into some of the highlight events of the year which serve to attract many students beyond simply just the economists.

The debates are the biggest attraction to those non-economists and are the Review's biggest interaction with the non-economics world. Every year the University's Philosophical and Historical Societies compete for the right to host the events; one in each term and contested against some of the strongest debating teams from some of the most prestigious universities in the world.

Trinity vs. Oxford

23rd November 2016

This year the Michaelmas Term Debate was held in conjunction with the Historical Society. It was contested against a team from Oxford University under the motion "This House Believes that the European Union is Unsustainable" with the Trinity team on Opposition.

This motion was carefully selected to put economic debate at the centre of current affairs and display the SER's ability to debate contemporary issues. It attracted a full house in the GMB, showing the desire for this sort of occasion.

The Oxford team opened the debate, arguing against EU sustainability by bringing up the rise in anti-EU sentiment and the Far-Right across Europe; from Farage's Britain and Le Pen's France. They argued that, because of this rise, the resistance to the EU would lead to its downfall.

Trinity responded by arguing that these sorts of surges in populism are regular occurrences and that the EU has always recovered and moved forward. They went on to argue Europe is adaptable and that, although the Europe we know today may not work, that it can change and develop in response to the threats to the EU.

A major point of clash in the debate was on this very point of European adaptability. The judges felt that Oxford made the stronger argument when they raised the issues of EU treaty changes in the previous decade which were met with fierce resistance which led to the current, anti-EU climate. Despite Trinity's best efforts to argue that the EU could change, Oxford's appeal to the historical difficulties held strong.

The only team to really explore the economics was the Oxford team. Having started his speech with the now infamous line of "I know nothing about economics," Oxford's captain then launched into a full speech discussing Fiscal Spill-Over in the Euro which would cause instability when combined with a single Monetary Policy. This Fiscal Spill-Over would require a single fiscal policy in order to ensure stability in the Eurozone given the single currency. It was convincingly argued that, given the anti-EU sentiment, this sort of fiscal centralisation could never occur. However, to not do this would keep the EU's unsustainable fiscal policy active. The EU requires reform to progress, but ultimately could not carry out the required reforms due to the resistance it would bring and because of this, the EU is unsustainable.

The Oxford team's stronger economic argument meant that it was them, and not the Trinity team, who carried the day. As a team, they worked well to form a strong argument woven through all speakers, with each supporting the other. Despite ceding ground on areas such as trade and the inevitable fall of anti-EU sentiment which occurs after every rise, they managed to hold the ground in more key areas of sustainability, and more importantly economic sustainability, which was the key to their victory.

Trinity vs. Yale

16th February 2017

The Hillary Term Debate was held in conjunction with the Philosophical Society. It was contested against a team from Yale University. Following the previous term's precedent of sustainability of international institutions, the motion was "This House Believes that Globalisation is Doomed to Fail" which followed another historic democratic result in the US. Again, this was chosen to fulfil the role of these debates to look at contemporary issues from an economics perspective.

Trinity Proposed this motion against an exceptionally strong team from Yale which included two speakers from the World University Debating Championships Final the previous month.

Trinity opened by arguing that Globalisation leaves too many people displaced and this is an inevitable consequence of Globalisation. This will always lead to a backlash and, because of increasing security concerns and nationalism, this backlash threatens Globalisation at its very core.

The Yale team were quick to point out, as Trinity had done some months before against Oxford, that these sentiments often arise and quickly fade, allowing Globalisation to resume. What may have won them the point was drawing attention to the fact that Trinity had failed to offer up a counter model. Trinity's lack of illustration about what the alternative world would look like meant that failed to really carry their point to its full conclusion and consolidate earlier work they had done on attacking Globalisation and its institutions.

Yale rather successfully argued that Globalisation would eventually resume, and that the current wave of anti-Globalisation was just that: a passing wave which would soon go out. Globalisation, they argued, gave too many benefits economically for sustained resistance.

Trinity attempted to engage this issue, arguing that while there are benefits, the core Trinity argument held firm and the rising inequality the Yale team seemed to ignore meant that the system would build to a collapse.

This remained one of the points of clash, with Trinity claiming that the system would build in pressure and eventually explode, while Yale argued that the rise in anti-Globalisation sentiment acted almost as a pressure release where some of the inequality could be corrected and then this would allow even more Globalisation to take place.

The SER Debates focus on bringing as many people into the fold as possible by taking contemporary issues and looking at them through an economic lens, which is what both debates attempted to do. Regardless of the actual debate and the speakers themselves, the debate served its function to expose people to contemporary topics from the point of view of economics. Both involved heavy political discussion, which is to be expected as in reality, economics and politics often go hand in hand.

From the management point of view, both of these events were very successful in achieving their aims. The teams from both sides of the two debates articulated economic arguments excellently before a full chamber in the GMB. This chamber was not full of economics students, but rather it was full of many people who potentially had not really considered the economics of such issues before. The relevance of these topics to the world at the time meant that everyone who went had the opportunity to learn about a new way to look at the issues affecting the world and a new point of view to consider.

The SER is not just a review for economists, but something more. Through these debates, it serves as a window into economic issues or the economics of certain issues which are relevant to the world in which we live. In this way, the SER Debates act as a complementary good to the Review itself. With the Review we can engage the economic community and economics students, and with these debates we can begin to bring people who have never considered these issues or arguments into the fold and discussing the economics of world around us.

RYAN CLEARY
Debates Manager, Student Economic Review 2017

Economic History

SOVEREIGN DEBT MARKETS AND POLITICAL STABILITY – EVIDENCE FROM 19TH CENTURY EUROPE

CHRISTOPHER SWORDS

Senior Sophister

The globalisation of financial markets seem a commonplace feature of the modern world economy, however the story of their development is less well-known. Christopher Swords gives an insightful historical overview of the origins of sovereign debt markets. He draws expertly upon 19th century examples of key turning points and figures at the centre of the genesis of the bond market, concluding with possible directions for future research in this area.

Introduction

"I used to think if there was reincarnation, I wanted to come back as the president or the pope or a .400 baseball hitter. But now I want to come back as the bond market. You can intimidate everybody." (Carville, 1993)

Twenty three years and six U.S. presidential elections have passed since Democratic strategist James Carville made his famous quip on the power of the bond market. In remarking on its power to intimidate, Carville was referring to the bond market's capacity to exert an influence over governmental policymakers, via its autonomy in setting the price at which government borrows in the global debt market. As one of the pillars of the financial system that characterizes the capitalist economy, the market for debt – both sovereign and corporate – offers a feedback loop between investors and policymakers. If a government executive signals an intent to implement policy that investors feel is not in that nation's best interests, they have the capacity to drive up that nation's cost of borrowing, communicating their unease and making it more difficult for new policy to be implemented. It is via this mechanism that a relationship between the bond market and political outcomes may emerge. Law and order, representative government, institutional stability and the enforcement of property rights are all desirable political characteristics that the bond market rewards; despotism, war and opacity are punished.

In light of recent political events and trends in public discourse, it has never been more important to understand the nature of the relationship between markets and politics. For the best part of 70 years, from the end of the Second World War, a liberal orthodoxy prevailed in western economics, under which the world economy became characterised by globalization – freer flows of trade, labour and capital around the globe. However, the financial crisis of 2008 proved to be an inflection point; the crash served to accentuate rising inequality and growing pockets of concentrated economic hardship, motivating a proliferation of public and political discourse marked by calls for closed borders, caps on migration and barriers to trade. The rise of populism in many developed Western states is indicative of this trend. In the context of capital, the consensus in favour of free cross-border flows was deeply shaken by the Russian and East Asian crises of 1997-98, during which it became apparent that the free movement of debt capital allowed for financial contagion to spread across borders. Reservations motivated by events such as these have had policy implications, such as the "gates" and "walls" to cross-border capital flows discussed by Klein (2012). It has been suggested that we are at the beginning of a second era of "deglobalisation" (Economist, 2016).

The integration of capital markets – a central feature of our democratic capitalist system – is therefore under threat. The efficiency of capital markets, and their capacity to serve as a signaling device to politicians and governments, is predicated on their integration, and the freedom to trade that integration facilitates. It has become imperative therefore to better understand the potential political consequences of erecting barriers to the free movement of capital.

In order to make inferences about the general effect of increases in the integration of capital markets, it is proposed here that it would be instructive to present an account of the particular period in history during which capital markets integrated most rapidly – in the aftermath of the Battle of Waterloo – alongside an account of the geopolitical trends that characterised the period.

Sovereign Debt Market Integration

The core theory of capital markets tells us that in general, the role of capital markets is to allocate capital such that marginal products of labour and natural resources between economic activities, or economies as a whole, are maximized. Under theoretical perfect capital markets conditions, we expect capital to move between economies until the prices of capital in these economies are in equilibrium. In other words, we should expect that capital move from nations in which it is abundant to nations in which it is scarce, in order to take advantage of differentials in the rate of return. As markets integrate and capital becomes more internationally liquid, interest rates between economies should tend to converge. When this is allowed to happen, capital is priced such that the marginal products of labour, land and resources between economies are maximized – the Pareto optimal outcome. To contextualise this, an increase in the integration of the 19th century European sovereign debt market would allow investors in a capital rich nation such as Great Britain, to invest in business projects in a capital-scarce nation elsewhere on the continent. The investor can expect to take advantage of an arbitrage opportunity in the form of a return above that which his risk warrants, due to the excess demand for capital in that nation. Eventually, these opportunities are bid away, and the two capital markets equilibrate.

The genesis of the bond market as we know it today can perhaps be ascribed to the period 1818-1822. The first half of the 19th century was a period of rapid development and international integration of European financial markets, during which time London emerged as a global financial centre. Prior to this, Europe was mired in a financial wilderness – revolutionary France defaulted on the monarchy's debts, French subjugation and annexation left the Dutch bankrupt by 1810, and the Russian monarchy narrowly avoided bankruptcy through two renegotiations of external debt, in 1797 and 1815. The respected Dutch system of sovereign debt issuance that prevailed throughout the 18th century was dealt heavy blows by the wars of 1793 to 1815 (Riley, 1980). The Battle of Waterloo in 1815, however, represented a turning point, as it figuratively pitted two financial systems against each other, with the British and their system of balancing the fiscal budget with debt raised in capital markets defeating the French and their alternative system of balancing by conquest and pillage.

Technological and institutional conditions had developed such that by the time of the conclusion of the Battle of Waterloo, they allowed for rapid international financial development. The introduction of the telegraph for instance greatly enhanced the speed with which information could travel across the continent (Standage, 1998), while the adoption of the gold standard as a currency peg throughout the latter half of the century across the continent mitigated currency risk, thereby allowing for freer capital flows (Obstfeld & Taylor, 2003).

One cannot discuss the 19th century globalisation of financial markets without mention of the house of Rothschild. The brothers Rothschild – Nathan, Amschel, Salomon, Carl and James – serve to embody this formative period in the development of the capitalist system with which we are today familiar. Via their internationally integrated network of banks, the Rothschild bankers underwrote a bond in 1818 for the state of Prussia to be issued in London and denominated in Sterling. They underwrote a similar issuance for the Russian state in 1822, the most significant difference in the present context being that interest payments on the Russian bonds could be collected in either London or St. Petersburg, in either Sterling or Russian Roubles. Being issued in a foreign currency and a foreign market, these Prussian and Russian bonds were unprecedented, and were identified by Ferguson (2005) as the first "Eurobonds". An immensely important financial innovation, these bonds set a new precedent for cross-border capital flows, and heralded a new era in financial markets in Europe and globally; one characterised by the integration of international markets and one whose development culminated in the markets that we use today.

Sylla, Wilson and Wright's (2006) investigation into the point at which trans-Atlantic capital markets began to integrate corroborates this conclusion. They analysed the price convergence of three financial assets that were traded on both the London and New York exchanges – shares in the First Bank of the US, shares in the Second Bank of the US, and US three-month bonds – as a gauge of market integration. It was an ideal test of market integration - with perfect arbitrage, prices of the same asset in separate markets should always be the same, and discrepancies eliminated immediately. Their analysis suggested that price convergence began in earnest in 1815, in the aftermath of the Battle of Waterloo and precisely as the Rothschilds were beginning work on their first Eurobonds.

Pax Britannica

From a political perspective, the period spanning from the end of the Napoleonic Wars until the beginning of World War I was a period of relative geopolitical calm, and was characterised by the ascent of the British Empire to global political and economic dominance. Victory over Napoleon at the Battle of Waterloo left the British Empire without a serious international rival and free to establish a period of hegemon referred to in the literature as Pax Britannica – Latin for "British Peace" (Johnson et al., 2008). Thackeray (2002) identified a vested interest in unimpeded international trade on the part of the British, combined with a navy powerful enough to police the oceans, as one of the central causes of the peace and stability associated with Pax Britannica. The emergence of the Great British Empire coincided with the proliferation of new ideas about free markets and trade, particularly those of Adam Smith (1776). Recognising the importance of trade for prosperity, the British invested in the Royal Navy to the point that it developed an unrivalled maritime dominance, allowing them to determine trade policy and coordinate the movement of goods and capital around the globe. With a global hegemon that had developed a commercial interest in peace, political stability prevailed. Although not a period of total geopolitical tranquillity – owing to the Crimean War (1854-1855), the Indian Mutiny (1857), and the Zulu War (1878-1879) – Brown, Burdekin and Weidenmier (2006) point to the marked decrease in reduction in British Consol price volatility as quantified evidence of calm.

It is tentatively hypothesised in this paper therefore, on the basis of their temporal co-occurrence, that the integration of the European bond market throughout the course of the 19th century was amongst the causal factors that induced the political stability that characterised the period.

The intuitive rationale for this hypothesis lies in the detail of the Prussian and Russian 19th century bond issuances. In addition to a mortgage on Prussian royal estates, Nathan Rothschild demanded what is referred to as a sinking fund as part of the collateral on the loan – a pool of capital in the form of English government bonds, supplemented annually with compound interest and more such bond purchases until the extinction of the Prussian debt (Ferguson, 2005). In a remarkable clause, Nathan

Rothschild decreed that the sinking fund should be administered by a committee of seven, four of whom should be outside of government. In explaining his thinking behind this clause, Rothschild explained that for British investors to invest in foreign debt, such debt should be structured as closely as possible to British debt, in that it should have some form of security beyond the “mere good faith of the government”. He cites the case of more recent British investment in French debt, which was undertaken upon the general belief in the representative system now in place there. Apparently, the 'sanction of the Chamber', or parliament, to debt incurred by the state affords a guarantee that is not to be found in debt issued by a state 'uncontrolled in the exercise of executive powers' (Ferguson, 2005: 318). It would appear here that Rothschild was effectively declaring that he would underwrite foreign loans in London but only for certain types of states – constitutional monarchies similar to that in Britain but not some neo-absolutist regime. Ferguson (2005) hypothesises that this financial liberalism may be seen as a subtle form of political pressure, in support of Prussian reformers who had been pressuring Frederick William III some form of popular representation. If so, we may have witnessed an instance in which the globalisation of financial markets exerted a definite influence over important political outcomes.

Subsequently, included in the Russian bond issue in 1822 was a war clause, which stated that 'The payment of the perpetual annuity, as well as the payment of the outstanding debts, will be effected in time of peace, as well as time of war, without distinction, whether the creditor belongs to a friendly or hostile nation' (Ferguson, 2005: 320). Rothschild and his bankers recognised that war greatly increased the possibility of a sovereign default, and included the clause in order to reassure investors that their dues would be paid irrespective of political situations. Simultaneously, the clause presented nation states with a considerable incentive not to engage in warfare or incite conflict – they would no longer be in a position to relieve war-induced financial pressure by a debt default.

Directions for Future Research

Two hundred years on, the potential for a second era of deglobalisation necessitates a greater understanding of the broader consequences of the disintegration of capital markets. In this essay, a brief account of the first period of European capital market integration and the political trends with which it co-occurred has been presented, in the hope that it may help to instruct hypotheses surrounding the role of capital markets in political outcomes. In particular, on the basis of the clauses included in the first Russian and Prussian foreign-issue bonds, it has been hypothesised here that the integration of European sovereign debt markets was among the factors that played a causal role in motivating geopolitical stability throughout the 19th century.

In order to test this hypothesis, researchers may make use of the fact that interest rate convergence is related to capital market integration, and that major financial asset (such as the British consol) price volatility is related to uncertainty in the broader political landscape. An investigation of the relationship between interest rate convergence in 19th century Europe, and consol price volatility over the same period, may help to determine whether or not a causal mechanism between capital market integration and political outcomes exists. It has never been more important to understand the nature of this relationship.

Conclusion

The 19th century marked a major turning point in the world economy. Ikenberry (2000) describes how the onset of the industrial revolution triggered a massive expansion of trade, capital and technology flows, alongside an explosion of migration and communications, and characterised the 'first age of globalisation'. The Rothschild Bank and the flotation of the first foreign-issue "Eurobonds" heralded an era of unprecedented capital mobility. Up until that point, capital had been tied up in the form of land, and the wealthy subsided off of the rents of the estates to which they were tied. This new system of paper security, such as that issued by Prussia in 1818 and Russia in 1822, endowed the elite with a portable property. No longer tied to their land, this newfound mobility allowed wealthy individuals to gather in cities, setting in motion the establishment of a new social order. Essayist Heinrich Heine (1838) went so far as to mention Nathan Rothschild in the same breath as Richelieu and Robespierre, as one of the three names that 'spell the gradual annihilation of the old aristocracy'. He rose the system of government bonds to supreme power, replacing land with money as the most important manifestation of capital.

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INTERNATIONAL TRADE AND THE MARITIME SHIPPING REVOLUTION

PANAYOTIS GOUNARIS

Senior Sophister

Just as rivers and oceans have unquestionably shaped societies throughout the centuries, so too has trade by waterways been pivotal in how economies have developed. Panayotis Gounaris explores innovations in the shipping industry and the effect they have had on international trade throughout the ages. He provides a clear and detailed analysis of the increased efficiencies that came along with the maritime shipping revolution and their implications for trade today.

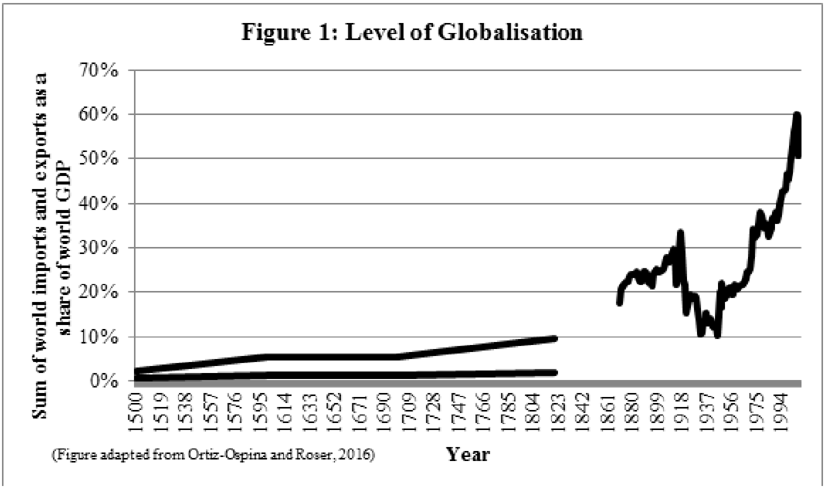
Introduction

Maritime shipping has always been important, even in the early stages of economic development. Adam Smith highlighted the important role that shipping plays in enabling trade in his book, 'The Wealth of Nations', published in the 18th century, before any meaningful revolution in the industry had occurred:

"*As by means of water-carriage a more extensive market is opened to every sort of industry than what land-carriage alone can afford it, so it is upon the sea-coast, and along the banks of navigable rivers, that industry of every kind naturally begins to subdivide and improve itself [...]*" (Smith, 1982).

Over millennia, the maritime industry has changed in many dimensions; there have been technological changes and innovation, changes in the structure of the industry and changes related to the geography of where the service is provided.

In the last couple of centuries international trade has grown significantly and changed the way our world operates. In the last few decades, trade has increased at a faster rate. At the end of the 19th century, the sum of world imports and exports was lower than 10% of world production, but in more recent periods, the global balance of trade increased to more than 50% of world production (Ortiz-Ospina and Rosa, 2016). This astonishing increase in international trade merits further examination. As is shown in Figure 1 below, the rate of trade growth increased quite significantly in the late 1800s and then again after the war in the mid-1900s. Significant technological change took place in the transport industry during these periods. This essay will examine the effect of technological advances in the maritime industry on international trade flows.



The Steamship

The first notable innovation in the industry was the steamship. Before its arrival, trade routes depended strongly on wind directions, so the possibilities for trade were limited. Because the trade of goods between two countries often involved carriage by sea, the introduction of the steamship, which was used regularly by 1807, drastically increased the possibilities for international trade by improving cross-country integration. It was possible for countries, which were separated by water to engage in trade more easily and efficiently regardless of wind directions (Levinson, 2008)

Research has shown that the advent of the steamship boosted trade significantly. Between 1870 and 1913 the world export to GDP ratio increased from 5% to 9% (Pascali, 2016). The increase in exports can be attributed to the fact that firms who were productive and cost-efficient could export more of their goods due to decreasing shipping costs. Firms who previously could not join the industry due to higher transport costs could now enter, which increased output and trade.

As well as increasing trade through lower shipping costs, the steamship increased international trade by reducing effective trading distance; trade could be conducted quicker and became more reliable – these were improvements in the quality of the service. Shipping firms could carry out a regular shipping service. Vessels were not confined to specific potential trade routes and could quickly reach their destination. It has been shown that the reduction in shipping times induced by the Steam Engine was responsible for around half of the increase in international trade during the late 19th Century (Pascali, 2016).

The Intermodal Container

Nonetheless, despite the improvements in efficiency during the 19th Century, the industry was still cost inefficient and trade costs were high in the early 1900s. Before the use of intermodal containers, freight costs were worth a considerable 12% of US exports and worth 10% of US imports. Since the average import tariff, another trade cost, was only 7%, freight costs represented a significant share of total trade costs. As the freight costs were so high – even higher than import tariffs- one questioned whether it made economic sense to trade using ships. Freight could represent up to 25% of the cost of a product in 1959 (Levinson, 2008).

The costliest part of the operation was the process of moving cargo. Goods had to be collected by truck, each good loaded separately from a warehouse and then brought to the port where they were unloaded separately and dragged to the pier. Every single piece of freight had to be stacked on top of another in the cramped and odd dimensions of breakbulk vessels. Goods were lost, stolen or just abandoned on the docks. Loading and unloading was complicated and took time. Two thirds of a ship's productive time was spent at a port which resulted in low levels of ship-utilization (Bernhofen et al, 2016). The fact that the process was so inefficient, unreliable and slow meant that shipping costs were excessively high.

The industry was as labour intensive as it was capital intensive and there were millions of workers[1] who provided services in and around the port. The Longshoremen were arranged in gangs and had strong labour union support (Levinson, 2008). With strikes often taking place, even higher shipping costs were incurred and the ability of the industry to provide a reliable service was often called into question.

It was in the 1950s that entrepreneur Malcom McLean thought about the concept of the intermodal container[2]. McLean, preoccupied with cutting costs, noticed that highway congestion was increasing and that transportation of goods by water could be quicker. As his ideas were developed and implemented over a large time period, huge cost reductions and quality improvements in the industry were seen. The advantages of the container were not felt immediately – the adoption was a slow process and innumerable changes to the industry were made.

The Container's Success in Reducing Transport Costs

The Ideal-X, which set sail in 1956, was the first successful container ship. The ship was loaded in eight hours carrying a modest fifty-eight containers and left the port on the same day. Loading cargo on a breakbulk vessel cost 5.83 dollars per tonne and took many days. With Ideal-X the cost was 15.8 cents per tonne (Levinson, 2008). The cost reductions associated with the container attracted new firms to enter the market, which led not only to greater competition, but to greater international trade flows (Levinson, 2008).

Shipping firms and ports required less labour as a result; a containership could be loaded in about one sixth of the time required for a conventional breakbulk vessel and only used around one third of the labour (Levinson, 2008). The world's first container crane was forty times more productive than the average productivity of an entire longshore gang (Bernhofen et al, 2016). Containerisation, a system of intermodal freight transport using intermodal containers, eventually displaced many thousands of workers who were involved in unloading, loading and sorting cargo in the Breakbulk era. This reduced the overall costs in the industry as less labour was required. The development and utilisation of advanced and highly specialised capital machinery reduced the costs even further.

International standardisation of containers occurred in 1965. The worldwide adoption of containers facilitated huge reductions in maritime shipping costs – in Britain, a study conducted by McKinsey & Company found that containerisation could involve a few large ports and would halve the freight bill of the UK (Levinson, 2008).

With the advent of containerisation, port side operations have become much more cost efficient and quicker; massive terminals accommodate massive containerships, each ship capable of carrying thousands of containers. Container handling is partly computerised. Cranes pick up and move containers using spreaders. These changes drastically reduce the average time a containership spends in a port (the more time a container spends in the port, the costlier it is for the ocean shipping firm). The UNCTAD claimed in 1970 that the costs of moving freight that ship lines faced on the new vessels were less than half of those on breakbulk vessels. Strong evidence suggests that the cost of shipping a tonne of international freight declined as containerisation became widely adopted in the late 1960s (Levinson, 2008).

The quality of the shipping service improved; the journey between Europe and Australia was cut from seventy to just thirty-four days (Bernhofen et al, 2016). Major users of international shipping abandoned breakbulk and switched to the more modern way of shipping; shippers had a choice in shipping their goods and chose to ship with containers. The revealed preference of shippers is strong evidence that the container was more beneficial and attractive in terms of cost. Shipping was clearly cheaper with the container.

During the same time period, the volume of sea trade increased drastically. In the port of Hamburg, eleven million tonnes of cargo were handled in 1960. In 1996, more than forty million tonnes were handled. In 2014, Hamburg cargo trade was 100,000 million tonnes (Levinson, 2008). Figure 1 shows that after the mid-1950s trade grew faster than ever before. To what extent the huge increase in sea and international trade was due to the cost reductions and efficiency increases of the container merits further discussion.

Nowadays freight costs do not really affect a shipper's decision whether to ship or not. One paper mentions that it is better to assume that moving goods is essentially costless than to assume that moving goods is an important component of the production process' (Glaeser et al, 2003). In 2004, the value of the world import trade was 9.2 trillion dollars whereas the cost of freight was 270 Billion dollars; the cost representing only 3.6% of the total value of world trade (Stopford, 2008). This measure also overestimates the shipping freight cost since it includes inland transport and distribution. It can be inferred that shipping costs have decreased significantly.

The above does not mean that transport costs are unimportant. If transport costs were higher in a certain country, a shipper in that country would add more weight to transport costs as a share of the total trade costs and the levels of trade could potentially be affected. Maritime transport costs have been shown to significantly impede the levels of international trade in developing countries, where they are high due to restrictive trade policies and private anti-competitive practises. This suggests that transport costs matter – they are important in determining the amount of international trade (Fink et al, 2002).

Increasing International Trade

In Paul Krugman's paper published in 1995, 'Growing World Trade', he acknowledged that the reasons for increased trade volumes remained an open, important and disputed issue. In 1960 America's trade as a percentage of GDP was 4.7%. In 1994 it increased to 11.4%. Journalists emphasised the importance of technological advances, whereas economists spoke about the role of multi-lateral and bilateral trade agreements and the removal of protectionist measures after World War II, and their role in boosting international trade.

A considerable number of empirical studies have examined the role of maritime shipping in boosting trade. Results have differed. Some have claimed that the maritime industry did not help at all in boosting trade. Other research has shown that maritime trade did not help to the same extent that other factors did, claiming, for example, that income growth and tariff reductions were more important factors (Baier and Bergstrand, 2001). A recent paper has claimed that intermodal containerisation played a key role in increasing trade and causing globalisation, downplaying the results of research undertaken earlier (Bernhofen, 2016). Another finding of this study was that containerisation boosted trade not only in "containerisable" products, but also boosted trade of goods that were not shipped with containers. The researchers claim that the presence of positive externalities shows just how important the innovation was.

Conclusion

Maritime transport has clearly played and continues to play a vital role in boosting international trade flows through cost reductions and quality improvements. During the two time periods of technological advancement discussed, the volume of international trade increased significantly. Although studies have conflicted one another, it is clear that there is some kind of link between technological improvements in maritime shipping and international trade.

Of course, there are other costs that affect international trade levels. Tariff costs, information costs, enforcement costs and distribution costs must also be considered (Anderson and Wincoop, 2004). When trade costs are so broadly defined; all the costs involved in getting a good from the producer to the consumer, then these costs appear to be quite large. It is important for policy makers to attempt to minimise all of these trade costs in order to increase international trade levels even further.

And even after considering all of these trade costs, there are still other factors that are connected with and affect international trade both directly and indirectly. As such, it is difficult to determine the direct effects that technological improvements in the maritime shipping industry had on international trade. As Paul Krugman put it: '*International Trade is, after all, the prime example [. . .] in which everything affects everything else in at least two ways*.' (Krugman, 1995: 328). While determining specific causal relationships may be difficult, the influence of shipping on societies and economies throughout the ages cannot be denied and makes this topic a fascinating one for all those interested in the development of international trade.

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Notes

1. Workers who are involved with operations in the port are called longshoremen.
2. An intermodal container is a container which can used on multiple modes of transportation; Vessels, Trucks and Railways.

Slavery's Legacy and Intra-African Trade Flows

Thomas Walsh
Senior Sophister

Slavery has undeniably left a deep scar on the development of African nations. An understanding of the past is essential to creating better future outcomes; in this essay, Thomas Walsh explores the history of slavery in Africa and outlines its long run effects on current trade outcomes. A thorough overview of the literature in this field facilitates a deeper understanding of why certain patterns can be identified in African trade flows and offers scope for further research in this area.

Introduction

"Hatred, slavery's inevitable aftermath"
José Martí, 1887 (Thomsett and Thomsett, 1997).

The African slave trade is widely seen as one of the most important events in African history. Its consequences for African development at the time were enormous, and much research has gone into its impact on African development today. Looking this far back in history to explain current economic conditions is not unfamiliar. Acemoglu, Johnson and Robinson (2001) went as far back as the 17th Century to investigate the effects of colonial rule on current African economic performance. Agreeing with Nathan Nunn's (2008) belief that the slave trades may have been at least as important as colonial rule for Africa's development, this paper aims to examine the possible impact of trade flows created during the slave trade on trade flows within Africa today.

Slaves were captured and traded from areas inland toward the coast of Africa to be sent to other parts of the world by boat. This created trade flows for the sole purpose of slavery, which in turn may have created trade relationships that persisted until today, thus stimulating current trade between the coastal and inland parts of Africa. Should this be the case, it would give rise to a potential benefit from the slave trade in which lasting economic relationships were formed, aiding trade and economic performance in the long run.

On the other hand, the fact that these trade flows arose for the purpose of slavery could have created a bad taste between the affected countries, thus negatively impacting trade in the long run. Early in the slave trade, nearly all slaves were taken in large scale conflicts or state organised raids, which created an environment of extreme insecurity outside of the local community (Nunn and Wantchekon, 2011). The widespread social and political mistrust resulting from this may have hindered trade and created further political conflict, which has had lasting consequences for current African trade and development. This paper aims to investigate the possible effect of slave trade flows, created through the capture and selling of slaves, on current trade flows within Africa, focusing on the transatlantic slave trade.

The Journey to the Coast

There exists are large amount of evidence regarding the flow of slaves during the slave trade. While there is in some respects a lack of quantitative data, there are many accounts describing the way in which slaves were captured inland in raids and transported to the African coastline, or how people from inland communities were sold into slavery by their families to slave merchants on the coast in the hope of protecting themselves. The demand and supply of slaves was not so unlike any other economic model and it resulted in trade flows being created from inland communities to European traders on the African coast.

Along the Gold Coast (modern day Ghana), people sold as slaves across the Atlantic were often captured from as far inland as the Sahel region (modern day Burkina Faso). In Central Africa, where nearly half of all transatlantic captives originated, those forced upon ships in Luanda or along the Congo River came from increasingly distant parts of the interior (Slaveryandremembrance.org, 2016). There are also reports of slave raids taking place up through Nigeria into the southern parts of Niger (Perbi, 2001), and evidence that among the societies inland that produced the slaves was the Kingdom of Matamba (da Fonseca Ferreira, 2010) which, as shown by the map below, was in modern day Zambia. All of this evidence suggests that the trade flows existed and were significant enough to possibly have an effect on trade today.

Figure 1 – Kingdom of Matamba (Africafederation.net, 2016)

Our focus is on the transatlantic slave trade in which slaves were transported from Africa to the New World. This is because it is by far the largest and most well-known, and the other three slave trades (the trans-Saharan, Red Sea and Indian Ocean) are much older and predate the transatlantic slave trade (Nunn, 2008). Between 1519-1867 it is estimated that nearly 12 and a half million slaves were deported from the shores of Africa to the New World (Eltis, 2001). It is also interesting to note that nearly all of the African countries involved in the transatlantic slave trade are not part of Africa's largest free trade zone, with the main exceptions being Angola, DR Congo and Zambia, as shown below. Trade in this region is clearly more complex than in the rest of Africa, perhaps due to its involvement in the transatlantic slave trade, making it an interesting area for research.

The Long Run Effects of the Slave Trades on Africa

There has been much work done to date on the role the slave trades played in shaping modern day African society. Researchers such as Nunn (2008) and Lovejoy (1989) agree that the slave trades are important in explaining current African development and this seems to be the consensus across the related literature. There are opposing views however, as demonstrated by Eltis (1987) who argues that the slave trades did not have as big an influence on African history as may have been thought. This view is not widely accepted and has been largely disproved by Lovejoy (1989) and other literature surrounding the topic.

Figure 2 – Africa's Tripartite Free Trade Area (TFTA) (BBC News, 2016)

Nunn (2008) focused his studies on the relationship between slavery and subsequent economic development. He looked at this relationship from two dimensions. One was to measure the impact of slavery through the volume of slaves exported from a country and determine its effect on subsequent economic development. His results found a robust negative relationship, suggesting that increased extraction during the slave trades is the cause of worse subsequent economic performance. An interesting point to note in his study is that he used instrumental variables as well as OLS estimates to investigate the possible claim that the least developed areas of Africa were originally selected into the slave trade. This would indicate that these areas were headed for poor economic performance today regardless of whether the slave trade took place there or not. Both the qualitative and quantitative evidence showed that it was in fact the most developed parts of Africa that tended to select into the slave trades, thus highlighting its effect on their development (Nunn, 2008)

The other dimension from which he looked at this relationship was in a study done with Wantchekon (2011). They traced current low levels of trust in Africa back to the slave trades and demonstrated the effect that these low levels of trust had on current institutional performance. Their evidence has shown that the slave trade resulted in a deterioration of legal and political institutions which persisted to this day, discouraging individuals to act in a trustworthy manner. They measured the relationship between lack of trust and slavery empirically and found that individuals' trust in their relatives, neighbours and local government is lower if their ancestors were heavily affected by the slave trade. A positive relationship between trust and distance from the coast also exists which further supports their findings (Nunn and Wantchekon, 2011).

Eltis (1987) based his startling conclusions on the monetary value of the transatlantic slave trade on a per capita basis. However, while the real costs of the slave trade on African societies were the loss of life, subsequent famine and disease, the economic costs of the slave trade on African economies were also severe (Lovejoy, 1989). All of this evidence suggests that slavery had a significant and negative effect on current African economies.

Current Levels of Trade within Africa

The level of current trade in Africa is another interesting area for research. Scholars such as Foroutan and Pritchett (1993), and Coe and Hoffmaister (1998) have taken gravity model approaches to explain the reasons for these current trade levels, which in comparison with other continents is quite low.

Four different studies undertaken by researchers across Africa and Asia found that Africa has the lowest internal trade volume compared to other trading blocs in Europe, Asia and Latin America (Afdb.org, 2013). In 2011 intra-trade among African countries was 10% (Rugwabiza, 2012). This low level of trade has negative consequences for African development. Reduced trade leaves African countries with low investment and competitiveness, high vulnerability to external shocks, missed growth and development opportunities and limited participation in global value chains (Rugwabiza, 2012). These significant negative impacts mean that finding the cause of diminished trade levels is essential in explaining current economic performance in Africa, a question which again finds many different answers across the literature.

Rugwabiza (2012) indicated that the low levels of intra-African trade are due to inadequate infrastructure, non-tariff barriers and historical factors suchs as colonial rule. Other researchers indicate that the low levels of trade are completely explained by the low degree of trade potential amongst the countries, primarily because of their low level of GDP (Foroutan and Pritchett, 1993). On applying the gravity model, Coe and Hoffmaister (1998) had a similar finding that Africa's relatively low level of bilateral trade with industrial countries is mainly due to the relatively small size of the average African economy. They even suggested that, if anything, Africa overtrades in the sense that its trade is higher than would be expected from the various determinants of bilateral trade.

While intra-African trade is lower than in other parts of the world, the question of whether it is relatively lower or higher is the subject of debate. This paper suggests that African slave trade flows may have had an effect on current intra-African trade flows.

This could crucially explain a reason for higher or lower trade within Africa relative to other continents. On review of the literature and given the destructive nature of the slave trades, one would expect that the effect could be significant and that trade flows created during the slave trades have had a negative impact on current trade flows within Africa, thus hindering trade and economic development.

Conclusion

The transatlantic slave trade marked a radical break in the history of Africa and was a major influence in transforming African society (Lovejoy, 1989). To this day it stands as the largest long distance coerced migration in history (Eltis and Richardson, 1997) and the extent to which it affected African trade flows and development make it both a fascinating and important area for research. Many of the devastating consequences resulting from the slave trade have continued to have a lasting impact on African society today, through the damage done to state structures, the creation of social and political mistrust, and the worsening of Africa's trade position in the world economy.

In between the Gold Coast and the coast of Central Africa were the Bight of Benin and the Bight of Biafra. These four regions were the main export regions of slaves and so were among the worst affected by the slave trade. The three regions of the Gold Coast, the Bight of Benin and the Bight of Biafra contained the largest population densities on the sub-continent and had the most sophisticated state structures before the slave trade (Eltis and Richardson, 1997). A study done by Whatley (2012) found that the transatlantic slave trade increased absolutism by up to 35%, while reducing democracy and liberalism. This created weaker states which had lasting negative effects on African trade and development.

The slave trade also resulted in widespread political and social mistrust. As discussed, Nunn and Wantchekon (2011) have shown that individuals with ancestors that were heavily affected by slavery have a lower level of trust in their local government. The worsening of peoples' trust in their government together with the lack of democracy and liberalism has made political reform increasingly difficult, prolonging the existence of weaker states which arose as a result of the slave trade.

One aspect of these weaker states is that they relied extensively on slavery (Lovejoy, 1983). When the slave trade ended, the structure of African exports changed drastically and the correct institutions were not in place to facilitate this change. This negatively affected trade because the rise of produce exports started at such a low base and at a time when slave exports were becoming less important, western Africa suffered a decline in its position in world trade (Lovejoy, 1989), a decline from which they still have not managed to recover.

The African slave trade is one of the largest events in African history and has played a major role in influencing the current state of African trade and development.

As summed up by Whately, "*You sometimes cannot understand the logic (or illogic) of the world without knowing how it got that way.*" (2012). In order to fully understand why current African trade has developed in the way it has, one must understand the slave trade and its important role in African development, making it an essential area for research.

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Did the Luddites Get it Right? Automation and the Labour Market

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Discontent about disappearing jobs has fuelled the polarised politics of recent elections; never have jobs lost to technology mattered more. Peter Wilson, however, examines the history of automation and its changes in the labour market in this essay, highlighting how other eras have also displayed a preoccupation with the fear of losing livelihoods to technology. This discussion of past trends sheds light on a highly relevant topic for both citizens and policy makers today.

Introduction

In 1930, John Maynard Keynes prophesied a "startling" future for economics:

"…Assuming no important wars and no important increase in population, the economic problem may be solved, or at least within sight of solution, within a hundred years. This means that the economic problem is not the permanent problem of the human race."
(Keynes, 1930)

This utopian society Keynes imagined in his essay "Economic Possibilities for our Children", rested on the power of technology as a driver of growth, relieving workers from the necessity of work. Technology would complement, empower and raise the worker of tomorrow to at-most a "fifteen-hour workweek". Yet almost one hundred years later, this has not been the case. Technology has had ambiguous effects on the labour market, ranging from vehement opposition and fears of automated job-loss, in the form of the Luddite Movement in the 19th century, to an uncertainty as to the extent modern technologies will render humans unemployed in the future. Estimations of "technological unemployment", a term originally coined by Keynes in the same essay, are as high as 47% of occupational categories within the next twenty years in some studies (Frey and Osbourne, 2013).

This paper will assess the impact of automation on the future of the labour market from a historical context. The effect of technology on unemployment in the long-run will first be assessed, followed by an examination of the potential for automation to exacerbate economic inequalities. Policy measures that could be implemented in response will then be proposed.

The Origins of Technological Anxiety

Technological Unemployment

It is first poignant to clarify exactly what Keynes was referring to when he mentioned 'technological unemployment'. In his own words, "this means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour" (Keynes, 1933). In modern terminology, he is referring to the effective substitution of capital for labour. Hence, when machinery and other forms of technology become more efficient than labour in terms of productivity, firms will increase capital and decrease labour thus raising unemployment. Those displaced by this process will be unemployed in the short to medium term, but this is simply a "temporary phase of maladjustment", according to Keynes. As The Economist (2014) clarifies - by raising productivity, automation that 'economises' on the use of labour increases income level, which in turn, will create demand for products and services, thus creating jobs for those displaced workers. However, this short-term period of displacement has historically caused some backlash from labourers.

A History of Automation and Unease

Beginning in the early 19th century, concerns of workers being replaced by machines began to increase. As Mokyr et al (2015) note, the Luddite Movement (1811-16) in Nottingham, England became a popular example of workers revolting against automation, destroying factory machines out of fear of job losses. However, it should be noted that these claims are often exaggerated and subject to misinterpretation. It would appear that the Luddites were, in fact, "more concerned with low wages and work practices", rather than just automation (Mokyr et al, 2015). The machines appear to have been a scapegoat for their frustrations, rather than the actual cause.

Their concerns about automation proved to be unfounded, as while automation saw some workers displaced, it equally created demand for other types of labour. Mechanics were necessary to maintain new machines, which created more demand for supervisors to manage the mechanics (Mokyr et al, 2015). In essence, technological change involves a process of job destruction in older occupations and industries, which is then followed by a period of job creation and higher standards of living. In Britain, these higher standards of living were apparent as real wages tripled between 1570-1875, then tripled again from 1875-1975 (The Economist, 2014). In summary, the effects of automation on the labour market during this period of industrialisation are succinctly captured by Knut Wicksell (1901 [1934]: 164), who wrote, '*The great inventions by which industry has from time-to-time been revolutionised at first reduced a number of workers to beggary… (but then) as accumulation continues, these evils must disappear… and wages will rise*'.

A Painful Transition

It is important not to understate the enormous undertaking that this transition can have on workers and the labour force, however. In the long-run, we have seen that economies, as a whole, will benefit from greater technology integration through improved productivity and thus growth. This simplified view of economic models neatly adds technology to capital and labour to increase output, but in reality, technological changes do not affect all workers in the same way (The Economist, 2014). While some workers will find that their skills complement new technologies, others will not. For the latter, the transition to acquire new skills often not immediate. In the case of the Industrial Revolution, as stated by Mokyr et al(2015), 'by many estimates it took longer than an average working lifetime to do so, and in the long run, we are all dead'.

Automation and Mass-Unemployment?

The scale and circumstances for a large disruption to the labour market are different in this ‘second machine age’ we are in (OECD, 2016). One argument is that mechanical technological improvements during the 19th century were limited to acting as a substitute to human strength and dexterity, but ultimately, the machines increased productivity in very simple, one-dimensional tasks such as assembly lines (Mokyr et al, 2015). Now, with the rapid increase in technological capabilities, encompassed by Artificial Intelligence (AI), increasing computer power and Big Data it is more feasible that future automation will be able to carry-out more complex tasks and thus create more ubiquitous unemployment in the labour market (OECD, 2016).

One of the clearest examples of this potential disruption to the labour force is in the trend for automation in self-driving cars. As Nicolas Yan (2016) explains, “Google’s fleet of self-driving cars, for example, has collectively logged more than 1.5 million autonomous miles on the road”. If we take the potential of this automation to disrupt, say, the truck driving market, which currently is related to 8.7 million jobs in the United States economy, as well as 'being the most common job in 29 of the 50 US states', the potential for unemployment loss in the short to medium term could be catastrophic (Yan, 2016).

To revert back to the opening quote from John Maynard Keynes in this paper, it would appear that automation will impact the labour market by increasing leisure, as he predicted, if this technology were to come to fruition. Yet, of course, it would do so at the cost of higher short-term unemployment. One might ask, is this trade-off adequate? It is true that, in this scenario, many workers would be displaced from their jobs and thus may have to accept lower-paying work. However, as Martin Ford states in his book ‘The Rise of the Robots’ (2015, pg 198), automation 'might indeed drive down wages or cause unemployment but more efficient production would also make everything cheaper. So even if your income fell, you'd still be able to continue consuming since prices for the things you wanted would be lower'. In essence, if the truck driving industry were to become fully autonomous, the cost of providing the service would fall, thus the cost of the products delivered would fall, allowing purchasing power to be aligned with the decrease in nominal incomes.

At this point in the paper, a pattern has emerged. The parts of the labour market most exposed to automation have the characteristic of being highly routine, such as truck driving in modern society, or a factory worker in the Industrial Age. It should come as no surprise so, that since 1950 in the United States, employment in manufacturing has decreased from 30% to 10%, while the service industry has increased from 50% of total employment to 70%(The Economist, 2014). Thus, it is evident that the shift from low-skilled, low-wage jobs to high-skilled, high-wage jobs is increasing. Furthermore, some studies have found that in high-tech industries, every job created equates to another five complementary jobs conceived (OECD, 2016). As Mokyr et al. (2015) conclude on this matter, 'the future will surely bring new products that are currently barely imagined, but will be viewed as necessary goods by the citizens of 2050 or 2080. These product innovations will combine with new occupations and services that are currently not even imagined'.

Automation Exacerbating Inequalities

The first part of this paper has shown that automation will most likely result in job displacement and job reorintation, as was the case in the Industrial Age. We have also adequately dismissed the claim of long-term or permanent unemployment at the hands of automation. Yet, that does not mean the effects of automation on the labour market are negated. Surmounting evidence would suggest that, although long-term substitution of capital for labour is unlikely in the near-future, it is far more plausible that automation could widen the inequality gap in many economies (OECD, 2016).

Firstly, the level of education a worker holds is strongly correlated with their risk of displacement. According to Berger and Frey et al. (2016), '40% of workers with a secondary education degree are in jobs with a high risk of job automation, while less than 5% of workers with a tertiary degree are'. Thus, automation could reinforce existing disadvantages faced by some workers. Polarisation of the labour market means that workers who are unable to adapt their skills to become complements to new capital face further separation into low-paying jobs, whilst highly skilled workers face further demand for their skills. If this trend were to widen, without government interference, a "plutonomy" may eventually arise i.e. ' a top heavy economic system where growth is driven primarily by a tiny, prosperous elite' (Ford, 2015). In this scenario, the middle class would begin to dissipate into the lower class, competing for lower skill jobs after being displaced, or the upper class, acquiring capital and hence wealth, creating greater inequality.

When Keynes wrote the ‘Economic Possibilities for Our Grandchildren’, he could not have predicted such a trend. His vision was one of shared equality, such that, all of society would need less labour as machines would be so productive, with the reward being increased leisure - evenly distributed (Rosen, 2016). He wrote that the standard of living may be between “ four to eight times” higher today, than in 1930 (Keynes, 1933). If we look at 1930, the average workweek was 47 hours, compared to 39 hours in 1970 (Rosen, 2016). Keynes’ prediction thus looked to be on track. Yet, since 1970, the working week has stagnated at 40 hours per week. If labour inequality is, in fact, growing, as this paper has so far suggested, then this would mean productivity is not being shared evenly which would explain this outcome.

A possible result of this finding is the appearance of “ regional inequalities”, where new jobs are created in cities with clusters of highly-skilled workers, while rural towns with low skilled workers accumulate those experiencing displacement or unemployment; dividing the standard of living (Berger and Frey,2016). When it comes to the effects of automation on the labour market, it is worth remembering: 'there’s no economic law ensuring that as technological progress makes the pie bigger, it benefits everyone equally' (Yan,2016).

The effects of automation on the labour market, stated in this paper, imply a need for government action to combat market failures. One of the profound future challenges of modern economies will be the measures that policy makers must take to ensure an equitable distribution of the benefits of productivity. Historically, as The Economist (2014) notes, this would have placed a greater emphasis on distribution of funds to education. Linking back to the Industrial Revolution, increasing the skills of children in the 19th century would have merely required providing schools where many illiterate children could learn to read and write (The Economist, 2014). In modern society, this is not so easy. Raising the standard of secondary and tertiary level education would be more costly and difficult to achieve. Online education provides a cheaper alternative, and together with labour market training, acts as a resource for workers to adapt their skills to the continuously changing nature of work, which was not necessary in the past when jobs were more permanent and stable (O’Hagan, Newman, 2014).

However, policy implications can become convoluted when it comes to unemployment benefits. Unemployment benefits act to financially relieve those who have lost a job through no fault of their own, allowing for effective job search (O’Hagan and Newman, 2014). But what if there are no jobs to search for? In the case mentioned previously, regarding automated cars, the potential for mass unemployment in the short-term for truck drivers is 8.3 million people in the United States alone. If these workers were to become unemployed, their skills may not be compatible with other sectors and industries, especially if more than one car-related sector becomes automated. In this case, unemployment benefits may become the sole income these workers have. This reduces the cost of unemployment and, raises their ‘reservation wage’ i.e. the price that workers will not work below (O'Hagan, Newman, 2014). Hence, this puts a strain on the welfare state.

A solution posed by many economists is a Universal Basic Income (UBI). As Martin Ford (2015) describes, universal basic income 'is a certain minimum income for everyone, or a sort of floor below which nobody need fall even when he is unable to provide for himself". The main difference between UBI and unemployment benefits are that all those in the labour market, not just those temporarily unemployed, would receive this benefit. And if, as previously derived, inequality rises, plutonomies form, and capital remains in the hands of those who are wealthy, this is a real problem. The data for would agree with this statement. Firstly, between 1992 and 2012 in the US, the top 5% of households in terms of income, rose from 27% of total spending to 38%, while the bottom 80% of household income decreased from 47% to 39% (Ford, 2015). Secondly, the marginal propensity to save is higher for these wealthy classes than it is for the middle and lower classes. The lower classes in particular have no choice but to spend their income in order to maintain their standard of living (Ford, 2015). Therefore, to aid those in lower positions, and keep aggregate consumption from falling significantly, a stipend such as UBI seems logical. Nevertheless, the cost of such a policy in practice has been estimated to be as high as $1-2 trillion for the US economy, for example, which is clearly not feasible (Ford, 2015).

Conclusion

The purpose of this paper was to provide a detailed historical analysis of the effects of automation on the labour market with consideration of future policy implications. Deriving from the Luddites and spanning throughout modern history, a preconception that technology holds as much potential for destruction as it does for creation has been widely accepted, but this might not necessarily be the case. The long-term effects of automation on the labour market and productivity are clearly beneficial. The potential automation bears for inequality should not be disregarded, however, and the outlined policy measures must be considered in response to disparities in incomes and wealth. To conclude, almost 100 years after Keynes wrote his infamous essay, we see that 'the economic problem is (still) the permanent problem of the human race'. How we perceive automation and its effect on the labour market, may very well decide if this remains true.

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Economic Policy

POVERTY AND SINGLE PARENTS: THE STATE'S RESPONSE

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That low-income single parents should be supported by the state is something policy makers can agree on. How best to do this is a more challenging matter. In this essay, Annabel O'Rourke tackles the important issue of the interplay between parenting alone and poverty with clarity of expression and rigorous detail. An in-depth discussion of measures currently providing for single parents facilitates well thought-out policy recommendations for improving outcomes for single parents and thus society more generally.

Introduction

Poverty reports across Europe highlight that the most disadvantaged group in society is single mothers and their children. It is therefore of huge importance that the Irish government continues to take action to reduce poverty among single parent families. The recent reform of the One-Parent Family Payment (OFP) in 2015 continues to garner much attention in the media, notably in favour of single parent families who believe the reform has failed them. The government has failed to make viable their objective of encouraging single parents to become economic actors, primarily due to a lack of tied support services such as effective childcare.

Lone parents are specifically dependent on services that allow them to act both as a worker and a parent, as they do not have a partner to alleviate the need to look after children. This paper seeks to highlight the importance of policies that facilitate lone parents to re-enter education and the workforce.

The Scope of the Problem

According to the "Women and Men in Ireland 2013" report, there were 152,100 single parent[1] families living in Ireland in 2013. Of these, 91.6% of families were led by women, as seen in Figure 1. The report further showed that the majority of female led households had children of nine years of age or less, illustrated in Figure 2 (Central Statistics Office, 2013). This implies that the majority of lone parent households are highly dependent on childcare. In Ireland, there are three different measurements used to identify if a family is living in poverty;

i) At Risk of Poverty: This indicator identifies all households whose income falls below 60% of the national median income, €10,926 in 2014 (Central Statistics Office, 2014a).

ii) Deprivation Index: The deprivation index, as defined by the Department of Social Protection, is a list of material forms of deprivation. The following is an example of some of the items on Ireland's deprivation index; Unable to afford two pairs of strong shoes, and living without heating at some stage in the last year through lack of money (Department of Social Protection, 2017).

iii) Consistent Poverty: Finally, consistent poverty is a measure which combines both the income and deprivation indicators of poverty (Department of Social Protection, 2017).

Year	Men	Women	%Women
2003	9.6	107.1	91.8
2004	10.8	114.9	91.4
2005	9.8	113.5	92.1
2006	10.1	115.6	92.0
2007	10	125.2	92.6
2008	10.7	124.9	92.1
2009	12.1	132.5	91.6
2010	11.3	142.5	92.7
2011	12.6	141.3	91.8
2012	11.5	147.8	92.8
2013	12.8	139.3	91.6

Figure 1

Age of Youngest Child	Men	Women	%Women
0-9	4	86.5	95.6
10-14	3.6	30.9	89.6
15-19	5.2	21.8	80.7
Total	12.8	139.2	91.6

Figure 2

In reference to the "Survey on Income and Living Conditions 2014", 60% of lone parent households were materially deprived, 32% were at risk of poverty, and 22% lived in consistent poverty, as shown in Figure 3. This specific group was by far the worst affected by poverty in comparison with all other types of households and individuals. In terms of principal economic status, the three groups in Ireland who were worst affected by poverty were the unemployed, students, and homemakers. (Central Statistics Office, 2014a)

	At Risk of Poverty		Deprivation Rate		Consistent Poverty Rate	
Principal Economic Status	2013 -%	2014 -%	2013 -%	2014 -%	2013 -%	2014 -%
At work	5	6.1	19.2	19.9	2	2.4
Unemployed	36.7	35.9	54.9	53.4	23.9	22.6
Student	28.2	33.7	36.7	33.3	15.2	12
Home Duties	21.2	24.6	33.4	32.5	0.4	11.9
Retired	10	10.9	15.8	12.5	1.7	2.4
Not at work due to illness or disability	18.1	22.8	53.1	51.3	10.8	13.2
Household Composition	2013 -%	2014 -$	2013 -%	2014 -$	2013 -%	2014 -%
1 adult aged 65+	12.8	13.7	23.5	20.3	2.9	2.7
1 adult aged <65	27.2	25.7	32.5	32.1	14.5	14.1
2 adults, at least 1 aged 65+	8.7	10.7	12.5	12.1	1.5	1.9
2 adults, both aged <65	11.2	10.6	24.5	22.3	3.9	4.5
3 or more adults	11.1	15.9	24.7	21.4	4.7	4.4
1 adult with children under 18	31.7	32	63.2	58.7	23	22.1
2 adults with 1-3 children aged under 18	11.1	12.8	31.2	30.2	6.5	7.9
Other households with children under 18	24.7	23.4	36.3	37.8	15	11.9

Figure 3. At Risk of Poverty, Deprivation and Consistent Poverty Rates (2013, 2014)

It is clear that single mothers and their children are, therefore, one of the worst-off groups in society. Their apparent limited access to the workplace appears to be an important factor. This fact is indeed something that should be of great cause for concern to the Irish Government.

What's being done? An overview of existing policy

The Irish Government has enacted several policies to support lone parents and provide them with a welfare safety-net. Historically, Ireland has treated single parents primarily as carers, not workers (Millar and Crosse, 2016). In recent years, the Irish Government has changed its stance towards lone parents and has begun promoting policies that encourage these parents to re-enter education and the workforce. This is in line with the EU's target of reducing the number of severely low-work intensity families (Davies, 2013). This paper seeks to focus on current policies which directly affect single parents re-entering the workforce and education.

Income Policy

In reference to the Citizens Information's definitions, the OFP is a payment given to lone parents who are raising at least one child below the age of seven and whose income is under €425 per week. OFP is able to work in conjunction with other forms of welfare benefits including the Family Income Supplement (FIS) (Citizens Information, 2017a). As seen in Figure 4, there were 85, 934 OFP recipients in 2014 (Citizens Information, 2013).

Age Group	Men	Women	%Women
Under 25	19	10665	99.8
25-34	322	33697	99.1
35-49	1196	36696	96.8
50 & Over	447	4876	91.6
Total	1984	85934	97.7

Figure 4. Recipients of One-Parent Family Payment by Age (2012)

According to Citizens Information, the Job Seekers'Transitional Payment (JSTP) is the follow-on payment given to lone parents whose youngest child is between the ages of seven and thirteen. Unlike the Job Seekers Allowance, single parents do not have to be actively seeking work. The main difference between OFP and JSTP is that a single parent cannot also receive the FIS. This makes it harder for parents to return to work as they lose out on this important source of income. Once the youngest child reaches the age of 14, the parent must move on to the Job Seekers Allowance. (Citizens Information, 2017c)

The FIS is a general subsidy for employed low-income parents. The parents in a family must work for a combined total of 38 hours or more per fortnight to access this supplement (Citizens Information, 2017d). The supplement is calculated to provide the family with 60% of the difference between their actual income (including OFP) and the income limit for their family size, as seen in Figure 5 (Citizens Information, 2016). This policy does not support single parent families as they have to make up the 38 hours by themselves without any potential for childcare from a partner.

Family Size	Income Limit 2016	Income Limit 2017
1 child	€511	€511
2 children	€612	€612
3 children	€713	€713
4 children	€834	€834
5 children	€960	€960
6 children	€1,076	€1,076
7 children	€1,212	€1,212
8 children or more	€1,308	€1,308

Figure 5. Family Income Supplement, Budget 2016 - 2017 Comparison

The OFP was reformed in 2015; previously it had been available to lone parents with children under the age of fourteen in 2011, this was reduced to the age of seven in 2015 (Kenny, 2015). According to One Family, Ireland's leading advocacy organisation for one-parent families, the group worst affected by the reform were single parents in part-time work who could no longer afford to remain in work due to the loss of the FIS (Kieran, 2015). Karen Kiernan, One Family CEO, highlighted the cost of childcare as one of the principal reasons that remaining in work was so expensive;

"What is needed to lift these families out of poverty is not a mystery. Simply, we need targeted financial supports for poor children and investment in services; a childcare system that is accessible to poor children and families and available outside of school hours." (Kieran, 2015).

Finally, the Back to Work Family Dividend (BTWFD), is a payment of €29.80 per qualified child per week when a parent returns to work after a certain period of employment and is payable for two years (Citizens Information, 2017e). In a report by the European Social Policy Network (ESPN), the BTWFD was seen as a positive step towards Ireland's move to enact labour force activation strategies. It stated that the policy was likely to have a positive impact on jobless households but that there were key factors that would need to be addressed, including a reformed childcare system which currently continues to be expensive and inaccessible (Daly, 2015).

Childcare Policies

In Budget 2017, an additional €19 million has been directed towards the new Single Affordable Childcare Scheme (SACS). This policy is means tested and will be paid in respect of children aged between six months and fifteen years. (Department of Children and Youth Affairs, 2017) In an Irish Times piece, Wayman noted that the highest amounts, about €8,000 a year, will be available to parents on the lowest incomes whose child is in up to 40 hours of childcare per week. This will result in some of the lowest income families only having to pay €2-4 per week for childcare. It will work in tandem with a universal subsidy whereby parents will receive a maximum of €80 per child in childcare per week between the ages of six to thirty-six months (Wayman, 2016). This policy will not come into effect until September 2017 but many reforms are needed, particularly regarding supports for lone parents.

Supporting Single Parents

Firstly, it is important to note that the proportion of single parent households continues to grow in the EU (Andersson, 2002; Bird and Ruggeri, 2014). This implies that this vulnerable group is going to require an increasing amount of government support and funding. It is, therefore, important to set-up a well-developed support system that not only aids lone parent households who are living in poverty but which also acts as a preventative measure to keep future single parent families out of poverty.

In particular, the "Single Parents and Employment in Europe" report reveals that single mothers are the most likely to be unemployed out of any group. In addition to this, single mothers who are employed part-time, more than any other group of mothers, tend to be in low-paid jobs which may indicate a lack of flexibility for parents in highly-paid occupations or an inadequate availability of childcare (Bird and Ruggeri, 2014). Full-time professional work needs to be welcoming to single mothers if government's wish to have them invest in their education and meaningfully enter the workforce.

On top of this, the European Commission's Paper, "Investing in children: breaking the cycle of disadvantage", highlighted the three pillars necessary to break the cycle of child poverty. These further revealed the aforementioned features were indeed significant. The first pillar described the need for "access to adequate resources", and in particular highlighted the need for work to become more flexible to parents' needs, including through parental leave. The second pillar addressed the need for access to "affordable quality services", particularly with respect to access to early childhood education and care. The final pillar highlighted the importance of a "child's right to participate" and engage in normal activities. The paper recommended that schools and community groups needed to continue to invest in better after-school activities and programs for children (European Commission, 2013).

It is particularly important to understand this key relationship between affordable childcare and entry to the workforce. The impact of child benefit schemes, as in Ireland and the UK, are more likely to be less effective in the absence of accessible and affordable childcare services, making it more difficult for mothers to engage in the workforce (Bradshaw and Kilkey, 1999).

Case Study: Sweden's Affordable and Universal Childcare Policy

According to the European Platform for Investment in Children, Sweden has the third highest employment rate of mothers of children under six in the EU, at 79.2% in 2014. This is in part due to their generous and flexible parental leave schemes (European Commission, 2017).

Sweden has a very well-designed flexible parental leave scheme which would entitle a single parent to eight months of paid leave per child at 100% of their income (European Commission, 2017). By comparison, the Irish system only allows mothers 26 weeks of leave while fathers receive a meagre two weeks of leave (Citizens Information, 2017b). Similarly to Ireland, Sweden invests a large amount into its family welfare system but noticeably places greater emphasis on services rather than income payments (Organisation for Economic Co-Ordination and Development, 2013). Sweden generally operates on a universally based system; in the case of public childcare, it is guaranteed to all parents on a full-day basis but it is progressive in the sense that a proportion of the family's monthly income (3%) is their sole contribution. This has led to 55% of children under 3 and 96% of children between three and six years being enrolled in public childcare (European Commission, 2017). In this sense, it seems reasonable to project that Ireland should invest more of its family welfare budget into services such as childcare.

Alternatives in the Irish Context

These policy proposals should be considered by the Department of Social Protection for Budget 2018. They are of pressing importance, given the high level of poverty faced by single parents and their children.

Short-Term Policy

i) Reinstatement of FIS for single parents who qualify for JSTP: The removal of FIS without sufficient childcare reform has led to lone parents being forced to leave the workplace as they cannot afford childcare. This has placed a greater burden on the government as it is difficult to encourage single parents to re-enter the workforce.

ii) Reform of FIS: FIS doesn't take into account the fact that single parents cannot combine their working hours with another partner. The required number of hours should be reduced to 19 hours per fortnight in the case of single parents.

Long-Term Policy

i) Free Childcare for OFP/JSTP recipients re-entering Education and the Workforce: The current SACS does not take into account the specific dependency of lone parents on childcare. Parents who qualify for OFP and JSTP are particularly in need of more affordable childcare. This policy requests that all OFP and JSTP recipients have access to free childcare when re-entering education and/or the workforce (working more than 18 hours per fortnight, in line with the reformed FIS). This will encourage single parents to become less dependent on these payments in the long-run. This will cost the government between €2-€154 per week per OFP/JSTP recipient re-entering the workforce/education. In the long-run, this investment will be less than the cost of the OFP/JSTP/JSA payments per week. It enables single parents to be lifted out of poverty and re-enter the workforce more qualified and less likely to enter the group of the long-term unemployed.

ii) Supply-Side Reform of Childcare: In Budget 2017, €3 million was allocated towards grants to enable schools to begin after-school care facilities (Citizens Information, 2016).

A huge increase is needed in this budget as the improvement of after-school facilities makes childcare more accessible and affordable. This paper suggests that a further €3 million is invested. This will reduce the government's associated costs with SACS as an increase in childcare facilities will lead to a decrease in the cost of childcare.

iii) Reform of Tusla (Child and Family Agency): Based on the current pattern of childcare use, two-thirds of families whose children need minding will not benefit under SACS. All childminders must be registered with Tusla but currently only 1% of minders are registered(Wayman, S. 2016). Lone parents need flexible childcare services, such as childminders, to allow for any circumstances that require unexpected child care needs e.g. illness of a child. Tusla needs to actively register childminders rather than allow them to voluntarily register, thus speeding up the process. This reform requires an increased amount of funding directed towards Tusla.

v) Parental Leave Schemes and Maternity/Paternity Benefit: Ireland's statutory maternity leave and recently introduced statutory paternity leave is very limited, at 26 weeks and 2 weeks respectively. It does not require the company to support the person while on leave, with government provided benefit set at a standard rate of €230 per week. (Citizens Information. 2017b) This policy recommends that the government enforces fully paid maternity/paternity leave for 50% of the period by employers, and 50% paid leave for the remaining period. The policy also highly recommends that equal paternity leave and benefits are awarded.

Evaluation and Recommendations

Studies show that the most effective way to get single parents out of poverty is to return them to the workforce. Currently, the majority of lone parents do not seek employment as only low-paying work is available. As such, they also risk the net income from their work not outweighing the loss of their benefits. Reducing the cost of childcare enables single parents to better overcome this. Another key goal is to have single parents re-enter the education system and be able to achieve higher earnings. Ultimately, this policy allows for lone parents to enter education and removes the greatest barriers to entry. Access to free university education is inequitable if the necessary requirement of supplementary childcare for lone parents is not included.

The introduction of SACS has overall been well received by the general public despite being a targeted subsidy. This implies that a further targeted subsidy aiding the most vulnerable in our society would also be feasible. As supplying a greater subsidy to OFP recipients would be marginal compared to the overall budget, it also appears to be financially feasible. The facilities already available at further education centres and schools allow for these policies to be possible.

The policy is likely to gain public support due to the long-term benefit of single parents re-entering the workforce. It also reduces the moral hazard associated with remaining on benefits as there is a greater incentive to return to work due to increased feasibility. Improved leave schemes are a trend across Europe; as such businesses have begun to accept them as part of their business models and contracts. Mandatory improved leave schemes are the next logical step.

Conclusion

These reforms mark the key path towards lifting lone parents out of poverty in the long-term. The policy targets the specific elements of SACS that will enable lone parents to actively enter education and the workforce. As a group who are unable to afford childcare but who also cannot advance without entry to education or the workforce, it is important to highlight the long-term benefits of effectively enabling this group to succeed so that they will no longer rely on the state.

The availability of childcare services that understand the needs of single parents is hugely important, as well as work that allows for this needed flexibility. Improved leave schemes are a long-term goal of this policy. The important element to note is that the necessary facilities are in place for greater childcare services and the needed groundwork to make businesses comply with improved leave schemes is already in place.

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Notes

1 - Single Parent Definition: According to the Citizens Information's OFP definition, a lone parent is a person who is raising children without the support of a partner. Children are generally defined as being under the age of 18. The lone parent must not be living with a spouse, civil partner, or co-habiting. They and their children must also be inadequately maintained by the parent of the child or their previous spouse/civil partner. (Citizens Information, 2017a)

THIRD LEVEL EDUCATION: LEVELLING THE PLAYING FIELD?

KEELAN BEIRNE
Senior Freshman

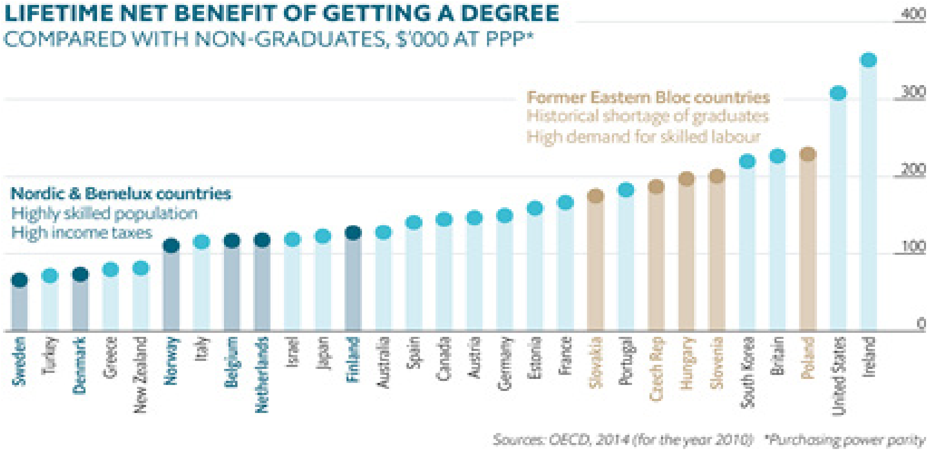
In this essay Keelan Beirne explores the challenges faced in providing higher-level education in universities which are of the highest possible standard while also remain accessible. He discusses how the provision of education can exacerbate inequality if policy makers do not exercise caution. Analysing the role of the market and the state in higher-level education provision, he concludes that there need not be a trade-off between efficiency and equity, and that a balance can be struck to achieve these goals in tandem.

Introduction

"Education is the most powerful weapon which you can use to change the world"
-Nelson Mandela

That education is a good thing is a fact few would dispute. This paper, however, seeks to address the possibility that recent trends in education might also be having negative effect on society. It seems at present that tertiary education in particular is more a force behind the divergence of incomes rather than an egalitarian force. Education may in fact be becoming the facilitator of the inequality Nelson Mandela fought to change. Since the 1980's incomes have been steadily diverging, due to a number of factors, as Piketty explains in his acclaimed book "Capital in the Twenty-First Century". Education's effect on income inequality is significant, and has been exacerbated by the technological shift of this period. Increased automation, improved information systems and increased integration and globalisation have increased the importance of cognitive ability, reducing demand for low skilled blue collar jobs, and thus increased the premium for third level education, especially university qualifications.

There is, however, potential to reverse this effect and turn education into a convergent force, reducing inequality and improving social mobility. More widespread, and perhaps universal, tertiary education would add to both efficiency in terms of worker productivity, innovation and effective screening, while also helping to equalise opportunities between classes. In terms of both efficiency and equity, it may be preferable to provide universal access to tertiary education, which will equalise opportunities, while preserving the certain level of inequality needed to ensure incentives remain.



Will it pay off? Education and Wages

The trends in recent years have made tertiary education increasingly important in terms of wage inequality, especially in Ireland. The wage premium, or the increase in future wages given by a third level qualification has steadily increased in most countries, especially in terms of university level qualifications. This trend is particularly pronounced in the case of Ireland. Ireland gives the largest payoff for a university degree in the OECD, even given the widespread availability of such qualifications (Tozer, 2017). This is despite the fact that 52% of 19-24 year old in Ireland have attained tertiary level education, and the overall attainment rate has increased from 29% in 2005 to 43% in 2015, implying the supply of graduates has steadily risen in recent times. In simple supply and demand logic, this increase in the price of skilled labour alongside a rising supply implies a surge in demand for high skill workers (OECD, 2016a). This shows the importance of taking education into consideration when discussing inequality in Ireland, and also the fact that changes in labour market dynamics, shifting jobs into high skill sectors, can greatly outweigh any increase in the supply of such skills. This trend is evident in labour markets throughout the OECD, as traditional blue collar low skill jobs have dwindled, and demand for high skill jobs requiring third level education has increased.

Education and Inequality

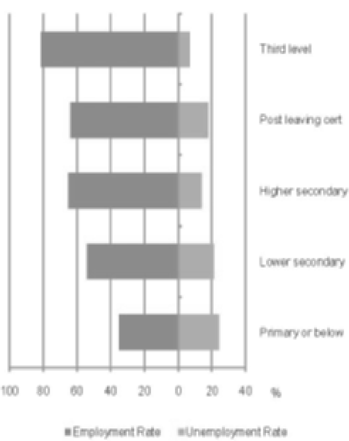
The demand for middle income jobs in rich world economies seem to be eroding, due to technological shifts. However demand for low skill jobs that must be done by humans and cannot be done by machines or computers have risen, producing a "U" shaped curve of job growth across income levels, with high growth at the top and bottom, and a fall in the middle. This causes increased polarisation in income levels and increased wage inequality (Lindley and Machin, 2013). Ireland's economy, characterised by industries which demand high skill graduates such as pharmaceuticals, finance, aircraft leasing and

IT, is particularly susceptible to this phenomenon. Even given our high levels of third level education attainment, inequality is on the rise. In terms of the gini coefficient, the OECD's raw measure of income inequality, Ireland's inequality fluctuated greatly in the crisis years, before settling on a trend on stable but gradual increases since 2010. In 2012, Ireland's Gini coefficient was .325 (OECD 2016b), however, the share of income going to the top one percent has risen in recent times, from less than 7% in 1990 to over 10% in 2007 (OECD 2016b). Despite Irelands relatively egalitarian Gini coefficient, the trend is worrying, especially in the context of rising inequality in other rich world countries. Educational attainment is also at risk of becoming polarized. This is shown in the wide variation of third level progressions in areas of Dublin, only a few miles apart. The percentage of students moving on to third level from schools in wealthy areas is much higher than the rate in more disadvantaged ones. In 2014, the rate for Dublin 4 is 84%, in Dublin 6 it is 99%, while in Dublin 17 it is just 15%, and was 16% in Dublin 10 (Humphreys, 2014). The disparities in progression rates reflect the role parents' income and social background plays in educational enrolment, and thus attainment. The role of parental income in the next generation's education, and thus income, shows that these rising trends will only compound each other over time, if left unchecked.

Equity versus Efficiency?

This leads us to consider the question of what the economic implications of this rising inequality in terms of efficiency are, and whether they are necessarily a bad thing. It might seem that we are witnessing the classic trade-off between efficiency and equity, famously described by the American economist Arthur Okun. However, this essay argues that that is not the case. The broader effects of education on the economy, and especially the effects of the concentration of education in the hand of a fortunate few, must be viewed in a macro perspective to be fully understood. While the benefits of education should not need to be emphasised, their fundamental value in terms of efficiency is often not understood. Third level education gives three main benefits in terms of economic efficiency. Firstly, it increases worker productivity for those who attain it. Secondly, it raises the chances of innovation which increases society's productivity and welfare, not just for those who are directly involved. Finally, third level education acts as a screen or signal for employers, allowing them to determine the best and most able employees in a relatively non-biased manner, boosting efficiency.

Figure 1: Employment rate and unemployment rate for those aged 25-64 classified by highest level of education attained, April-June 2011



While many view this screening effect, which was highlighted by Joseph Stiglitz and Michael Spence in their work on information asymmetry, as a negative aspect hampering efficiency, this is not necessarily the case. Using education as a market signal to employers is in fact arguably an aid to efficiency, as it allows capable workers to move into roles which maximise the use of their abilities, and helps employers make efficient use of the labour they employ. Issues do arise with third level education being used as a market signal, but they are avoidable. The first issue is whether or not third level education is an accurate signal of ability. If it is only accessible to a fortunate minority, it is more likely to be a signal of background and wealth, than one of cognitive ability. However, if education is universally accessible, giving students from all backgrounds as equitable opportunities as is possible, education is quite an effective signal, reflecting work ethic, memory and other cognitive skills so important in the modern economy. Even if it is exclusive, third level education is still probably preferable to other market signals, such as credit ratings, work history, family background etc., which may be even more exclusive to privilege. However, even given its place as an effective signal to employers, third level education is extraordinarily expensive to be only of value as a market signal. Luckily, it also brings many other benefits, which I have already mentioned, although the scale of these benefits is often questionable.

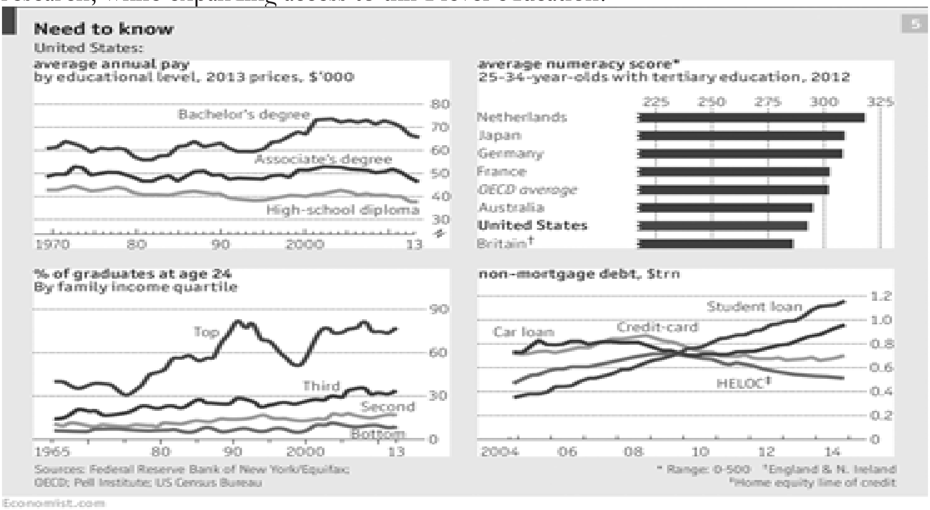
In terms of boosting productivity, the role of third level education is intuitive, but difficult to measure. One would expect the premiums being paid for third level graduates to reflect an increased productivity. However this increased productivity may be due to the fact that graduates have been screened from the workforce, highlighting their increased productivity, present even without third level education. If one looks closely, however, one notices a rise in premiums for highly technical qualifications, such as engineering, computer science and mathematics (The Economist, 2015). While graduates from these areas are likely to be very talented, it is difficult to imagine these people having the same skills in their field without third level education. This implies that education does fulfil its basic purpose, providing people with knowledge and skills, thus increasing productivity. An expansion of accessibility would improve productivity and thus the value of overall human capital in the economy, increasing output. If we accept that third level education does boost individual workers' productivity, it makes sense to give all people an opportunity to access it and boost their own abilities, thus improving society's overall productivity.

The third and most apparent benefit of third level education, in particular university education, is its contribution to technology and innovation. Research universities, which have their roots in Germany but have been championed by the American system, have played a huge role in many of the technological innovations of modern history. This role is of increasing importance. As technology progresses and becomes more advanced, an increasing amount of detailed and in-depth research and knowledge is required to push the boundaries of technology. These expertise are usually best provided by universities, which have the skills and resources to innovate on the boundaries of technology. This occurs both in terms of universities giving people the knowledge they need to innovate, and also research institutions making their own breakthroughs. As inventions are often improvements of other inventions, the more innovation that takes place, the more innovation is inspired, creating something not dissimilar to a multiplier effect. One only needs to view the rapid growth of information technology in recent times to see this in action. The role of universities in economic growth is often understated. They have provided us with countless technological innovations that would be difficult to imagine being absent in the modern economy, from polio vaccines to jet engine. Because innovation is dependent on existing technology we observe a multiplier effect from increased third level education. In terms of the Solow model, it would cause a sustained increase in the total factor of production, and thus sustainably raise living standards. At its fundamental level, giving everyone access to third level education would in turn give access to the knowledge necessary for innovation, and thus help to maximise innovation.

Universal Access

The equalising and convergent potential of third level education is substantial. While education cannot and should not cause equal outcomes, it can provide an increased equality of opportunity for all people, independent of social class or background. Universal accessibility to third level education could help to increase equity while not only avoiding a loss of efficiency, but actually improving efficiency. Access to tertiary education for all social groups provides an increased equality of opportunity among young people and helps to minimise the role of wealth and background. At present, higher education tends to disproportionately benefit higher income groups, meaning the college wage premium exaggerates inequality and leads to inefficiencies. There is no economic reason to only provide certain levels of education to those who can pay for it, or whose family can. If sufficient funding can be provided, a wider access to education could improve both equity and efficiency. As the graduate wage premium rises, and tertiary educational continues to disproportionately benefit the more wealthy, inequality will tend to rise. Added to this, globalisation will only serve to increase inequality, as multinational firms will demand more and more skilled workers. This theory is highlighted by Eric Maskin, who advocates increasing the numbers educated, and thus skilled, which will reduce this inequality (Kremer, Maskin, 2014). As Ireland's highly open economy is a huge benefactor of FDI, which tends to demand high skilled labour, this is particularly relevant. With a large and rising demand for skilled labour in Ireland's "knowledge economy", it makes sense to meet this demand, and boost equity by easing access to tertiary access.

However, a magic wand cannot simply be waved to provide universal access, and preserve efficiency. Tertiary education is not a homogenous product; its quality is affected by the market. However, while the market alone does not provide an ideal product, nor does the state. The European model, in which the state provides free fees for tertiary education, provides a more equitable service, but reduces funding for research and innovation. The American model, which is based on private institutions charging fees to students, has produced the world's leading research institutions, while failing to provide equal access to all income groups. Another huge issue is the challenge to keep conditions for both institutions and students competitive, to maximise gains to productivity, and to ensure universities don't just provide signals to employers. This is an issue both models face. In the US, studies have shown that employers principally filter applicants by the school they attended. This reduces the incentives for students to obtain good grades, and thus reduces the incentives for learning. Similarly, lectures have much more incentive to research rather than teach, and thus learning becomes neglected. This does not help to reduce fees or make top universities more accessible, as their exclusivity is what gives them their value. This means that top schools are incentivised to keep admissions low and fees high, a double blow to accessibility (The Economist, 2015). The fact that top schools are populated by a majority of wealthy students adds to the lack of equity in the American system. This system, however, has its virtues. American institutions consistently dominate the top 100 University rankings, and are among the world's leading research institutions. The top American universities have moved to the cutting edge of research, providing innovation and technological progress to society, which drives growth and improves living standards. This role of universities in sustainable growth and innovation should not be understated. There is therefore a need to preserve both efficiency in teaching and in research, while expanding access to third level education.



Conclusion

The focus of policymakers should be to provide universal access and opportunity, as opposed to free fees, while using incentives to boost the importance of grades and thus learning, all the while maintaining proper funding and competitiveness in terms of research. These goals are not necessarily contradictory, nor are they unachievable. If access to all institutions can be eased no matter their rating, this will create a more level playing field, which will result in graduates being screened by their academic ability, firstly, to get into the institution in a fair competition. Thus, wider access and an income-neutral selection process could also add to incentives to educate for both students and institutions, and thus raise productivity. In terms of research, maintaining the independence of institutions, while also maintaining their funding, would provide a suitable environment for innovation. Perhaps the main challenge to this is to acknowledge the role and importance of academic research in the economy and living standards, both by the government and society at large.

These three goals can be realised in tandem, provided we realise the importance of tertiary education in economic and social progress. The answer lies neither with the market nor with state provision, but with sensible policies to regulate and manipulate the market, in order to produce an optimal outcome. Mr Mandela was certainly correct, education is a weapon which can change the world. The nature of this change, however, is determined by how we use it.

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Corporation Tax: Myth or Miracle Maker?

Mark Finn

Senior Freshman

Ireland has come under increased scrutiny in recent years over its leniency in taxing big business. Mark Finn gives a comprehensive overview of corporation tax and foreign direct investment. While the prevailing consensus is that corporation tax is the best way of attracting firms from abroad, this essay explores other important factors and presents a more nuanced analysis of the relationship between corporation tax and foreign direct investment.

Introduction

In 1997 *The Economist* published an article entitled 'Ireland Shines' examining the causes of Ireland's 'astonishing economic success' (The Economist 1997). It cited the same reason that has so often been cited as the primary cause of Ireland's economic boom: Foreign Direct Investment (FDI). The economic benefits of FDI for Ireland are often used to justify Ireland's low rate of corporation tax, which has been criticised by other EU Member States. (Carswell, 2016) . The logic underlying these low tax rates follows conventional economic thought: low tax rates incentivise firms to do business in a given country and any raise in this rate will cause a decline in FDI. Interestingly however, Ireland is not cited as a European Leader for FDI. Ireland is not regarded as the best country for companies to establish their European Operations, with Germany being the most popular followed by the UK and France. Furthermore, the number of FDI projects in Ireland occurring in 2013 was 111; in the UK it was 799, in Germany it was 701 and in France it was 504 (Ernst & Young, 2014). It should be noted that these three countries all had (and continue to have) higher rates of corporation tax than Ireland's 12.5%, with Germany at 29.58%, the UK at 21% and France at 33.33% (KPMG, 2017). These findings challenge the narrative that low corporation tax is the sole or dominant factor in attracting FDI. This essay will analyse the role of corporation tax in attracting FDI, which will be followed by an examination of the other factors that influence the FDI level. Finally, a number of policy recommendations will be presented.

Explaining FDI

According to economic theory, the corporation tax rate is the primary determinant of the level of FDI in a country (Mudenda, 2015). Whilst other factors are acknowledged across the literature, corporate taxation rates are frequently hailed as the most significant; indeed it has been argued that the rate of corporation tax is the single determining factor for companies deciding where to set up operations (Root and Ahmed, 1978)[1]. It follows that the OECD has also cited the reduction of corporate tax rates as a primary means of attracting FDI.

This assumption, however, is flawed. Conventional economic theory assumes that corporations are profit motivated, yet it can be argued that there exists an upward limit on their desire for profit or that there are certain internal limitations which affect profit maximisation. An interesting example of this is the US textile industry. The US textile industry has suffered massively from the relocation of labour to low-wage economies. The fact that this industry that still exists and is now growing within the US, despite the fact that labour can be sourced cheaper elsewhere, is a testament to the fact that profit, and a desire to accumulate it, may be limited by certain factors; in this case anything from anti-global sentiment, to concern of workers' welfare by customers or governmental policy. In the case of other industries however, which are in this context assumed to be solely influenced by profit, an argument can be made that this profit need not come from savings made by corporation tax. A company could equally increase its profits by investing in countries that have specific trade deals (for example EU Member States), or lower wage costs. For instance, India, a large receiver of FDI inflows, has a minimum wage roughly equivalent to 5 USD per day (Worstall, 2016).

There exists data to back up the idea that corporate taxation is not the sole determinant of FDI. For example, in 2014, the top five countries in terms of FDI recipients were China, Hong Kong, the US, the UK and Singapore (United Nations Conference on Trade and Development, 2015). Although the report does factor out 'Caribbean offshore financial centres', the fact remains that there are a large number of other countries with lower rates of taxation; indeed, China and the US both had corporation tax rate significantly higher than the global average for 2014 (KPMG, 2017). Research conducted in 2013 shows that, while reductions in corporation tax often do attract FDI, there are other factors at play; it also warns of an overgeneralisation of the effectiveness of a tax cut, as they are often region specific (Baccini, Li and Mirkina, 2014). Baccini et al. also note that while policy makers believe that a favourable tax rate is the primary factor that incentivises FDI, managers of multinational enterprises (MNEs) will usually state that it is not 'very important for investment decisions'.

Beyond Corporation Tax

There is a large amount of literature concerning the other factors which influence foreign direct investment. These factors can be divided into four categories: economic, social, political and policy (Root and Ahmed, 1978). 'Economic' refers to general macroeconomic indicators such as GDP, GDP per capita, balance of payments and currency purchasing power. Social factors include education rates, urbanisation rates and the power of the labour movement while political factors refer to government efficiency, the levels of international aid it may receive, its attitude towards and interference in the economy and the level of peace and stability in an area. Finally, policy factors refer to taxation rates, taxation simplicity, as well as attitudes towards foreign nationals. This above list is by no means exhaustive, but provides a broad insight into the additional factors at play when it comes to foreign investment decisions.

Primarily, it can be argued that there are certain prerequisites for a country to possess before an MNE will consider investing there. These include obvious factors such as peace and stability; Lebanon has a corporation tax rate of 15%, nearly 10% below the global average, but FDI rates dropped by 24% in 2015 as tensions and political instability escalated in the region (Investment Development Authority of Lebanon, 2017). Additionally, workers who are suitably trained for the firm in question must be present within that country. This is why tech companies invest in developed, highly-educated and skilled countries as opposed to those with low education rates. In a model where Company X will engage in FDI, they can choose Country A or Country B. If we assume that both countries fulfil the basic, benchmark requirements (i.e. are peaceful and open to foreign nationals setting up industries there) as well the more specialised requirements (suitably trained workforce, access to raw materials necessary for production of a good and so on) then the deciding factor could very well be the rate of corporation tax. It should be noted that all of the factors affecting a firm's investment decision bear profit in mind. A better workforce leads to increased productivity, while consumers in wealthier countries have higher disposable incomes. Thus, from a profit perspective, an educated workforce and a prosperous economy are attractive for FDI. While low corporation taxes may reduce the costs of a firm, there may be other more effective ways for firms to do so. Indeed, one such factor could be the effective rate of corporation tax as supposed to the prescribed rate; France has an effective rate of roughly 8% for very large firms despite a prescribed rate of 33.33%. Thus, the effective tax rate may prove a deciding factor for certain firms, most likely larger ones that can afford to devote resources to identifying tax loopholes.

Perhaps one of the greatest concerns when it comes to increasing the rate of corporation tax is the fear that companies will leave, in search of a more favourable tax rate. It has been noted that companies will often either operate overseas or channel their profits through overseas offices (Genschel and Schwarz, 2011). However, the elasticity of

MNE's responsiveness to a tax change must be questioned. Elasticities are firm-specific. For instance, manufacturing firms are likely to be less elastic than service-based ones, due to intensive and specialised labour and capital requirements. Research from the OECD has shown that tax rises tend not to lead major changes in the current levels of FDI that exist within a country. They could, however, deter new FDI inflows (Bénassy-Quéré, Fontagné and Lahrèche-Révil, 2005). This could be due to the fact that relocation is often quite costly and time consuming. Furthermore, taxation rates vary from year to year meaning firms have a chance to lobby governments which is less time consuming than relocation. Kazman has also indicated that, within the US, the Laffer Curve theory, which shows the relationship between tax changes and government revenue, doesn't hold for individuals or corporations; suggesting that money doesn't always move abroad in response to tax rate changes.

Conclusion and Policy Implications

This essay has explored the role of corporation tax in attracting FDI. Increasing corporation tax rates must not necessarily result in a decline in FDI levels. Additional factors, such as political stability or the availability of an educated workforce, play a part in FDI decisions. These findings have important policy implications. Countries seeking to attract FDI should recognise that, while corporation tax is an important factor, it is not the only factor that influences a company's FDI decision. Engaging in education schemes in order to ensure a skilled workforce is a necessity. Furthermore, economic conditions, such as a high-income population, trade agreements and so on, reassure companies that there is potential for their firms to grow. For instance, HSBC threatening to relocate to Dublin following the British exit of the European Union suggests that EU access is the deciding factor for them, not the rate of corporation tax. Countries need to fulfil the baseline requirements for companies to be able to thrive; only after that will tax competition prevail.

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Notes

1- For the purposes of Root and Ahmed’s work, the other policy factors affecting FDI were tax incentive laws: complexity vs. simplicity; tax incentives: liberality; attitude toward joint ventures; local content requirement and limitations on foreign personnel.

Applied Economics

Have Cake and Eat it: A Game Theory Analysis of the Upcoming Brexit Trade Talks

Théophile Pastre
Senior Sophister

Theophile Pastre employs a game theoretical approach in his analysis of the outcomes of the much-anticipated Brexit negotiations. This extensive game, in which information asymmetries are expertly modelled, outlines the strategies that are likely to be adopted by Britain and the EU and can offer guidance to negotiators in the upcoming trade talks.

Introduction

British Prime Minister Theresa May has continually stated her commitment to initiate the procedure to leave the European Union (EU) in March 2017 to the Commons Liaison Committee. The UK government plans to have reached a deal by March 2019, when the two-year legal deadline, set by Article 50 of the Lisbon Treaty for the withdrawal of a Member State from the EU, expires. As trade negotiators draft their strategies, and assess how they can get the most – or rather, lose the least – from the upcoming Brexit negotiations, it is instructive to use game theory models to analyse the options faced by each side of the negotiating table. The Leave vote, which set the UK on a path towards separation from the EU, campaigned on an anti-globalisation platform, vowing to 'take back control' of national borders. While the preferences of the UK in the Brexit trade talks, to maintain access to the European Single Market (SM) and implement strict migration controls, are, for the most part, known to both parties, the same cannot be said for the position of the European Union. Imperfect information, in this strategic interaction between trade negotiators, sets the stage for an insightful game-theory approach to the upcoming trade talks.

Outline

This paper models an extensive game with imperfect information, involving British and European trade negotiators. The aim of British negotiators is to secure a successful exit from the EU, imposing limits on immigration while maintaining as much access to the SM as possible. In contrast, the negotiators representing the 27 member states wish to ensure that the departure of the UK does not lead to the collapse of the Union. The game features two players - British and EU-27 trade negotiators. For simplicity's sake, they will be referred to as UK and EU27 respectively. The type space for the two players is as follows: UK has only one type, while EU27 can be one of two types, either political or economic. In this sequential move game, Nature moves first and determines EU27's type. The probability that EU27 is political is 1/3, and the probability that EU27 is economic is 2/3. After Nature's signal, only EU27 is aware of its own type. The UK assigns a probability to each of EU27's types after it observes EU27's first action.

Having identified its type, EU27 decides whether to be tough in Brexit talks and insist that access to the SM must go hand-in-hand with the free movement of people, or to be accommodating and allow the UK to maintain partial access to the SM and to impose limits on migration. If EU27 chooses to be accommodating, the UK is satisfied with the outcome of the trade talks and the game ends. However, if EU27 instead chooses to be tough, the UK must decide whether to reiterate its demands for migration caps by investing in bilateral diplomatic efforts, or to exit the talks, in which case the UK's trading relationship with the EU is relegated to World Trade Organisation (WTO) status. If the UK decides to exit the talks, the game ends. Finally, if the UK chooses to invest in diplomatic efforts, then EU27 will choose whether to give in to British demands, or stick to its tough line. If it chooses to stick to its tough line, an agreement is not reached within Article 50's two-year time frame. In this case, the UK's trading relationship with the EU is relegated to the WTO status.

Assumptions

Three assumptions underlie this model. Firstly, the model assumes that the UK negotiators do not know precisely whether their EU counterparts will begin the Brexit trade talks with a focus on political outcomes or economic outcomes. It is assumed that EU countries are twice as likely to favour a compromise that keeps the UK in the SM while allowing it to cap migration in order to minimise the economic impact on the EU (economic type of EU27) than they are to push for a demotion of the UK to the WTO status so as to discourage other Eurosceptic movements across the Union (political type of EU27). It is assumed that the EU-27 countries will speak with one voice at the negotiation table. This reduces the number of players from 28 to two, thus simplifying the model. Finally, this model assumes that the UK will not go back on its pledge to leave the EU. This simplifies the game tree by reducing the number of branches, effectively ruling out the status quo whereby Britain is a member of the EU.

The pay-offs, presented in the game tree above also rely on a set of assumptions about the actions and preferences of each player type. It is assumed that the pay-offs to the UK do not depend on EU27's type. That is, the UK is indifferent between the outcome of negotiations with a political EU27 and reaching that same outcome with an economic EU27. Furthermore, it is assumed that the UK prefers to maintain access to the SM and being permitted to impose migration controls than moving to WTO status, where it would have full autonomy on migration controls but no preferential access to the Single Market. It is also assumed that the UK's diplomatic efforts bear a cost, and that they benefit EU27 countries, towards which they are oriented. Thus, the UK assigns a higher pay-off to reaching an outcome without having to invest in diplomatic efforts. Conversely EU27 assigns higher pay-offs to outcomes where the UK has invested in diplomatic efforts.

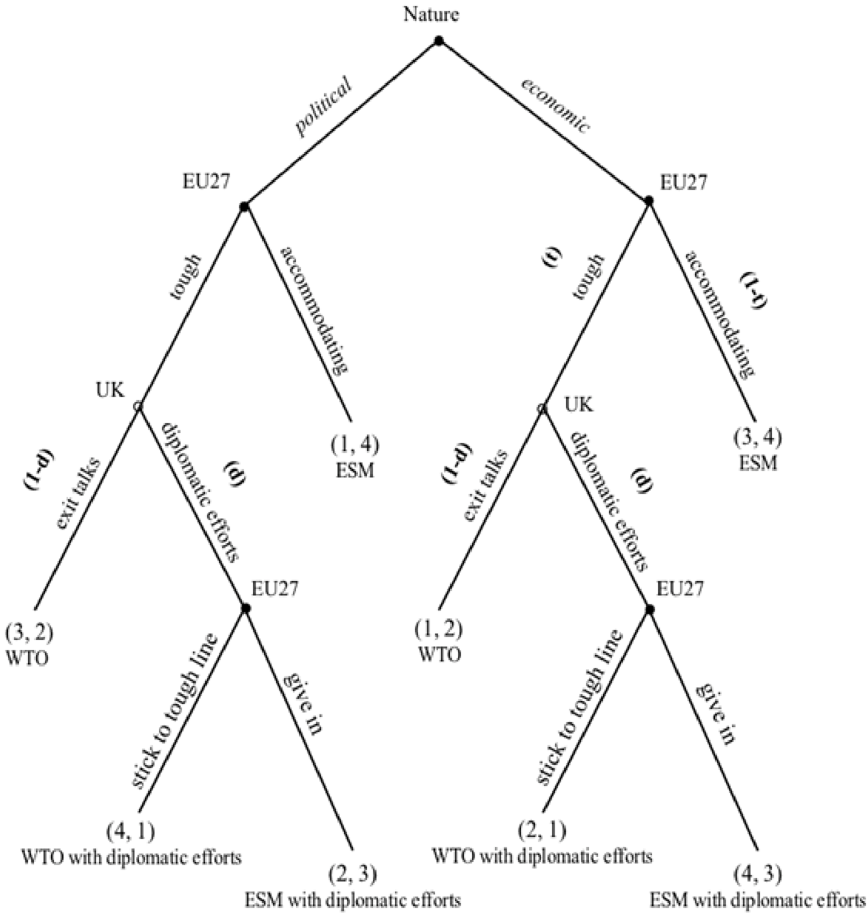
As for EU27, it is assumed that its two types have different preferences. The political type hopes to prevent the collapse of the EU by pushing for a tough trade deal in the hope that it will discourage Eurosceptic impulses across the Union. Thus, it favours a WTO outcome over allowing access to the SM and the implementation of migration controls. In contrast, the EU27 economic type aims to prevent the collapse of the EU by protecting the economic stability of the EU. Hence, it would choose to make concessions to the UK, rather than see it relegated to WTO status.
These elements can be synthetised into the following pay-off table for the three player types:

Outcome	UK Pay-offs	*Political* EU27 Pay-offs	*Economic* EU27 Pay-offs
Market Access and Migration Control, no diplomatic efforts	4	1	3
Market Access and Migration Control, with diplomatic efforts	3	2	4
WTO status, no diplomatic efforts	2	3	1
WTO status, with diplomatic efforts	1	4	2

Equilibria

The extensive Bayesian game modelled above yields three equilibria. If the UK believes that there is less than a 50% chance that EU27 is politically motivated given it played tough, then it will invest in diplomatic efforts, in the hope that it will face the economic type. In this scenario both political and economic EU27 will play tough at the first node in order to maximise their pay-offs. On the other hand, if the UK believes that there is more than a 50% chance that EU27 is politically motivated, given it played tough, then it will exit the trade talks, so as not to waste resources on the presumed political type. In this scenario the political type will still play tough at the first node, as it is the dominant strategy, but the economic type will be accommodating at the first node so as to prevent the UK from exiting the negotiations. If the UK believes that there is an exact 50% chance EU27 is politically motivated given it played tough, then it will alternate between investing in diplomatic efforts and exiting the trade talks with probabilities 2/3 and 1/3 respectively, as it is unsure as to whether it is facing the economic or the political type. In this scenario, the political type will still play tough at the first node as it is the dominant strategy, and the economic type will mix its strategies, with a probability of ½ for both tough and accommodating at the first node.

Model



Extensions and Analysis

The aforementioned assumptions will now be discussed in terms of their impact on the game's outcomes, and the extent to which they hold up in the real world. First, the biggest assumption made by this model relates to the probabilities associated with each of EU27's types. It is realistic to assume that the UK does not know EU27's type ahead of the negotiations, since the EU has formally asked its members not to conduct bilateral talks with the UK regarding Brexit before it triggers Article 50. However, the calculation of accurate probabilities for the likeliness of each type proves a more complicated exercise.

Although EU27 countries currently emphasise that access to the single market can only be granted if EU rules on the free movement of people are adhered to, Theresa May's latest speech evidences a belief among British negotiators that EU27 countries will want to minimise the economic damage incurred by Brexit, especially those with the strongest trading relationships with the UK, such as Ireland, Belgium, the Netherlands and liberal-minded Nordic countries. This mindset underpins the assumption that Prob. (economic) = 2/3 and Prob. (political) = 1/3. However, it could be the case that UK negotiators actually believe those probabilities to be different. For instance, if the probabilities were ½ and ½ respectively, it would upset the final equilibria of the game. In such a case, the only equilibrium would be for UK to play exit while political EU27 plays (tough, stick to tough line) and economic EU27 plays (accommodating, give in). In short, the outcomes of this model rest on the assumption by UK that the probability of the political type of EU27 is low.

The model also assumes that the 27 member states negotiating with the UK will speak with one voice. While this facilitates a simple two-player game, it must be noted that European countries have markedly different economic interests. Indeed, France for instance is keenly interested in poaching the UK's activity in financial services, while the Visegrad Four (Czech Republic, Poland, Slovakia, and Hungary) are more interested in defending the free movement of workers in the EU. The assumption, however, can be deemed realistic, as it is likely that the 27 member states will meet to establish a united position before March 2017 in order to negotiate effectively with the UK. While the EU27 entity is not an individual, its type reflects the consensus that will have been reached among by member states. Relaxing this assumption and designing a 28-player game would alter the structure of the model and prove much more difficult to solve.

The model makes the assumption that the UK will not renege on its commitment to leave the EU. This assumption is realistic, given the recent announcements by the May government that Brexit will go forward, as well as the self-imposed deadline to initiate the Article 50 procedure in March 2017. Nevertheless, Irish Taoiseach, Enda Kenny, and President of the European Council, Donald Tusk, have invited the UK to keep the option of not leaving the EU in the trade negotiations and many British citizens are against leaving the EU. Including this 'Remain' option in the game would add another branch to the game tree (representing the status quo), which would significantly change the structure of the game as well as the strategies of the players involved. In such a case, the dominant strategy of EU27's economic type would instead be to push for a non-Brexit.

It is quite possible that Britain might opt to leave the SM altogether, as Theresa May's announcement on 20th January 2017 suggested (Mance, 2017). This scenario is coherent with the above model, where the probability that EU27's type is economic is at least as high as the probability that EU27's type is political. As previously mentioned, in this case, the model predicts only one equilibrium, where the UK plays exit while political EU27 plays (tough, stick to tough line) and economic EU27 plays (accommodating, give in). These are the strategies both sides of the negotiating table seem to be choosing today. It is, therefore, reasonable to expect the Brexit talks to result in the UK's exit from the SM, and the relegation of its trade relationship with the EU to WTO status.

Conclusion

This paper presents an extensive model that is useful when it comes to understanding the complex decisions facing both British and EU negotiators. The Bayesian game proposed yields three equilibria, which can provide diplomats with guidance as to the strategy they should adopt in the upcoming Brexit negotiations in order to maximise their pay-offs. However, this paper also notes that, while most of its assumptions are intuitive, these outcomes are dependent on the probabilities assigned to the economic and political type of EU27. Altering these probabilities could dramatically reduce the number of equilibria.

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Appendix: Finding the Equilibria

Using backward induction and starting at the end of the game, it emerges that the *political* type of EU27 will decide to stick to its *tough line*, while the *economic* type of EU27 will *give in* to British demands. These are the relevant pay-offs to use when comparing outcomes for decisions earlier in the game. Moreover, it appears that the *political* type of EU27 has a dominant strategy (*tough, stick to line*); it will always prefer to play *tough* at the second node, regardless of the action the UK decides to take at the third node.

Let t represent the probability that the *economic* type of EU27 plays *tough*.
Let d represent the probability that the UK decides to invest in *diplomatic efforts* and reiterate demands for migration caps.

This paper starts by looking for the UK's best response at the third node, as a function of its beliefs.

UK will prefer investing in diplomatic efforts if the expected utility of playing *diplomatic efforts* is greater than the expected utility of playing *exit*:

Let p denote the UK's belief that EU27 is *political*, given it played *tough*.

EU_{UK} (*diplomatic efforts* $\div$p) = p(1)+(1-p)(3) = 3-2p
EU_{UK} (*exit*$\div$p) = p(2)+(1-p)(2) = 2
EU_{UK} (*diplomatic efforts*$\div$p) > EU_{UK} (*exit*$\div$ p) $\iff$ 3-2p > 2
$\iff$ p < ½

Therefore, the UK's best response is:
- if p < 1/2, UK will invest in *diplomatic efforts*
- if p > 1/2, UK will *exit* the trade talks
- if p = 1/2, UK will be indifferent between investing in *diplomatic efforts* and *exiting* the trade talks.

The UK's belief must be consistent with EU27's strategy and with Bayes' rule. Thus, it is possible to work out what value of t would lead to each belief.

p = Prob (EU27 is *political*÷ *tough*)
p = (Prob (*tough*÷*political*) x Prob (*political*)) / (Prob (*tough*÷*political*) x Prob (*political*) + Prob (*tough*÷*economic*) x Prob (*economic*))
p = ((1) (1/3)) / ((1) (1/3) + t (2/3))
p = 1 / (1+2t)

For what values of t will $p < 1/2$?
p = 1 / (1+2t)
p < 1/2 <=> 1 / (1+2t) < 1/2
<=> 2 < 1+2t
<=> t > 1/2

Case 1: t > 1/2 → p < 1/2:

Since p < 1/2, UK will always invest in *diplomatic efforts*.
If UK always invests in *diplomatic efforts*, then the *economic* type of EU27 should play *tough*.
Hence t =1.
This is consistent with the starting point and is therefore an equilibrium.
Equilibrium:

Political EU27: (*tough, stick to tough line*)
Economic EU27: (*tough, give in*)
UK: (*diplomatic efforts*)
Beliefs: Prob (EU27 is *political*÷*tough*) < 1/3.

Case 2: t < 1/2 → p > 1/2:

Since p > ½, UK will always *exit* the trade talks.
If the UK always *exits* the trade talks, then the *economic* type of EU27 should play *accommodating.*
Hence t = 0.
This is consistent with the starting point and is therefore an equilibrium.
Equilibrium:

Political EU27: (*tough, stick to tough line*)
Economic EU27: (*accommodating, give in*)
UK: (*exit*)
Beliefs: Prob (EU27 is *political*÷*tough*) > 1

<u>Case 3: $t = 1/2 \rightarrow p = 1/2$:</u>

Since $p = 1/2$, UK is indifferent between investing in *diplomatic efforts* and *exiting* the trade talks.

If $t = 1/2$, then the *economic* type of EU27 is mixing between being *tough* and being *accommodating.*

In order for the *economic* type of EU27 to be willing to mix between these two strategies, it must be indifferent between them: given UK's strategy, the expected pay-off from both actions must be equal. This can only be the case if UK is also mixing.

EU_{EU27} (*tough*÷ d) = 4d+(1)(1-d)

EU_{EU27} (*tough*÷ d) = 3d+1

EU_{EU27} (*accommodating*÷d) = 3.

EU_{EU27}(*tough*÷ d) = EUEU27 (*accommodating*÷ d) <=> 3d+1 = 3

<=> d = 2/3

The UK is willing to invest in *diplomatic efforts* with this probability, because in this scenario the UK is indifferent between investing in *diplomatic efforts* and *exiting* the trade talks.

Equilibrium:

- *Political* EU27: (*tough, stick to tough line*)
- *Economic* EU27: (*tough* with probability 1/2, *accommodating* with probability 1/2, *give in*)
- UK: (*diplomatic efforts* with probability 2/3, *exit* with probability 1/3)
- Beliefs: Prob (EU27 is *political*÷*tough*) = 1/2.

A GAME THEORY ANALYSIS OF DONALD TRUMP'S PROPOSED TARIFF ON CHINESE EXPORTS

JAKE MCCGWIRE

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In this essay, Jake McGwire employs the principles of game theory in his examination of Donald Trump's trade policy. He utilises both strategic and extensive form games in order to shed light on the optimal outcomes for both the USA and China in this strategic interaction, and, in doing so, he provides a clear understanding of the complex trade decisions facing world leaders today.

Introduction

On the 20th January 2017 Donald Trump, the 45th president of the United States of America, took office. However, what will take place over the next four year is, as of yet, shrouded in uncertainty. Four words echoed throughout his campaign: "Make America Great Again".

How does he plan to to achieve this? Trump's administration hopes to 'bring back American jobs' through a series of strategic trade policy decisions: withdrawal from the Trans-Pacific Partnership (TPP), renegotiation of the North American Free Trade Agreement (NAFTA), the implementation of tariffs on Chinese goods, and, if met with resistance, potential withdrawal from the World Trade Organisation (WTO). The magnitude of these decisions may seem extreme, but when framed in the context of increasing domestic jobs and incomes it seems palatable to Americans and, if his reasoning is to be believed, possible. These benefits do assume that, regardless of how the USA treats its trading partners, there will be no repercussions. Unfortunately, both economic theory and history suggest some fundamental flaws in this logic. This paper will examine the theory behind trade policy and apply this logic to the gargantuan, yet fragile, trade relationship between the USA and China.

Strategic trade theory describes the decision making of governments when trying to influence the outcome of an economic interaction between themselves and another nation. The concept of trade policy dates back to Ancient Greece when Athens placed duties of five percent at all ports in the empire in an attempt to increase revenue (Scheidel et al, 2008). History has identified the significant role of trade policy, in particular protectionism, and the huge influence it exerts on trade, price convergence and welfare. This was particularly true during the 19th and 20th centuries.

Trade theory suggests that a country's welfare can be increased by the repatriation of profits from foreign firms to their domestic competitors. This refers to the classical macroeconomic equation, in which GDP (often considered a proxy for welfare when looked at in per capita terms) is equal to C+I+G+(X-M), where (X-M) represents net exports. According to this relationship, as imports rise, more profits are sent abroad and the result is a decline in GDP. In theory, it is, therefore, rational for a country to impose tariffs on foreign goods and provide subsidies for domestic goods, as it will result in an increase in net exports, which in turn will have the effect of increasing GDP per capita. Applying this logic, it is rational for each player (country) to opt for protectionism over free trade. Unfortunately, this incentive is shared by all nations. Thus, this strategic trade interaction represents a prisoner's dilemma situation, whereby each player's best response is to employ tariffs, resulting in a sub optimal outcome for all. Therefore, strategic trade theory stresses the importance of trade agreements and the role of supranational institutions (such as the WTO) to police international trade, in order to restrict the ability and incentive for countries to deviate in the direction of protectionism.

Traditionally considered to be countercyclical, protectionist trends have historically had a significant negative effect on the volume of world trade, and, as such, provide empirical support for the prisoner's dilemma argument. The most significant example of this was at the start of the Great Depression, when the world economy experienced a huge shift towards protectionism, following the implementation of the 1930 Smoot-Hawley Tariff in the USA (Eichengreen & Irwin, 2009). Although this tariff is not considered to have caused the Great Depression, various papers attach blame to it for identifying the USA as a target for discriminatory and retaliatory trade policy (Irwin, 2011).

The decisions facing Trump can be understood if considered in the context of Game Theory. A basic model will first be explored, followed by the incorporation of a set of further assumptions, which aim to make the model more realistic and applicable.

Strategic Form Game

The matrix conceptualises the standard way of thinking about tariffs, and, as the payoffs show, this is representative of a prisoner's dilemma situation. The game is set up as follows: There are two players, the USA & China, and each has two available strategies -impose tariffs (T) or maintain free trade (F). Their preferences are defined as:

USA:
TF>FF>TT>FT

China:
FT>FF>TT>TF

		China: T	China: F
USA	T	$\underline{2},\underline{2}$	$\underline{5}$,0
	F	0,$\underline{5}$	4,4

The best response for each player is to impose tariffs, which results in the Nash

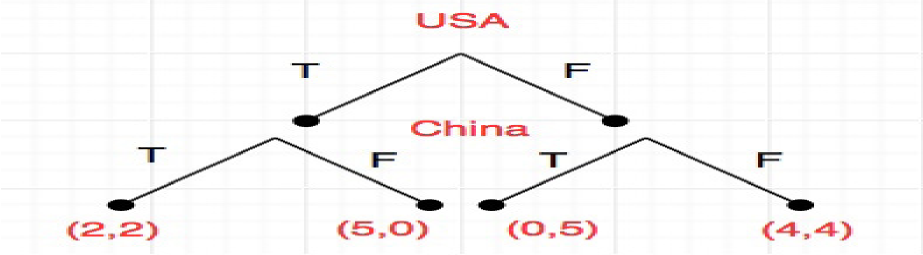
Equilibrium (NE) of (TT), from which neither player has an incentive to deviate. Although this is the NE and, as such, it is their optimal response, both countries could have received higher payoffs if they had coordinated. In reality, this 'coordination' is both encouraged and policed by the WTO. If both the USA and China maintained free trade, then both countries would have benefitted from higher levels of trade, and received higher payoffs. O'Rourke (2007) and Edwards & Van Wijnbergen (1987) present evidence supporting this idea, namely that free trade allows for higher utility and welfare levels. Their research suggests that increased trade has the effect of increasing income per capita and lowering living costs, both of which are indicators of utility.

The payoff matrix suggests that if the USA imposes tariffs, and China does not, then, in theory, America's exports will be unaffected but the price of foreign goods will increase and thus, the demand for them will decrease. This decline in demand for foreign goods will be transferred to goods from domestic producers, which will in turn increase domestic output and GDP. Conversely, if China is subject to American tariffs and choose not to reciprocate, they will see a decline in their export levels, while their imports will be unaffected. Given that the Chinese economy is so reliant on export-led growth, this is a dangerous possibility. It must be noted that the model assumes that both the USA and China are immune to penalties imposed on them for imposing tariffs and breaking WTO and other trade agreements. Payoffs, therefore, are directly representative of the impact of the chosen strategy on exports and imports. As it stands, the payoffs are symmetrical and so the rationale above can be applied when the strategies are reversed. If both countries opt for free trade, then a prosperous free trade environment remains, and, as aforementioned, if both impose tariffs, the result is a dramatic decline in world trade and a subsequent fall in GDP and welfare.

Viewing this in a strategic simultaneous format, however, implies that this interaction is simultaneous and that there are no opportunities for either country to respond to the actions of the other. This lacks real-life validity. A sequential game is a more realistic model.

Extensive Form Game

The model below depicts the standard trade policy dilemma between two nations. Here, a starting point of free trade, which is similar to today's trade environment, is assumed.



In this game, with these assumptions in mind, it is always rational for China to choose T in each subgame. The USA must, therefore, opt for tariffs to ensure a payoff greater than zero. Hence, the subgame-perfect Nash Equilibrium (SPNE) is (T,TT). However, given China's reliance on trade, it is unlikely that they would opt for a protectionist policy without being provoked. In reality, they are aware that this interaction is not confined to a two-stage game. This analysis, however, assumes that this interaction is limited to one move per player with USA playing first.

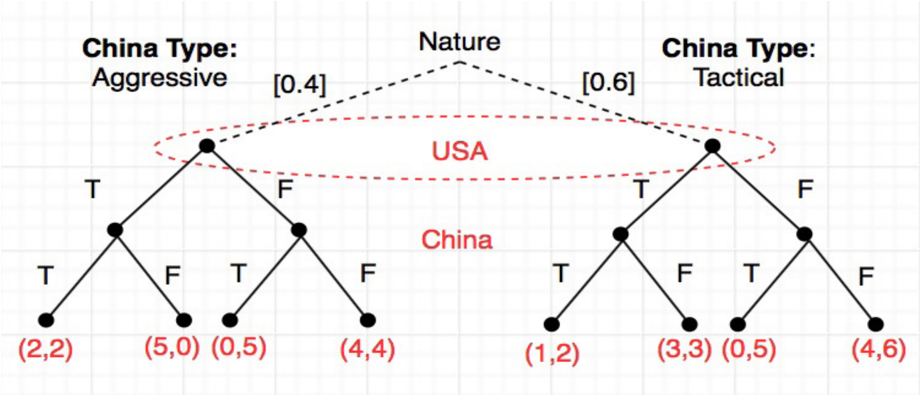
Imperfect Information

It is reasonable to assume that the USA does not fully understand the motivations behind Chinese trade policy or the country's reliance on trade, owing to the authoritarian nature of the Chinese government, which curtails free speech and censors foreign media outlets. The model, therefore, assumes that the USA is dealing with different 'types' of China, with each type requiring a different response.

This imperfect information is incorporated into the model (below). It is assumed that there are two types of Chinese government. The first type is aggressive. This is based on the observations of Irwin (2011), who, when analysing the effect of the 1930 Smoot-Hawley Tariff, concluded that its most detrimental effect was its identification of the USA as a target for discriminatory trade policy. The Smoot-Hawley Tariff sparked a wave of retaliatory protectionist policies against the USA. The aggressive Chinese government is assumed to behave in the same manner. It will retaliate equally to any tariff placed on Chinese goods, without considering the consequences.

The second type of government is tactical. Only the Chinese government fully understands the extent to which its economy is reliant on export-led growth and the effect that a decline in exports would have. The government will have developed various contingency plans to maintain high exports in the event of a rise in protectionism. This model assumes that the tactical government can manipulate currency in such a way that an increase in tariffs by the USA does not result in a payoff of zero if China opts for free trade. This currency devaluation also allows China to receive a higher payoff than the USA if both opt for free trade.

We also assume that China will be opportunistic and will seek to form trade deals that the USA turns away from. For instance, Trump's plan to withdraw from TPP (if his claims are to be believed) may see China step in to take its place. Japan has stressed that without the absence of the USA from TPP will result in a pivot in the direction of the Chinese alternative: Regional Comprehensive Economic Partnership (RCEP). Not only will this have the effect of increasing China's payoff in both situations where it opts for free trade, but it will also reduce the payoff for the US, as trade is re-allocated to this new partnership. This model, in line with its original version, assumes that both the USA and China will be worse off if they both choose to impose tariffs.



Thus, the payoffs the USA receives vary, depending on whether they interact with the aggressive or tactical China. The USA, however, due to information asymmetries, do not know which type they are interacting with and so rely on probabilities to calculate its expected payoffs. The probability that China is aggressive is 0.4, while the probability that China is tactical is 0.6. These probabilities are determined by Nature, who moves first in this game.

China's optimum strategy for all subgames is (T,T,F,F). The USA is aware of this and can calculate their expected payoffs, given these strategies. The USA's expected payoffs for choosing Tariffs are (2,6) and for Free Trade are (2,4). It follows that they will opt to impose tariffs. This yields a Nash Equilibrium of (T, TTFF). Interestingly, when this game is run as a Bayesian game, the Bayesian Nash Equilibrium is (T,TF). This suggests that the sequential nature of the interaction does not necessarily affect the result.

Extensions and Analysis

The analysis suggests that the threat of China implementing tariffs after the USA has chosen to opt for free trade forces the USA to opt for tariffs in the first instance. It is perhaps pertinent to examine the effect that an agreement put in place to remove this threat would have on the equilibrium outcome. Figure 5 shows that if China cannot choose to implement tariffs after the USA has chosen free trade, the equilibrium then shifts to one of free trade, where both players receive higher payoffs. This emphasizes the important role that the WTO plays in deterring countries, such as the USA, from reneging on its trade agreements and abandoning its position as the leading free trade economy. The same result could equally be achieved through bilateral agreements between nations. If one country breaks its trade agreements, the other countries would retaliate by imposing harsh economic sanctions against that nation in order to prevent repeat incidents.

The analysis shows that tariffs are not the answer; there are other tools that the

USA can use to achieve their economic promises. Arguably the most subtle and most beneficial tool in the long run is the subsidization of domestic research and development. This, not only encourages domestic innovation, but also drives the innovation that would increase the competitiveness of American industry relative to its Chinese counterparts.

Conclusion

This model has sought to provide a deeper understanding of the complexity and uncertainty inherent in the trade decisions facing today's leaders and policymakers. In the strategic interaction between the USA and China, information asymmetries allow the Chinese government to choose to act either aggressively or tactically. The payoffs that the USA receives vary greatly depending on China's type. This analysis highlights the negative effects of protectionism, and, in doing so, the dangers associated with populist politics, in which logical reasoning and empirical analysis no longer provide a basis for policy agendas.

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Appendix

Figure 1:

Basic Simultaneous Game

N=2

S={Tariff (T), Free trade (F)}

For USA: TF > FF > TT > FT

For China: FT > FF > TT > TF

		China	
		T	F
USA	T	2,2	5,0
	F	0,5	4,4

Figure 2:

Sequential Game

SPNE: (T, TT)

		China			
		TT	TF	FT	FF
USA	T	2,2	2,2	5,0	5,0
	F	0,5	4,4	0,5	4,4

Figure 3:

Sequential Game with imperfect information.

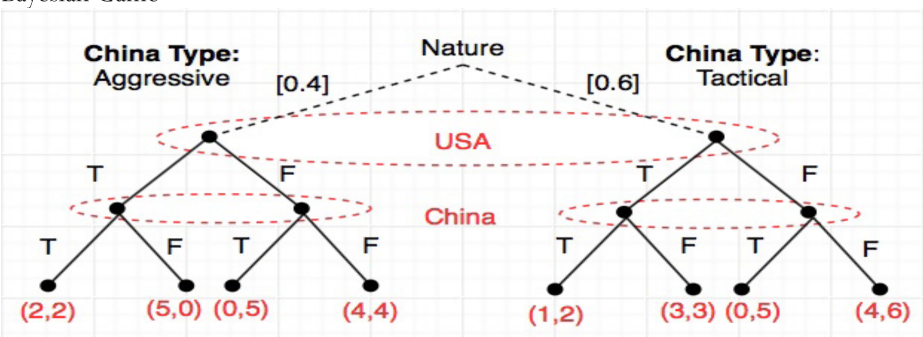
Expected payoffs for USA if:

USA plays T: $2*0.4 + 3*0.6 = 2.6$

USA plays F: $0*0.4 + 4*0.6 = 2.4$

Figure 4:

Bayesian Game



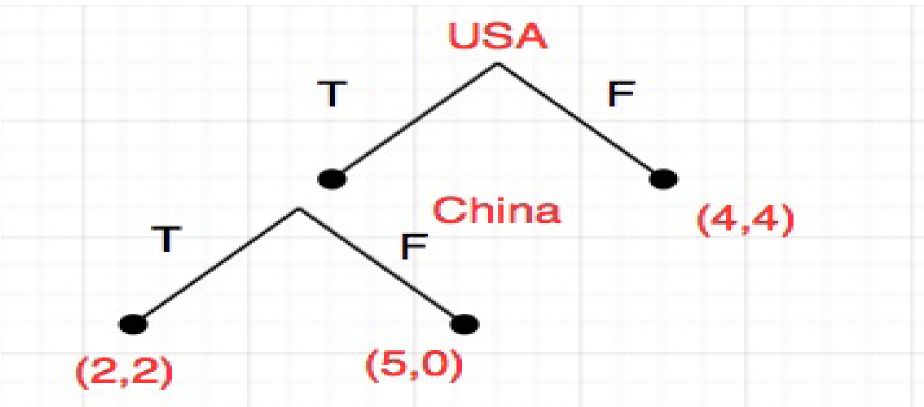
Type I: Retaliatory [1/2]		China T	China F
USA	T	2,2	5,0
	F	0,5	4,4

Type II: Opportunistic [1/2]		China T	China F
USA	T	1,2	3,3
	F	0,5	4,6

Expected Pay-off for USA	TT	TF	FT	FF
T	1.4	2.6	2.6	3.8
F	0	2.4	1.6	4

BNE (T, TF)

Figure 5:
Sequential Game with threat of China breaking away from agreements first removed. This results in a new NE of (F,T), where if faced with tariffs China will employ tariffs, but given this knowledge the USA will choose free trade resulting in a higher outcome. This is only possible now that the risk associated with the USA choosing free trade initially has been removed.



A Hellenic Tragedy: Greece, the Troika and the Euro - A Game Theory Approach

Stephen Garavan
Senior Sophister

In this paper, Stephen Garavan aptly applies the principles of game theory to his exploration of the bailout negotiations that took place between Greece and the Troika in the summer of 2015. His extended model, which he skilfully adapts to capture interactions involving both perfect and imperfect information, identifies the conditions under which Greece will request and subsequently be granted a bailout by the Troika.

Introduction

The Greek crisis of 2015 remains one of the most captivating economic and political dramas of recent years. The negotiations between Greece and its creditors – the triumvirate of the IMF, the European Commission and the ECB, collectively referred to as the Troika – over the state of the Greek economy reached existential proportions for both the Hellenic Republic and for the future and viability of the Euro. While the central issues that lay at the heart of the negotiations were often masked by political and economic rhetoric, this paper will analyse the game that was played by both sides.

The Greek economy was in freefall between 2008 and 2015, with Gross Domestic Product (GDP) collapsing from over €350 billion to under €195 billion (World Bank, 2015). The implosion of Greek market activity corresponded to a series of bailouts delivered in 2010 and 2012. The bailout by the Troika in 2010 totalled €110 billion (Magnay et al, 2010). In 2012, an even bigger bailout valued at €130 billion was required to keep the Greek economy afloat (Spiegel & Barker, 2012). By 2015, the Greek State's inability to meet the terms of these bailouts put it on a collision course with its creditors. Negotiations over a new bailout continued with the possibility that failure to agree could result in Greece exiting the Eurozone. By July 2015, Greece's membership hung on a knife edge after the Greek electorate rejected the terms of a bailout negotiated by the Syriza government with the Troika in a referendum.

In the aftermath of the referendum, the Greek prime minister defiantly announced that the result had simply increased his negotiating position (Hope, 2015). A Greek exit, or 'Grexit', from the Eurozone would not simply have damaged the Greek economy, but would, in addition, have wrought damage on the entire Eurozone (Wolf, 2015). The prospect of Greece defaulting on its debts brought the Greek government and the Troika into a classic game scenario, whereby each player had a considerable amount to lose in the negotiations that dominated the news cycle in the summer of 2015. This paper attempts to capture the fundamental strategic decisions made by each player during these months.

Model

The model represents a scenario, in which the Greek government can choose between requesting a bailout from the Troika and exiting the Eurozone. Greece's need for a bailout depends on whether it is solvent or insolvent in the long-term. If it is solvent, and a bailout is granted, the Troika will recuperate their money and the country will recover economically. If Greece is insolvent and receives a bailout, it will remain in the Eurozone for a period of time. The Troika, however, will not recover its money and the Greek economy will not recover. It is assumed that if this happens, the game will revert to the beginning and a new round of negotiations will take place at a later date. If the Greek government opts to leave the Eurozone without requesting a bailout, the game will end and the Troika will not have to make any strategic decision.

This paper will analyse two cases. A simple sequential game with perfect information will first be assessed. Secondly, an extensive form game with incomplete information will be examined. In the case of asymmetric information, the type space of the Greek government will be two-fold; Type 1, in which the Greek government represents a solvent country and Type 2, where the Greek government represents an insolvent country. A third player, Nature, will determine which type of player the Greek government is. Nature moves first. There is a probability of 0.4 that Greece is solvent, and a probability of 0.6 that Greece is insolvent. In the game with imperfect information, the Greek government will always know what type of player it is, but the Troika will not know which type of Greece they are playing with.

Assumptions

There are a number of assumptions that govern each player's behaviour in the game. The utility functions for both players are assumed to be homogenous. Given this, it is assumed that both the Greek government and the Troika prefer that Greece remains in the Eurozone. It is assumed that the Troika prefers not to lose money. If they give a bailout to an insolvent Greece, the game assumes that this money is lost. The Troika have a further preference for making the correct economic forecast. In other words, they prefer to grant a bailout application if Greece is solvent, and reject a bailout application if Greece is insolvent. It is assumed that the Greek government strictly prefers to secure a bailout, given either state of nature. The Greek government do, however, have a further preference for honesty. By asking for a bailout, it is assumed that the Greek government are claiming that they are solvent. A premium is given if this is true, and similarly a premium for honesty is given if an insolvent Greece decides to leave the Eurozone without requesting a bailout. The payoffs for each outcome, which are listed in the appendix, can be used to form the game's preferences.

Perfect Information

A simple sequential game with complete information will first be analysed. In the case of perfect information, the Troika knows whether Greece is solvent or insolvent. The Greek government moves first and either requests a bailout from the Troika, or chooses to exit the Eurozone before the Troika has a chance to move. If the Greek government requests a bailout, the Troika will then decide whether or not to grant it.

(i) Greece is Solvent:

By backwards induction, the sub-game perfect equilibrium can be found. The Troika will always give a bailout once Greece requests one. Knowing this, Greece will always choose to request a bailout over exiting the Eurozone.

(ii) Greece is Insolvent:

The sub-game perfect equilibrium can again be found using backwards induction. The Troika will never chose to give a bailout to an insolvent Greece. Knowing this, the Greek government will chose to exit the Eurozone in order to maximise their payoffs.

Imperfect Information

If players are constrained to pure strategies, an equilibrium cannot be reached. However, by allowing for mixed strategies, a Bayesian Perfect Equilibrium can be obtained. If the Greek government represents a solvent nation, it will always choose to request a bailout from the Troika. If they represent an insolvent nation, the Greek government will mix between requesting a bailout and voluntarily opting to exit the Eurozone. By mixing between these strategies, the Troika cannot determine what type of player the Greek govermment is. If the Greek government requests a bailout, it may still represent an insolvent nation. The strategies and beliefs of each player can thus be described as follows:

(i). Greek Government's Strategy:

- If the country is solvent, then it will always request a bailout.
- If the country is insolvent, then it will request a bailout with a probability of ρ.

(ii). The Troika's Strategy:

- Choose to grant a bailout with a probability of α.

(iii). The Troika's Beliefs:

- If the Greek government request a bailout, then they are solvent with a probability of 0.5.

The equilibrium can be described as follows. If Greece is solvent, the Greek government will request a bailout with a probability of 1. They will never opt to exit the Eurozone. If Greece is insolvent, the Greek government will mix between exiting the Eurozone and requesting a bailout. If they are insolvent, there is a 0.66 chance that Greece will still request a bailout. The Troika believe that if the Greek government requests a bailout, there is a chance of 0.5 that Greece is solvent. The probability the bailout will be granted in response to this request is 0.33. The solution is outlined in full in the appendix.

Analysis

The game outlined above is a simple simulation of the strategic decisions made by both the Greek government and the Troika during the summer of 2015. The game shows that, if Greece is solvent, requesting a bailout is a strictly dominant strategy for the Greek government. However if Greece is insolvent, the Greek government will still mix its strategies between exiting the Eurozone and applying for a bailout. This Bayesian perfect equilibrium, obtained from the imperfect information game, is a fascinating outcome for a number of reasons. Although the Greek government is aware that if the country is insolvent they will be unable to repay any of the bailout funds to the Troika, they will choose to mix strategies as the bailout can keep them in the Eurozone. Information asymmetries regarding the underlying state of the Greek economy allow the Greek government to mix strategies. In the game with perfect information, subgame perfect equilibria give the 'optimal' result. An insolvent Greece voluntarily exits the Eurozone, while a solvent Greece obtains a bailout.

The introduction of information asymmetries alters this result. By mixing strategies, the Bayesian perfect equilibrium allows for a probability that sub-optimal game outcomes are observed. The case where the Greek government successfully applies for a bailout, in spite of the country's insolvency, is particularly interesting. Under the game's assumptions, the bailout, in this case, will result only in the underlying insolvency of the Greek state being covered up for a period of time. The game simply returns to its starting position and a new game is played. The 2015 negotiations played out this way. In a process that former Greek finance minister Yanis Varoufakis (2011) has labelled 'extend and pretend', both players end up facilitating bailouts that they know will not actually fix the Greek economy. The bailouts only temporarily solve Greece's economic problems. Inevitably, the same issues will arise again in the future.

Conclusion

The game shows that the Troika's payoffs are always maximized with symmetric information. However, in the case of asymmetric information, the Greek government can potentially increase payoffs by mixing between requesting a bailout and exiting the Eurozone, if the Troika similarly mixes between granting a bailout and rejecting a bailout. This outcome is based upon highly restrictive assumptions, which could be modified to model a game that more closely reflects the reality of interactions between the Greek government and the Troika. An obviously limiting assumption in the game put forward in this paper is that both players face a binary choice between Greece exiting the Eurozone and a bailout being granted. If this assumption were relaxed to allow a third option, such as an option to restructure or write off Greek debt, the game would perhaps be deemed more realistic, in that it would better match the reality of the negotiations that took place in 2015. Such an addition would require a reworking of the game described here, where the solvency of the Greek State is determined not exogenously by nature, but rather by outcomes of strategic interactions between the players.

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Appendix:

Payoffs for the Troika	
Not Losing Money	2
Keeping Greece in Eurozone	1
Making the "Correct" Economic Forecast	1
Base Pay-off	1
Maximum Potential Pay-off	5

Table 1

Potential Pay-offs for the Greek Government	
Securing a Bailout	2
Staying in the Eurozone	1
Honesty Premium	1
Base Pay-off	1
Maximum Potential Pay-off	5

Table 2

Parameters of the Incomplete Information Game	
Natural Probability that Greece is Solvent	q
Troika's Belief that Greece is Solvent	k
Probability that an Insolvent Greece Will Request a Bailout	ρ
Probability that a Solvent Greece Will Request a Bailout	β
Probability that the Troika will Grant a Bailout from within the Information Set	α

Table 3

Calculation of Troika's belief that they are playing a solvent Greece:

U_{Troika}(Grant Bailout) = 5k+2(1-k) = 3k+2

U_{Troika}(Don't Give Bailout) = 3k+4(1-k) = -k+4

These are equal when k = 0.5

Calculation of the behavioural strategy of the Greek government:

(i) k=0.5.

k = (Solvent|Request a Bailout)

$$k = \frac{P(\text{Request a Bailout}|\text{Solvent})P(\text{Solvent})}{P(\text{Request a Bailout}|\text{Solvent})P(\text{Solvent})+P(\text{Request a Bailout}|\text{Insolvent})P(\text{Insolvent})}$$

$$k = \frac{0.4}{0.4+\rho(0.6)} \rightarrow \rho=2/3$$

Therefore (Request a Bailout|Insolvent)=ρ=2/3

(ii) k>0.5.

The Greek government will always play requesting a bailout. In other words $\rho=1$. This cannot be a perfect Bayesian equilibrium.

(iii) k<0.5.

The Greek government will always play leaving the Eurozone. In other words $\rho=0$. This cannot be a perfect Bayesian equilibrium.

Calculation of the probability with which the Troika mixes between granting and rejecting a bailout application:

$$4\alpha+1(1-\alpha)=2$$

From Golden Age to Great Recession: Academic Macroeconomics and the Policy Toolkit

Christopher Swords

Senior Sophister

Since the financial crisis, macroeconomic policy has come under increased scrutiny for its role in achieving economic stability. In this paper, Christopher Swords examines how academic macroeconomics has developed over the last century and applies it to pivotal events in recent times. His discussion of the challenges facing macroeconomic analysis contributes to our understanding of policy makers' decisions and offers an insight into important considerations for macroeconomic stability in the future.

Introduction

In the same way that the oil shocks marked the end of the Golden Age of Capitalism in 1973, the 2008 Financial Crisis was the culmination of the preceding economic period referred to as the Great Moderation. Sufficient time has now passed to allow for the compilation of historical accounts and analyses of this period. The purpose of this paper is twofold. Firstly, it is to provide a summarized account of academic developments witnessed in the field of macroeconomics over the Great Moderation period. It aims to apply the basic theory to topics at the frontier of policy-relevant macroeconomic research. The second purpose of this paper is to illustrate the interaction between academic macroeconomic research and the most important economic phenomena of recent times, applying this theory to the 2008 financial crisis and the subsequent period of secular stagnation. We shall see that the contemporary macroeconomic paradigm was ill-equipped to deal with either.

A Brief History of Macroeconomics

Following the challenges posed to the Keynesian model by the collapse of the Phillips curve relation in the 1960s, the academic economic landscape came to be dominated by the Chicago school and its hard form of free market ideology. The Lucas critique – that rules derived from aggregated historical macroeconomic data should not be considered structurally invariant with respect to changes in government policy (Lucas, 1976) – was the final nail in the coffin of the post WWII Keynesian synthesis, and heralded in an era of macroeconomic modelling based on microeconomic foundations. Robert Lucas' line of thought eventually led him to the infamous and popularly villainised rational expectations assumption, which necessitated that economic decision-makers (you and I) should optimally predict the value of economic variables that are relevant to them (say, the direction of property values, for anyone thinking of taking out a mortgage), given the available information set (Lucas, 1972).

A corollary to the assumption of rational expectations is that economic agents should be able to foresee the effects of any proposed monetary or fiscal expansion, and adapt wage and price expectations accordingly. This logic was the basis of Sargent and Wallace's (1975) policy-ineffectiveness proposition, which postulated monetary and fiscal authorities had absolutely no capacity to influence the output of the economy in the short-run – heresy to a traditional Keynesian.

Concurrently, Eugene Fama (1970) was developing his efficient-market hypothesis (EMH). Formally, the EMH states that no information about an asset (a stock, bond, house, derivative, etc.) available in the present or the past should influence the price of that asset in the future. The overarching practical implication of the hypothesis is that no investor nor asset manager should have the capacity to consistently earn a higher return than a market index on a risk-adjusted basis, and that the market price of a financial asset represents the best estimate of that asset's true value.

Rational expectations, policy-ineffectiveness and efficient markets became the pillars of the next major school of economic thought – New Classicism. The tenets of the New Classical synthesis served as the basis for the derivation of the real business cycle (RBC) model of economic fluctuations. Pioneered by Kydland and Prescott (1982), the RBC model proposed that business cycles[1] are caused exclusively by random exogenous, real technology shocks, to which individuals and firms respond optimally. The model was celebrated for its micro-foundations, as well as for its simplicity – shocks are conceptualized as the result of one exogenous factor (technology), and are related to the business cycle by a limited number of parameters (the rates of interest, depreciation and discount, labour's share of income, and the fraction of time that people spend at work). Crucially, monetary and fiscal policy had no role to play in this model of the short-run economy. As Prescott reportedly taught his graduate students at the University of Minnesota: "postal economics is more central to understanding the economy than monetary economics" (Romer, 2016: 4).

If the idea that the Fed and the Treasury have no capacity to influence the direction of the US economy seems counterintuitive to some readers, rest assured some highly regarded economists felt the same way. Romer (2016) cites the Volcker deflation episode as evidence of an inconsistency. Figure 1 illustrates quite clearly that in raising the Fed Funds rate in the years after his appointment as Fed chairman in 1979, Volcker permanently raised the real interest rate and induced two recessions, over the course of which unemployment rose from 6.3% to a peak of 10.8%. Larry Summers (1986: 25) was particularly scathing of what he referred to as the "price-free economic analysis" that characterized RBC theory. He collated most of his peers' issues with the

RBC model in this same paper, questioning firstly what these exogenous "technology shocks" actually were in reality, secondly the ex-post nature of the model's calibration and its sample specificity, thirdly its parameter identification, and finally the notion that all unemployment above the natural rate is the result of intertemporal substitution and voluntary changes to labour supplied. Indeed, it would seem absurd to rationalize an event such as the Great Depression as a mass collective decision to take an extended vacation.

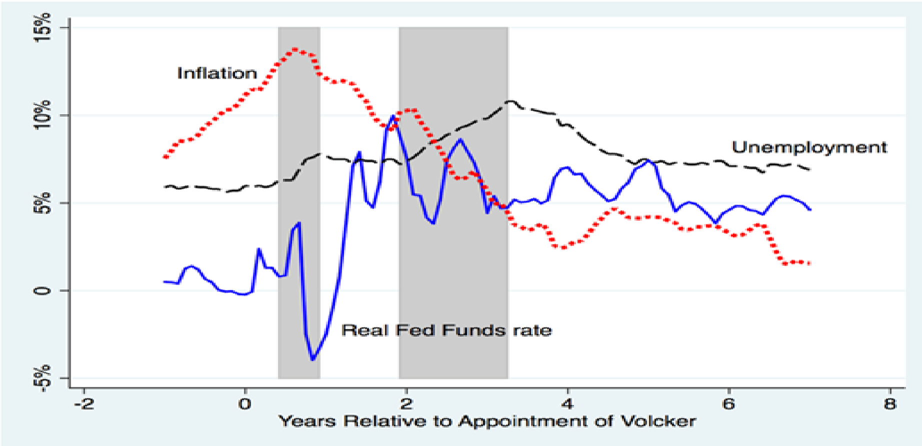

Figure 1: Volcker deflation (Romer, 2016)

Summers (1986), Mankiw (1985), Blanchard (1987) and others suggested that short-run fluctuations in unemployment and output beneath trend are more likely the result of exchange mechanism failure – firms have output that they want to sell and individuals have labour that they are willing to exchange for it, but some system failure prevents the exchange from occurring. This line of thought yielded the introduction of nominal rigidities in prices and wages to mainstream macroeconomic modelling, and heralded the emergence of New Keynesian thought.

By allowing for nominal frictions, the overarching implications of the New Keynesian synthesis are that rational expectations-based equilibria need not be unique, that the economy may not naturally attain full employment, and that monetary and fiscal policy do in fact have the capacity to influence the real economy in the short-run. In light of this, policy rules returned to academic relevance. Taylor (1993) pivoted away from Friedman's constant money growth rule in asserting that central banks should adjust interest rates in response to deviations in inflation (π_t) and output (y_t), so as to maintain credibility in inflation targeting. Roberts (1995) derived the New Keynesian Phillips curve, based on the dynamic Calvo model of pricing. It says that this period's inflation depends on current output and expectations of next period's inflation.

The combination of the Taylor rule, the dynamic household Euler equation and the New Keynesian Phillips curve yields the three-equation New Keynesian model, which typically takes something along the lines of the following form:

$$i_t = \pi_t + r_t^* + a_\pi (\pi_t + \pi_t^*) + a_y (y_t - \overline{y}_t)$$

$$C_{t+1} = (1 + R_t - \delta)\beta C_t$$

$$\pi_t = \beta E_t (\pi_{t+1}) + \lambda(\sigma + \varphi)\overline{y}_t$$

The New Keynesian model provides the bone structure of the dynamic stochastic general equilibrium (DSGE) model that central bankers were using to model the economy and set interest rates, up to and beyond the financial crash of 2008 (Blanchard, 2016).

The 2008 Financial Crisis

From the middle of the 1980s, a happy consensus emerged in macroeconomics (Summers, 2014), during which refinement of the DSGE modelling procedure dominated activity in the field. Simultaneously, the American economy entered what came to be referred to as the Great Moderation. Up until 2008, business cycle volatility appeared dramatically dampened (see Figure 2). Some commentators concluded that they were witnessing the end of the business cycle (Economist, 1997). As complacency set in, the academic free-market idolatry propagated by the likes of Lucas, Fama, Prescott and Sargent, and the conceptualization of the economy as one unified self-correcting system, gradually spilled over into practical financial and policymaking spheres. This allowed for the emergence and perpetuation of two pernicious economic trends that facilitated a gradual destabilisation of the US economy – deregulation and cheap credit.

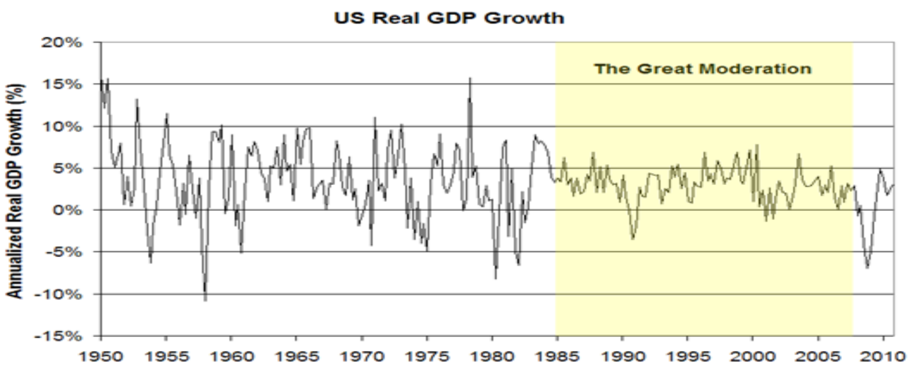

Figure 2: US real GDP growth (Federal Reserve Economic Database)

Three policy decisions that have come to characterize the period from a regulatory perspective will now be discussed. Firstly, in 2004, the Bank for International Settlements decreed in the Basel II regulatory accord that banks would be permitted to determine their own capital ratios[2], using internal value-at-risk (VaR) models. VaR models use past financial data in order to plot a probability distribution of the amount of losses on its assets that a bank could possibly suffer over a particular period. The problem was that by calibrating their VaR models with data from the low-volatility Great Moderation, banks dramatically underestimated the probability of a cataclysmic "tail-risk" event, like the crash witnessed in 2008.

Secondly, beginning in the 1990s and formalized in 2006, banks were instructed by regulators to implement "mark-to-market" accounting, whereby assets on a bank's balance sheet are valued at the rate at which they are traded at on the market (Cassidy, 2009). The move was a recognition on the part of regulators of the efficient market hypothesis – if markets are the most efficient aggregators of price information, then it follows that this is how they should be valued in official accounts. Subjecting long-term valuations to daily price volatility in such a way greatly accentuated the cyclicality of the system.

Finally, the market for derivative products was left without any special form of regulation. "Naked trading" – buying or selling of derivatives outside of the purposes of hedging – proliferated and financial markets became a venue for gambling on the outcome of different events. When one firm sells another a derivative, notional assets and liabilities are created but no new capital is created, levering the system and increasing systemic risk. Overall, the regulatory landscape came to be characterized by the belief that markets and financial institutions should be free to regulate themselves, in accordance with the academic notions of rational agents and policy ineffectiveness.

In November 2002, in the aftermath of the dot-com bubble, the nominal interest rate set by the Fed stooped as low as 1.25%. Rates were by then 2% below those implied by the Taylor rule (Taylor, 2009). With the Fed funds rate below 2.5% from 2001 up until the beginning of 2005, prime lending rates, corporate bond rates and, crucially, mortgage rates were all kept low, facilitating a borrowing binge[3]. Cheap access to credit on the part of consumers interacted with the perverse incentive structure on the part of mortgage lenders (caused by the move away from an originate-to-hold model and towards an originate-to-distribute model) to motivate an appalling deterioration of mortgage lending standards. In bubble areas such as Los Angeles, San Francisco and Miami, house prices rose by 265.5%, 226.6% and 213.1%, respectively, between 1996 and 2006 (Global Property Guide, 2016).

The crash itself illustrated the limitations of contemporary methods of economic modelling, those that characterized models such as VaR and the DSGE. A particularly unhelpful characteristic of DSGE models at the time – such as in Smets and Wouters' (2007) popular point of reference – is that they are log-linearised around equilibrium. They allow only for analysis of small additive stochastic disturbances in the neighbourhood of the deterministic steady state (Buiters, 2009). In the midst of the crash however, mark-to-market accounting, margin calls, high leverage ratios, contagion and a rapidly disintegrating property market made for a series of self-defeating positive feedback loops.

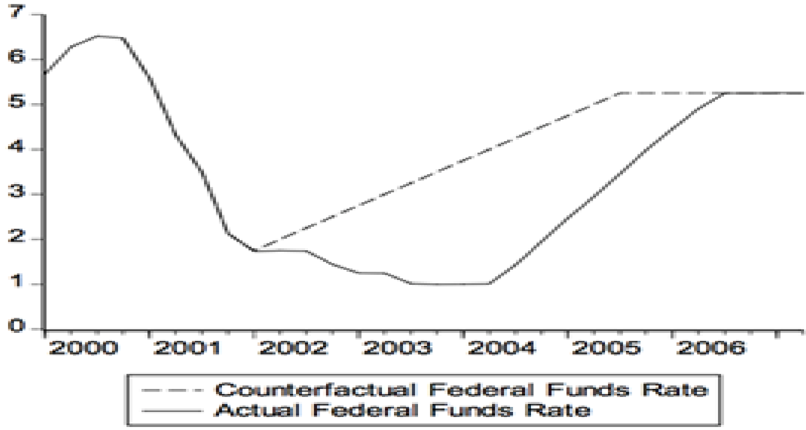

Figure 3: Federal funds rate (Taylor, 2009)

There was nothing additive about the highly non-linear liquidity crisis that resulted. It was neither a random real technology shock nor a result of stickiness in prices or wages. But it was enough to initiate the most severe global recession since the Great Depression. Academic free-market ideology had facilitated the foundation of a macroeconomic environment characterized by cheap credit and a regulatory framework predicated on a commitment to allowing markets to regulate themselves. The result was a system that was highly leveraged and highly pro-cyclical. This application of misguided ideas set the economy on a trajectory that ultimately brought about the Great Recession.

Secular Stagnation

Characteristic of the New Classical and New Keynesian traditions is a myopic focus on the second moment (variance) of output and unemployment (Summers, 2014). Technical tools such as the Hodrick-Prescott filter were used to determine trend output in past data, which is then extrapolated into the future, largely assuming away any issues surrounding the first moment (mean). The implication is that DSGE models allowed only for self-equilibrating V-shaped recessions in which output and employment return to equilibrium in an orderly fashion (Buiters, 2009).

This, however, was not observed in the aftermath of the crash. Instead, what we witnessed was an L-shaped recession and a permanent loss in potential output – potential GDP in the US and the Eurozone have been revised sharply downwards in the years since the crash (8% and 10%, respectively, as in Figure 4). This phenomenon has since been labelled secular stagnation, and it is the theme that characterizes developed economies today. The most popular explanation of the economic dynamics underlying secular stagnation, articulated by Summers (2014), posits that the failure of output to recover to potential is due to a divergence in the full-employment real interest rate (FERIR) away from the actual real interest rate. With the real interest rate too high, aggregate demand is dampened, and output remains below potential.

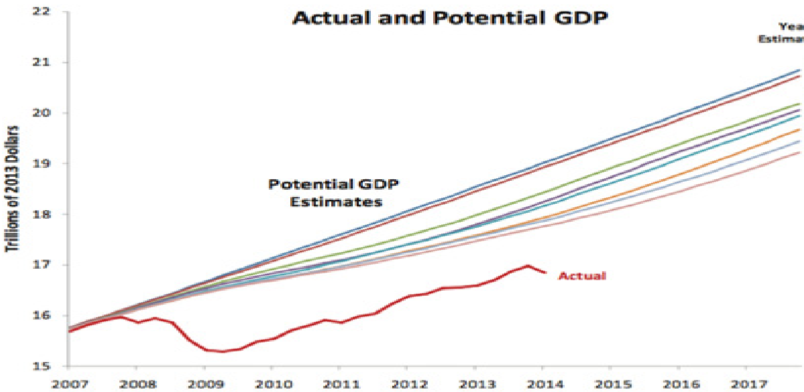

Figure 4: Actual and potential GDP in the US (Summers, 2014)

The implication of this theoretical analysis is that the standard macroeconomic policy toolkit is insufficient to tackle secular stagnation. The New Classical synthesis would have it that policymakers need not react at all – the economy will naturally revert to trend growth. The data illustrates quite clearly that this is not happening. New Keynesian analysis suggests that policymakers fine-tune the nominal interest rate, in accordance with the Taylor rule, in order to mitigate the pernicious effects of nominal rigidities on aggregate demand. The present issue however is that the FERIR is thought to lie beneath the zero-lower bound (ZLB) of nominal interest rates (Summers, 2014). Combined with low inflation, this makes it difficult or impossible to equate the FERIR and real interest rate by manipulating the nominal rate. Central bankers resorted to more unconventional methods when they initiated programs for buying a variety of financial assets from commercial banks and other financial institutions, termed quantitative easing (QE).

The core thesis was the same however – increase the money supply in order to stimulate demand (Bullard, 2010) – and the effect of pumping money in markets has been ambiguous. With equity valuations having reached all time highs and bond yields all-time lows (Tsaklanos, 2016), a pension funding crisis has emerged in developed economies – the public pension shortfall in the US is estimated to be as large as $3.4tn (Authers, 2016). Under such conditions, consumers and firms should be expected to consume and invest less, in order to save more, countering the original purpose of QE. Furthermore, those that benefit most from inflated equity prices are the wealthy[4], accentuating inequality and concentrating wealth in the hands of those least likely to spend it.

With the standard policy prescription having failed to return the US economy to pre-crash trend growth, there is little consensus amongst macroeconomists as to how to tackle secular stagnation. Summers (2014) is an advocate of increasing demand and returning to (albeit somewhat lower) potential output, not by attempting to further reduce the real interest rate, but by increasing fiscal investment, reducing barriers to private investment, and reducing inequality. Gordon (2016) is more pessimistic and asserts that a combination of economic headwinds – rising inequality, diminishing returns to education, unfavourable demographic trends, and sovereign debt burdens – have conspired to severely reduce potential output. His analysis suggests that US GDP per capita growth will be as low as 0.8% for the next 25 years. Eichengreen (2014) on the other hand, outwardly disagrees with both Summers and Gordon, positing instead that any stagnation in the US is the result of under-investment in infrastructure, education and training. These disparate views on one of the presently most important macroeconomic themes are evidence of the fact that we are, in actuality, a long way from a standard, consensus macroeconomic model.

Concluding Remarks

We have seen that the free market ideology propagated by academic concepts such as rational expectations, policy ineffectiveness and efficient markets were malignant on two dimensions. They provided the intellectual rationale for the financial deregulation and cheap access to credit that were important characteristics of the US economy throughout the Great Moderation, and were a part of the process that left it vulnerable to a shock on the scale of that observed in 2007-2008. The policy toolkit endowed upon us by New Classical and New Keynesian economics has proven insufficient to overcome the challenges posed by secular stagnation.

The crash itself in 2008 illuminated the limited capacity for contemporary modelling techniques to account for such events. The RBC model was celebrated for its simplicity, but the system it was designed to describe is immeasurably complex – social systems like an economy do not follow deterministic processes in the same way that physical systems do; in fact, economic systems are the product of processes that are liable to change over time. This idea suggests that in the future macroeconomic discourse, it may be necessary to move away from holistic theories and the pursuit of general laws. Blanchard (2016) for example is of the opinion that DSGE modelling must become less insular. He cites behavioural economics and big data empirics as examples of fields from which macroeconomics can draw more from in the future, offering guidance to prospective researchers as well as to students of economics.

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Notes

1. The term used to describe cyclical deviations in GDP growth from its long-term trend (or average) rate; booms and recessions are interpreted as the peaks and troughs of these cycles.
2. The bank's ratio of equity capital to liabilities – if a bank' assets suffer a percentage write-down in value greater than its capital ratio, the bank is considered insolvent.
3. The amount of outstanding mortgage debt in the US economy rose from $2.76tn at the beginning of 1987, to $13.8tn by the beginning of 2007 (data from federalreserve.gov).
4. See, for example, Ait-Sahalia, Parker and Yogo (2004).

European Economics

Bridging the Gap: Vision versus Reality of EU Cohesion Policy

Emily Waters

Senior Sophister

Regional disparities have long been a feature of the European Union. In this paper, Emily Waters evaluates EU cohesion policy to date. She assesses both its objectives and its outcomes and, in doing so, underlines the significant gap that still exists between Europe's rich and poor. She argues that although cohesion policy, in its previous form, has done little to address this divide, its value cannot be wholly discounted.

Introduction

EU cohesion policy was established as a means of promoting harmonious European expansion. Its aim was, essentially, to bridge the gap that had emerged between the rich and poor regions of Europe. The success of this policy, however, is much disputed, as discrepancies in both income and unemployment levels still exist in the European Union. Recent reports have shown that Gross Domestic Product (GDP) per capita in 17 member states is currently lower than the EU28 average of 27,300 (Eurostat, 2015). Similarly, unemployment rates in European nations range from 40 per cent to 200 per cent of the EU28 average (Eurostat, 2015). Each process of EU enlargement has resulted in greater regional disparities, with the difference in life expectancy at birth between developed and undeveloped regions having increased substantially since 2004 (Eurostat, 2015).

The paper will examine the extent to which this vision of an economically homogeneous Europe has been realised, by analysing both the geographical dissemination of economic activity in Europe, and the objectives and outcomes of EU cohesion policy. The latest European strategy for reducing regional inequality in the Union will then be explored, followed by an analysis of the unnecessary and potentially distortive nature of EU cohesion policy.

Cores and Peripheries

It is perhaps beneficial to first discuss the geographical distribution of economic activity in contemporary Europe. Despite its 4.3 million square kilometre reach, Europe's economic operations are highly concentrated in western Germany, France's northeast, the Benelux nations and the southeast of England. The inhabitants of Europe's core regions enjoy both higher incomes and lower unemployment rates than their peripheral counterparts. Recent studies have identified marked national differences, with GDP per capita of member states currently ranging from 30 per cent (Severozapaden, Bulgaria) to 325 per cent (Inner London) of the EU28 average (Eurostat, 2015).

An analysis of employment levels in Europe highlights similar economic discrepancies across the member states. While core regions such as Luxembourg and western Germany boast employment rates some 10 per cent higher than the EU average of 69.2 per cent, aggregate employment in Bulgaria and southern Italy stands at just 55 per cent (Eurostat, 2015). It is important to note that European integration has steadily narrowed income inequality across nations. Economic differences within EU regions, however, have become more pronounced with each process of enlargement (Baldwin and Wyplosz, 2015).

The Early Years

The objectives and results of EU cohesion policy to date ought first to be considered before assessing the effectiveness of this policy. Income levels in European regions converged to the EU6 average in the 1970s (Puga, 2002). The process of EU enlargement, however, saw the emergence of regional inequalities within Europe. Income per capita in new member states, such as Portugal and Greece, fell to 40 per cent below that of Germany, Luxembourg and Denmark (Commission of the European Communities, 1997). This disparity in income levels across member states saw policy makers set an economically homogeneous Europe as their primary objective. Modernising the regional economy and reducing the incidence of poverty at a European level was the means by which this aim would be achieved (Commission of the European Communities, 1997, 2001).

On the whole, early EU cohesion policy was a moderate success as it led to the improvement of European infrastructure in underdeveloped regions and the narrowing of disparities in income per capita between member states. Pre-crisis EU cohesion policy, however, failed to reduce the poverty rate in Europe with some 15 per cent of its total population at risk of poverty in 2000 (Commission of the European Communities, 2004).

The Effect of EU Enlargement

When it comes to analysing the social and economic impact of EU cohesion policy on the regions of Europe, the influence of further enlargement and the effect of the 2008 financial crisis must be considered. The advent of ten new member states on 1 May 2004 increased pre-existing disparities in both income and employment in Europe. Not only did GDP per capita in these countries stand at less than half of the European average, employment rates were also some eight per cent lower than those of the EU15 (Commission of the European Communities, 2008). Between 2000 and 2006, EU cohesion policy focused on improving living standards and life expectancies of all member states, in an attempt to bridge the gap that had emerged between the rich and poor regions of Europe. While some convergence took place in areas such as transport infrastructure, discrepancies in employment rates and social wellbeing remained.

These economic differences were exacerbated further by the outbreak of the financial crisis in 2008 (Commission of the European Communities, 2010, 2014). Between 2007 and 2013, EU cohesion policy attempted to combat the devastating economic effects of the crisis, with a focus on the achievement of sustainable economic growth and the development of Europe's peripheral regions. Despite their efforts, however, EU policy makers have created only limited economic and social cohesion in Europe. As of 2014, over one third of all member states had unemployment rates higher than the EU average of 9.8 per cent (European Commission, 2014).

EU Cohesion Policy, 2014-2020

In an attempt to convert their vision of an economically homogeneous Europe into reality, EU policy makers have adopted an ambitious new strategy that focuses on achieving smart, sustainable and inclusive growth in Europe by 2020. With eleven thematic objectives, ranging from investing in education and skills to strengthening research and technological development, EU cohesion policy for 2014 to 2020 places a greater emphasis on the achievement of results (European Commission, 2014). Its budget of over €351.8 billion exceeds those allocated for previous cohesion policies. This figure, which makes up some one third of total EU expenses for the period in question, is aimed at both advancing harmonious development in the Union and reducing regional disparities in income and employment between member states (Stratfor, 2015).

The extent of regional diversity in the EU requires significantly more than the implementation of a one-size-fits-all programme of reform. Rather, European regions ought to be involved in the construction of such policies and provided with the means to accomplish their own goals (Commission of the European Communities, 2010). EU cohesion policy for 2014 to 2020 is a further move towards this approach as it incites both national and regional participation to combat widespread issues surrounding employment, social inclusion and innovation in Europe. It remains to be seen, however, whether this new strategy will succeed in finally closing the gap that exists between the developed and under-developed regions of Europe.

A Contradiction in Terms?

It must, however, be noted that that the implementation of EU cohesion policy arguably contradicts one of the fundamental principles of the European Union itself. In the aftermath of the Second World War, European leaders believed that peace between nations could only be accomplished through trade and cooperation of European nations facilitated by the economic process of deregulation. By creating a single market for goods, capital, employment and services, policy makers hoped that trade between states would flourish and tensions in Europe would gradually ease. The European Union is constructed around the idea of the common market, yet Cohesion policy interferes in this market by using money raised from taxes to redistribute wealth amongst the various regions of Europe (Farole, Rodríguez-Pose and Storper, 2011).

Common criticisms of EU cohesion policy focus on its irrelevance, as well its distortive nature. Under the neoclassical growth framework, open markets and competition lead to regional convergence and the equal distribution of productive factors between member states (Pieñkowski and Berkowitz, 2015). Given that such activities are assumed to occur naturally in the economic environment and that the subsequent distribution of regional aid could result in the misallocation of factors, cohesion policy is frequently deemed to be both irrelevant and potentially harmful. However, this assumes the validity of convergence between member states. Where this convergence does not naturally occur, the imperative for cohesion policy to be implemented exists, despite distortionary effects. This kind of redistribution can be seen as essential for the EU to remain politically feasible.

Conclusion

Through the examination of both the objectives and results of EU cohesion policy to date, this paper has shown that European policymakers have failed to convert past visions for economic and social cohesion in Europe into true reality. While cohesion policy has seen the creation of 594,000 new jobs in Europe between 2007 and 2010, vast disparities in social wellbeing, education standards and income levels across European nations still exist (European Commission, 2014). Despite its contradiction of one of the founding principles of the European Union, it is important not to completely discount the role that cohesion policy plays. Without its funding, even wider discrepancies would likely exist between the EU28.

In an attempt to foster harmonious expansion and to bridge the gap that currently exists between the rich and poor regions of Europe, EU policy makers have developed a new strategy that focuses on achieving sustainable, smart and inclusive growth in Europe by 2020. However, whether this ambitious approach will finally transform their dreams of an economically homogeneous Europe into reality remains to be seen.

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Europe Thinks Differently: The Augmented Role of Competition Policy in the EU

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Charlotte O'Neill's in-depth analysis of the European Commision's landmark ruling against Apple and Ireland underlines the distortive effects of state aid. In this essay, she examines both the legal and economic framework on which this decision was based, and, in doing so, highlights the changing role of competition policy within the European Union.

Introduction

In the era of the stateless enterprise, state aid control has become an ever-more important competition tool at the European Commission's disposal. State aid control is one of the most politically sensitive competition issues because it touches on sovereign states' national fiscal competencies with regard to allocating government funds as they see fit (OECD, 2010). The European Commission's use of state aid control and the political sensitivity surrounding its remit culminated in the landmark ruling against Ireland and Apple, in which advanced transfer pricing arrangements made between Apple and Irish Revenue in 1991 and 2007 were classified as state aid. In this ruling, the Directorate-General (DG) for Competition adopted an uncharacteristically expansive interpretation of state aid rules that may have future implications on the scope of European state aid control, the functioning of the European Union's competitive environment and its interaction with international corporate tax affairs.

A more fundamental issue facing the EU is arguably at play in the Apple case. At the 2016 Tax Congress of the Berlin Tax Forum, Pierre Moscovici, the EU Commissioner for Economic and Financial Affairs, Taxation and Customs, left no doubt that the EU is tackling tax avoidance with renewed rigour (European Commission, 2016a). The prospect of a Common Consolidated Corporate Tax Base (CCCTB) is once more being negotiated after its initial proposal in 2001. The aim of this is to clamp down on base erosion and profit shifting, which costs the EU in the region of fifty to seventy billion euro in revenue every year (European Commission, 2016a). Addressing this issue from a competition perspective has proven most promising, given the significant resources of DG Competition and its clear state aid control mandate. In this context, state aid investigations are a means by which multinational tax avoiders may be legitimately sanctioned due to the resultant distortionary effects on competition within the Single

Market. Hence, the Apple case can be looked at as one piece of a larger European puzzle.

Theoretical justifications for state aid control:

The Support of Inefficient Production

Economic theory posits that the granting of state aid by a single national government can create distortions across the entire Single Market (Friederiszick, Röller, and Verouden, 2006). It is the existence of these distortions or negative externalities that is the primary justification for state aid control being conducted at the supranational level in the EU. State aid reduces effective competition if it supports inefficient production. Subsidies may drive more efficient competitors out of the market entirely, to the detriment of not only the competitor, but also consumers, who may incur higher prices, lower output or lower quality products from the inefficient but subsidized producer (Spector, 2009). The mobile device market offers an interesting example as it generates roughly two-thirds of Apple's total revenue (Mickle, 2017). After a decade of growth, 2016 saw the global market shrink for the first time. This can be attributed to saturation in developed economies and rising competition in emerging markets. (Cheng and Lee, 2016). In theory, as saturation in the mobile market increases as a result of the commoditisation of the smartphone, the distortionary effects of any state aid granted to Apple rises correspondingly. In the international smartphone vendor market, market share is largest for Samsung with 21.9%, Apple is second with 14.6% and is followed by Huawei with 8.8% . This suggests that Apple, although controlling less market share than Samsung, still exerts a degree of market power in the industry that will exaggerate any distortionary effect of state aid. Here, the issue of moral hazard arises as the theoretical 'soft budget constraint' created by the aid erodes Apple's incentive to maintain efficiency. (Spector, 2009).

The Distortion of Dynamic Incentives

The erosion of efficiency leads to the distortion of dynamic incentives. When an undertaking is granted aid that is invested in research and development (R&D) this usually strengthens the presence of that undertaking in the (future) product market and generates greater market power (Spector, 2009). Competitors are likely to expect a reduction in residual demand, which will induce a decrease in investment; this is the crowding-out effect which results in a lower increase or a decrease in overall investment in the market (Spector, 2009). Alternately, competitors respond by maintaining or increasing investment.

For example, Apple and Spotify are competitors in the digital music market (Verbergt and Duxbury, 2016). Apple's favourable tax treatment has freed up financial resources to invest in enhancing the existing Apple Music app, in more aggressive marketing or in developing more advanced music products. In response to fiercer competition, Spotify may anticipate a decline in demand and reduce investment accordingly. This reduces their market power by shifting oligopoly rents to Apple (OECD, 2010). Otherwise, they can maintain or increase investment in order to compete. In theory, the effect on overall societal welfare is ambiguous. However, it is clear that Apple can pre-empt part of the demand which, without the aid, would have been at least partially served by their rival (OECD, 2010). Thus, without state aid control a single government has the ability to distort competition across the Union by altering the behaviour of both recipients of aid and their competitors.

Apple's European Tax Structure

Apple's corporate structure is conducive to transfer pricing within the Apple group. The Apple group includes Apple Inc., which is headquartered in the U.S., and a number of affiliated companies, some of which are incorporated in Ireland (European Commission, 2016b). Of the companies incorporated in Ireland, Apple Operations International (AOI), Apple Sales International (ASI) and Apple Operations Europe (AOE) are non tax-resident in Ireland (European Commission, 2016b). Transfer pricing refers to the prices charged on commercial transactions between companies belonging to the same group or within a company which operates a permanent establishment in a separate jurisdiction. This involves an allocation of that company's profit between its permanent establishment and the other parts of the company (Bernard, Jensen and Schott, 2006). Through this mechanism, multinationals can allocate profit between separate companies within the group. The OECD's 'arm's length principle' stipulates that tax administrations should only accept transfer prices between group companies that are paid as if they were agreed to by independent companies negotiating under comparable circumstances at arm's length (OECD, 2010). This is to prevent multinational companies from manipulating transfer prices, in order to attribute as little profit as possible to jurisdictions with a higher corporate tax rate and as much profit as possible to jurisdictions where profits are taxed at a lower rate, such as Ireland.

Under a cost-sharing agreement ASI and AOE use Apple's intellectual property to sell and manufacture Apple products in markets outside North and South America (European Commission, 2016b). This agreement facilitates payments from ASI and AOE to Apple in the US, which fund R&D activity carried out in the U.S. on their behalf. These transfers funded over half of all research activity conducted by the Apple group in the US to develop its intellectual property worldwide (European Commission, 2016b). Apple further utilised this framework such that, in the European market, when a customer purchased products from a physical store in their Member State they were in fact contractually purchasing the products from ASI in Ireland. Hence all sales and the resulting profits were recorded directly in Ireland. The 1991 and 1997 contested tax rulings allowed the internal allocation of these profits within ASI, making it possible to split these profits (European Commission, 2016b). The majority of the profits were internally allocated away from Ireland to a head office within ASI. This head office did not own a premises, nor did it employ any staff and it was not based in any country - all profits allocated to it were untaxed, essentially creating a so-called *stateless enterprise* in terms of tax obligations. A small remaining fraction of ASI's profits were allocated to its Irish branch and subject to tax in Ireland. Looking at figures from 2011 offers an illustrative example: ASI recorded profits of €16 billion. However, the profit allocation methods endorsed by the 1991 and 1997 rulings meant that only approximately €50 million was taxable in Ireland, which left €15.95 billion of profits untaxed (European Commission, 2016c). AOE, which manufactures certain ranges of computers for the Apple group, benefitted from similar tax arrangements endorsed in the same rulings. Through the same mechanism, most of AOEs profits were allocated to its stateless head office and were, thus, not liable for taxation in any jurisdiction, while the relatively small remainder were taxed in Ireland (European Commission, 2016b).

Establishing the Existence of State Aid

The European Commission is one of the few international competition authorities with the scope to vet the granting of government subsidies to companies or ‘state aids’ in the parlance of the European Union (OECD, 2010). In accordance with Article 107(1) TFEU, any aid granted by a Member State or through State resources that distorts or threatens to distort competition, by favouring certain undertakings or the provision of certain goods, shall be incompatible with the common market, in so far as it affects trade between Member States (European Commission, 2016b). In proving that a measure does in fact qualify as an aid, under Article 107(1) the following cumulative conditions must be met:

(i) the measure must be imputable to the State and financed through State resources;

(i) it must confer an advantage on its recipient;

(iii) that advantage must be selective; and

(iv) the measure must distort or threaten to distort competition and have the potential to affect trade between Member States.

The Commission ultimately found that the contested tax rulings constituted state aid, which is incompatible with the internal market. Firstly, relating to (i), the Commission deemed the tax rulings issued by Irish Revenue to constitute an intervention by the state or through state resources and, hence, are imputable to Ireland. European case law demonstrates that even in cases where there is no positive transfer of state resources, a tax exemption granted by state authorities that puts the recipient in a more beneficial position relative to other taxpayers will constitute state aid .

Secondly, with respect to (ii), the Commission found that Irish Revenue did in fact confer an advantage on Apple, in failing to adhere to the arm’s length principle. The Commission argued that the profit allocation methods endorsed in the rulings did not constitute a remuneration for the Irish branches that an independent operator would accept under normal market conditions. This resulted in the lowering of ASI and AOE's tax liability in Ireland, which they would otherwise have been obliged to pay (European Commission, 2016b). This constitutes operating aid, which strengthened ASI and AOE's financial position relative to competitors by freeing up financial resources for investment in areas such as business operations, R&D, sales and marketing activity etc.

Thirdly, regarding (iii), the Court of Justice has previously held that in the case of an individual aid measure, as opposed to a scheme, *"the identification of the economic advantage is, in principle, sufficient to support the presumption that it is selective"*. Citing this case law, the Commission found that the very fact that the measures provide an advantage to ASI and AOE suffices to assert that the advantage is selective in nature (European Commission, 2016b). Nevertheless, for the sake of completeness the Commission analysed the rulings under the three-step Court of Justice guidelines for selectivity. Again, they were found to be selective as they represented a derogation from the reference system, i.e. they deviated from Ireland's normal applicable tax regime.

Finally, in relation to (iv), ASI and AOE are part of the Apple group, a multinational group operating in all Member States. Thus, any favourable aid granted to them is liable to affect intra-Union trade (European Commission, 2016b). Through this reasoning, the Commission found that the four conditions set forth in Article 107(1) were met. As such, the contested rulings amounted to state aid.

A 'Think Different' Approach

The Commission's approach to state aid regulation has evolved over time, demonstrating the transition to more economically-focussed, as opposed to legally-focussed reasoning (Friederiszick, Röller,and Verouden, 2006). The Apple ruling incorporated a more expansive interpretation of state aid law, and so, in many ways, it epitomises this transition. The decision deviates from past decisions in two ways. Firstly, the concepts of 'advantage' and 'selectivity' have been collapsed (US Treasury, 2016). Usually, the Commission examines the existence of an advantage and the selective character of the measures separately. However, in this instance they looked simply at whether the advanced pricing arrangements conferred 'selective advantage' on Apple (U.S. Treasury, 2016). Secondly, in prior cases the commission attained that disparate treatment based only on whether the company is a multinational or a standalone company has not necessarily led to a tax decision being deemed selective in nature. Usually, the commission compares multinationals which gain from the measure with multinationals which do not. In the case of Apple, the economic benefit provided by the Irish government, through the advanced transfer pricing agreements, which was not extended to any standalone company meets the selectivity requirement (US Treasury, 2016).

In short, the Commission has deemed Apple's transfer pricing rulings as selective, regardless of the fact that any multinational company could have, in theory, obtained them. The significance of this approach means that the Commission can find advantage if it disagrees with the Member State's application of the arm's length principle. Both Apple and Ireland have claimed that this approach expands the Commission's role beyond competition enforcement into that of a supra-national tax authority. Whether this is the case or not will be determined by the European Court of Justice during the appeals process. For now, however, the decision suggests that reviewing Member State transfer price determinations will be increasingly common in future competition investigations, an approach that, until now, has been unchartered territory for DG Competition.

Conclusion

The Apple ruling represents a seminal moment for the DG Competition, in that the investigation deliberately highlighted how a major global corporation aggressively utilised its corporate tax structure to minimize its tax obligations. In addressing this issue under the remit of state aid control, the Commission has emphasized how this practice distorts competition in the Single Market and has signalled that this warrants an enhanced role of competition authorities in international corporate tax affairs. Until a harmonized European corporate tax framework is developed, it is most likely that the Commission will continue on this trajectory. On whether this approach is practicable in the long run, the jury is very much still out.

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Towards a European Financial Transactions Tax

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In this essay, Patrick Lavelle thoroughly explores the much-disputed European Financial Transactions Tax. He examines the rationale behind the tax and addresses the concerns critics have voiced in terms of its practicality. He pays particular attention to the potential such a tax bears for the migration of market activity, drawing on evidence from the Swedish case to support his argument.

Introduction

In the aftermath of the financial crisis, financial markets came under great scrutiny. Many felt that greater financial regulation was required. In September 2011, the European Commission released a proposal for the introduction of a financial transactions tax (FTT) in the European Union (EU), perhaps as a response to these growing concerns. The proposed FTT would be levied on all transactions between financial institutions, in which at least one part of the transaction is located in the EU (European Commission, 2011). While several member states were opposed to the idea, in early 2013, the Council of the European Union allowed eleven Member States to proceed with the introduction of a common FTT, using the enhanced cooperation process. Negotiations are ongoing between these Member States. This paper will discuss the proposed FTT. The rationale behind the introduction of an FTT will then be examined, followed by a critical analysis of the practicality of the tax.

Proposal

The European Commission's tabled proposal advocates a taxation of securities at 0.01% of the market price, to be paid by both the purchasing and selling financial institutions, as well as a taxation of derivatives at 0.01% of the notional amount underlying the product, to be paid by all financial institutions involved (European Commission, 2014). The issuance of shares, enterprise bonds, public bonds, other public debt instruments, shares in UCITS and alternative investment funds are to be ring-fenced from the tax, as well as transactions in and with foreign currencies and 'traditional' investment banking (European Commission, 2014). Similarly, recent reports have suggested that a wide range of derivatives will be included. However, there are likely to be exemptions granted for derivatives linked to sovereign bonds, as well as an exemption for sovereign bonds more generally (Reuters, 2015).

Objectives

It is perhaps pertinent to first discuss the rationale behind the introduction of a European Financial Transactions Tax. The European Commission has stated two primary objectives of the proposed FTT. An FTT will ensure that the financial sector makes a fair contribution to cover the costs of the financial crisis. (European Commission, 2014). The FTT is viewed as a revenue source, as a means of compensating the public sector for the bailout of the financial sector and as an insurance premium to be used to deal with systemic risk problems in the banking sector (Kitromilides & González, 2012). This might be branded as politically motivated rather than economically sound. Equally, it might be viewed as a justifiable response to the costs borne by society from dangerous forms of speculative trading.

The FTT's second objective is to harmonise national legislation of the taxation of financial transactions (European Commission, 2014). The proposal responds to a proliferation of different kinds of FTTs in recent decades in different countries, with Kitromilides and González (2014) estimating that there are 40 'unilateral' FTTs in existence today. In addition, the EU's FTT aims to act as a step in the direction of a global FTT. The Commission believes that a unilateral European tax can ''pave the way towards a co-ordinated approach with the most relevant international partners" (Kitromilides & González, 2012:312).

A secondary objective of the introduction of an FTT is the creation of "appropriate disincentives for transactions that do not enhance the efficiency of financial markets thereby complementing regulatory measures to avoid future crises" (European Commission, 2013:2). This aim is, perhaps, a response to the excessive speculation that has since been deemed a cause of the Great Recession. Economists have suggested various FTTs in the past, many of which were proposed in response to economic crises involving market failure. Among the earliest versions of an FTT was Keynes' securities transaction tax (STT) on stocks, aimed at discouraging the kind of speculation that fuelled the stock market bubble that led to the Great Depression (Burman et al., 2015). Keynes believed a substantial government transfer tax by the US government might prove the most serviceable reform in aiming to mitigate the dominance of speculation over enterprise in the USA (Davidson, 1998). In the 1970s, Tobin proposed a new kind of transactions tax, to be levied on all foreign exchange transactions (CTT), in order to limit currency fluctuations that impair a country's efforts to regulate aggregate demand (Matheson, 2011). Proposed in the context of the Bretton Woods system (Kitromilides & González, 2012), the Tobin tax as it is now known, was to be levied multilaterally by world governments to tackle efficacy problems of unilateral national implementation (Eichengreen, 1996).

The Commission's FTT proposal, too, is driven by similar experiences. Advances in technology and product innovation, as well as deregulation, have seen a dramatic fall in transaction costs in the financial sector in the last 35 years (Matheson, 2011). According to European Parliament sources, the value of world financial transactions, which was 25 times world GDP in 1995, rose to 70 times that value by 2007 (Matheson, 2011). The chart below (Schulmeister et al., 2008) compares the dynamics of global transactions in foreign exchange markets to the development of overall world trade in goods and services, demonstrating the growth of financial transactions at a rate several times faster than the markets for goods and services. It is primarily the derivatives market that has driven this growth. Schulmeister et al. (2008) describe the cumulative effects of increasingly short-term transactions that have become common in recent decades as having a destabilizing effect. The result is asset markets characterized by excessive liquidity and excessive price volatility, which in turn leads to large and persistent deviations from their fundamental equilibria. The implementation of an FTT, however, will see those transactions with a shorter time horizon become more costly. In this way, an FTT will reduce excessive liquidity arising from financial transactions that are short-term oriented (Schulmeister et al., 2008).

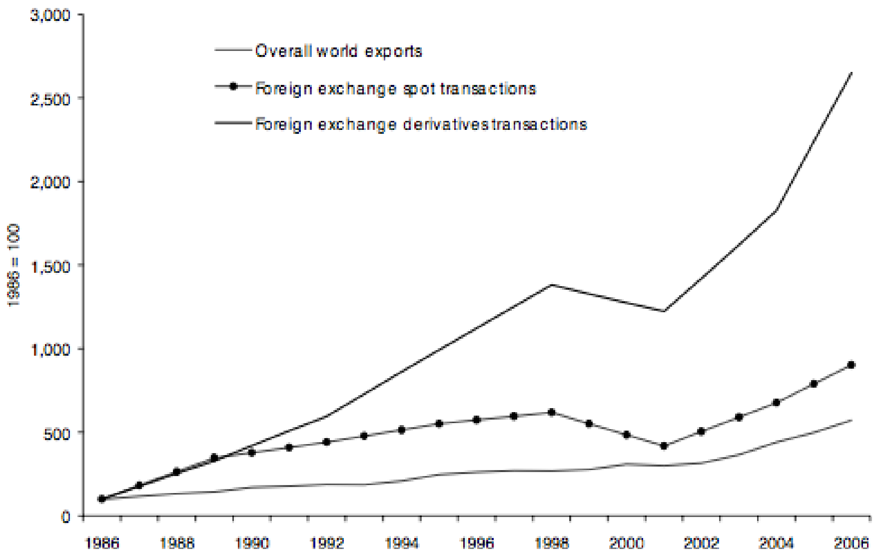

Table 1: World Trade and Foreign Exchange Transactions (Schulmeister et al., 2008)

Feasibility

It must be noted, however, that there are a number of potential issues that have seen critics question the feasibility of the proposed FTT. The most hotly debated issue in assessing the feasibility of the proposed FTT is the extent to which it can be avoided. Schulmeister et al. (2008) identify that investors, faced with the increased cost of financial transactions, may adapt their behaviour by: continuing to trade as normal and simply paying the tax (Option 1), changing the location of the trade (Option 2), trading substitute securities (Option 3) or choosing not to trade (Option 4). They argue that, "In general, an investor will pick the option that is least harmful to his profits" (Schulmeister et al., 2008:23). If substitutes are not widely available (Options 2 and 3), an investor will choose Option 1 as long as he/she continues to make profits from trading. Otherwise, he/she will select Option 4, choosing instead not to trade at all (Schulmeister et al2008). Thus, the likelihood of Option 2 and Option 3 being chosen must be discussed in order to assess efficacy of the proposed FTT.

The Commission's proposal seeks to cover all financial product markets in order to prevent the possibility of trading substitute products (Option 3). This, however, has proven a difficult balancing act in negotiations among Member States. The Commission proposed a 'triple A' approach. The tax would apply "to all markets (such as regulated markets or over-the-counter transactions), all instruments (shares, bonds, derivatives etc.) and all actors (banks, shadow banks, asset managers, etc.)", in order to "minimize potential distortions across different market segments and reduce the risk of tax-planning, [and] substitution" (Directorate-General for Taxation and Customs Union, 2014). However, many of the eleven participating member states have sought exemptions for sovereign bonds, some forms of derivatives and certain pension fund types from the FTT.

The capacity for the relocation of trade to other markets in response to the tax (Option 2) appears to be the crux upon which the success of an FTT will depend. Tobin argued that a financial transactions tax needs to be introduced multilaterally, as the world's financial transaction business will simply migrate to a location where such a tax is not imposed if one country imposes it. It has been suggested that it might suffice to secure agreement on an FTT among the states in which the world's largest financial transactions markets are located (Eichengreen, 1996). Eight such states have specifically been named, and include the UK and USA (Eichengreen, 1996). Indeed, in line with such rationale, the idea of an FTT was discussed at a G20 meeting in 2011. However, it failed to win support (Reuters, 2011). Similarly, the Commission's 2011 proposal for an EU-wide FTT posited that market access to the world's largest market dis-incentivised migration. This proposal, however, failed to gain EU-wide support, with 17 states opposing the plan, including states with large financial sectors such as the UK, Luxembourg, and the Netherlands. Thus, given that eleven Member States have chosen to implement an FTT independently, we must appraise its feasibility with regards to the extent of the opportunities for tax avoidance through mass migration of trade to other financial centres outside of the tax jurisdiction.

The UK's pending exit from the EU further complicates this issue. It has been claimed that the absence of Europe's largest financial centre, the city of London, from the FTT would make the tax redundant. Activity would simply migrate from Member States to London. However, the uncertainty surrounding the UK's future relationship with the EU makes it difficult to ascertain the potential for activity to migrate to London, in the event that an FTT is implemented. On the one hand, a so-called "Hard Brexit" could reduce the capacity for the migration of financial activity, in which case the main opponent of the FTT would be removed from the negotiation table, thus increasing the pressure on smaller Member States opposing the FTT to join. On the other hand, the assumption that the migration of activity will not take place due to the sheer size of the EU is undermined by the fact that Europe's largest financial centre will no longer be located in the EU.

A Financial Transactions Tax in Practice

The Swedish experience of unilaterally introducing a securities transaction tax provides a relevant case study in this regard. In January 1984, Sweden levied a tax of 0.50% on the purchase and sale of equities (Burman et al., 2015). While the tax rate and other details changed over time the basic structure remained the same, namely that the tax was imposed on registered Swedish brokerage services (Burman et al., 2015). In the face of substantially declining trade levels and revenue figures that were far below projected levels, Swedish authorities repealed the tax in 1991, but it left lasting effects on the Swedish stock market. Activity had not yet fully recovered to pre-tax levels (Burman et al., 2015). The table from Schulmeister et al. (2008) below shows the transactions tax revenues. In the case of Sweden, mass migration of trading activity proved its downfall. The London Stock Exchange acted as an appropriate substitute market (Schulmeister et al., 2008). For example, in 1998 27% of Ericsson's shares, Sweden's most actively traded company, were conducted in Stockholm, falling further to 23% in 1989, and recovering to 41% in 1992 following the tax's abolition (Eichengreen, 1996).

Thus, a lesson can be learned from the Swedish experience - the tax liability for nationally based companies should be worldwide (Schulmeister et al., 2008). Opportunities for the migration of financial activity must be minimised. This very concept, referred to as the issuance principle, lies at the core of the current proposal for a European FTT. However the efficacy of enforcing this is unclear, with some non-participating member states expressing concern that that they will be required to collect taxes on transactions on behalf of a participating Member State (Crisp, 2014). Indeed, the UK has threatened to launch another court appeal against it, with its previous appeal rejected by the European Court of Justice as premature. The UK, the Netherlands, Luxembourg, Ireland and the Nordic Member States have chosen not to partake. Consequently, many important financial centres in the Union will lie outside the tax jurisdiction, thus increasing the potential for the migration of market activity.

	Revenuues of Turnover Tax on Securities	Revenues of Turnover Tax on Securities	Transaction tax rate	Annual Swedish Trading volume	Trading of Swedish stocks inside Sweden	Trading of Swedish unrestricted shares inside Sweden
	In % of GDP	In % of total tax revenues	On equity traded, per round-trip	Executed in London	Average of 19 large Swedish companies	
1984	0.10	0.21	1%	NA	NA	NA
1985	0.13	0.27	1%	NA	NA	NA
1986	0.26	0.53	1%,2%	NA	NA	NA
1987	0.35	0.66	2%	30%[1]	NA	NA
1988	0.34	0.66	2%	48%	61%	47%
1989	0.45	0.85	2%	51%	57%	42%
1990	0.43	0.81	2%	52%	56%	42%
1991	0.25	0.50	1%	NA[2]	52%	40%
1992	0.02	0.04	0%	NA	56%	50%

The revenue data are for the total of all turnover taxes on securities, while the transaction tax rate represented in column three only applies to the major tax on equity (there were different tax rates for other instruments. 1- For 1987, there is an estimate only by the Stockholm Stock Exchange. 2-In December 1991, all taxes were abolished.

Table 2: Swedish transaction tax revenues and trading migration (Schulmeister et al., 2008)

Conclusion

The practicality of a Financial Transactions Tax is much disputed. The EU's sui generis nature provides little precedent against which implementation of such a tax can be assessed in a supranational setting. However, it is a question that can only be answered when the tax is implemented and its effects observed. The issuance principle seeks to limit the risk of market migration. However, the Swedish case highlights the opportunities that the 17 non-participating Member States provide for its facilitation. Should the current proposal for an FTT prove successful in practice, it might well win favour among non-participating Member States. However, the decision to implement a European Financial Transactions Tax will ultimately come down to whether Member States agree with the rationale behind it, a source of debate that is unlikely to abate in the future.

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Urban Economics

Paying for Peace of Mind: Urban Riots and Housing

Finn McLaughlin

Senior Sophister

Against a backdrop of discontent with the status quo and disenfranchisement from the political system, Finn McLaughlin examines the effects of riots and crime on the urban environment, in particular on the housing market. His synthesis of three strands of urban economic literature sheds light on this phenomenon, which causes much damage to communities, and society and the economy more generally.

Introduction

In many respects, cities reflect the best in humanity. From the ancient metropolises of Jericho, Babylon and Uruk in the Levant, to their contemporary counterparts of New York, London and Tokyo, cities have long been recognised as hives of economic, cultural and social activity. Yet, while the agglomerative advantages of cities (Rosenthal & Strange, 2004) have offered unique solutions to economic and social challenges, these fonts of creativity and progress are not without flaw.

In particular, perhaps the most significant negative externality associated with cities as agglomerative entities is the greater threat posed by civil unrest, delinquency and violence. Perhaps the most well-known manifestation of this problem is the phenomenon of urban rioting. Riots often appear as spontaneous reactions to seemingly minor or trivial events, yet they reveal a brooding discontent bubbling just beneath the surface with only a spark required to ignite the blaze.

Examining the economic implications of urban unrest has taken on a renewed pertinence in light of recent cultural and political developments. In the United States, and indeed across the developed world more broadly, there has been a growing spectre of dissent and disillusionment that is now translating into demonstrative action. The Black Lives Matter movement, for example, has grown out of continued police brutality and institutionalised racism against African Americans. Though many of the organisation's demonstrations have been conducted peacefully, the simmering discontent that underlies their existence is reminiscent of conditions proceeding previous race riots. The events in Ferguson, Baltimore and Charlotte (Rothstein, 2015) serve as a reminder of how easily a situation can escalate. Similarly, the increasing polarization of American politics, as embodied by the Presidency of Donald Trump, has spawned a number of violent protests over the past year including a string of riots in California and Oregon in response to the election's outcome (Sottile, Schmidt, & Murphy, 2016). This paper has been directly motivated by these developments and seeks to unearth greater insight into the economic dynamics underlying these civil disturbances, specifically in relation to housing markets.

An extensive volume of literature has been published since the regular race riots and turbulence of the 1960s, dissecting the causes and effects of riots, yet the literature on the subsequent consequences of these violent phenomena for urban property markets remains somewhat underdeveloped. Riots are, by definition, highly destructive events, both materially and economically. Alongside the widespread looting and property damage, they can also severely damage an area's business confidence and prompt neighbourhood instability as residents reconsider locational decisions. In light of these detrimental effects riots inflict upon the urban environment, it is only natural to wonder how this phenomenon effects housing in afflicted areas.

This issue lies at the intersection of three interrelated strands of urban economic literature — namely, the economics of riots, crime and housing. The aim of this paper is to provide a comprehensive synthesis of this nexus of literature. It is hoped that by examining the dynamics of urban riots and their bearing on housing markets and locational decisions, that a more connected, complete image will emerge of a fascinating, yet largely unexplored area of research.

The remainder of this paper will provide an overview of the prominent literature on riots, crime and housing, respectively, before discussing what conclusions might be drawn from this pool of knowledge and identifying potential avenues for future research.

Urban Riots

Since the widespread civil unrest and race riots that engulfed the United States during the 1960's, a growing body of literature has emerged seeking to examine the causal forces driving individuals and communities to engage in violent civil disobedience and specifically, its manifestation in the form of urban riots.

The spatial confinement of the city itself may foster an environment that is ripe for conflict. While some argue that the shared social institutions of the city may foster a common sense of urban identity amongst heterogeneous city dwellers (Barth, 1982), a multitude of ethnically, socially and culturally diverse factions living in close proximity may in fact breed tensions. While urban conflicts of this kind have often fed upon sectarian divides, as in Belfast (Besley & Mueller, 2012) and Ahmedabad (Field, Levinson, Pande, & Visaria, 2008), perhaps more prominent in recent memory are urban race riots which polarise cities along racial and ethnic lines. This is particularly pertinent in the context of the United States, where the legacies of antebellum slavery remain shackled to the national conscience and embedded in perceptions of identity.

Many authors have sought to construct empirical models of rioting behaviour. Building on the seminal work of Tullock (1979), DiPasquale & Glaeser (1998) provide a highly informative study that seeks to adapt the neoclassical framework of rioting to account for community-level variables. While the authors' findings bolster the traditional view that riot incidence and intensity are a function of rioters' opportunity cost of time and the likelihood of facing reprisal, they also offer a counterargument to the notion that community factors are irrelevant. They highlight the role of ethnic heterogeneity and the potential for individual-level variables, such as unemployment, to partially capture community-level forces.

In terms of the underlying conditions that give rise to riots, perhaps the most cited factors are divisive residential segregation (Olzak, Shanahan, & McEneaney, 1996) and economic disenfranchisement (Kerner, 1968; McCone & Christopher, 1965). Some have suggested economic and social issues were compounded by the sense of relative deprivation (Chandra & Foster, 2005), while others believe greater fiscal accommodation could have eased such tensions (Gillezeau, 2010). Myers (2000) contributes a fresh perspective to a long strand of research exploring the contagion and diffusion of riots, emphasising the role of media coverage and bias towards concentrating coverage as a function of riot severity.

While there has been considerable analysis of the underlying societal forces that foster a riot-prone environment and induce citizens to take to the streets, it is equally important to understand the economic and social consequences of such activity. Riots are implicitly destructive. They create instability and uncertainty that may hamper small inner-city businesses facing steeper insurance premiums (Aldrich & Reiss Jr, 1970), attenuate employment opportunities (William J Collins & Margo, 2004) and dissuade investment and growth (Matheson & Baade, 2004). The resultant decline and loss of amenities is likely to negatively impact property prices. Furthermore, Brazil (2016) highlights the transitory increase in residential segregation experienced by some riot-afflicted American cities in subsequent decades and, indeed, a more pronounced, long-term increase in segregation at the suburban level.

Though research into the direct effects of urban riots on housing markets remains an under-populated strand of the broader body of urban economic literature, there are a few influential studies that merit discussion. In particular, Collins & Margo's (2007) findings that owner-occupied property prices in riot-afflicted areas experienced significant and persistence declines relative to non-afflicted areas, controlling for riot severity. The authors attribute these effects to changing perceptions of security and amenities. Similarly, Collins & Smith's (2007) evidence on the negative effect of proximity to riot epicentres on property prices in Cleveland lends support to this hypothesis. These studies provided key motivations for this paper and highlight the potential of this topic for further exploration.

The Economics of Crime

There exists a rich body of literature studying the economic implications of both the underlying motives of urban crime and its consequences, from the seminal work of Thaler (1978) to more recent evaluations of this distinctly urban issue (Glaeser & Sacerdote, 1996). Much of this research has focused on the impact of crime on residential property prices, with the vast majority of studies finding violent crime, rather than property crime, to be a key disamenity that depresses housing prices. Crime and urban rioting are inextricably linked and may exhibit similar dynamics; as such it is important to now discuss the economics of crime in the urban economics context.

A wide array of literature on urban crime may shape the lens through which riots are analysed. Boggess & Hipp (2010), for example, focus on the effects of crime on neighbourhood stability and how this interacts with ethnic composition, with important connotations that may be applicable to riots. Others have focused on the varying degrees to which crime rates are capitalised into asset prices based on neighbourhood income levels and the nature of the crime (Tita, Petras, & Greenbaum, 2006). Furthermore, Frischtak & Mandel's (2012) study of the introduction of UPP police stations into the favelas of Rio de Janeiro highlights a possible means of deterrence.

A key issue that has emerged in the literature on urban crime relates to its endogeneity, both in terms of reported statistics its relationship with house prices. The unreliability of crime reporting, due to skewed incentives (Baer & Chambliss, 1997), has been well documented as well as the endogeneity of regional reporting (Skogan, 1999) and its disconnect with trends in victimisation (Levitt, 1998), meaning that it is very difficult to determine the exact causes underlying changes how and how often crimes are reported. As identified by Ihlanfeldt & Mayock (2009), there are five primary mechanisms through which property prices and crime may be endogenously related and, having instrumented for crime accordingly, they find prospective homeowners will pay *"a nontrivial premium"* to live in a safe neighbourhood. Gibbons' (2004) study of crime's negative influence on Inner London property prices implements a range of potential instruments to circumvent the endogeneity between property prices and the crime rate, including crime density per square kilometre and the proximity to public houses. These findings and strategies serve to inform our understanding of the crime-property dynamics that may be at play within communities in the aftermath of riots.

Similarly, Cullen & Levitt's (1999) analysis of the net out-migration pervasive in crime-ridden neighbourhoods may hold for areas affected by riots. The authors present fascinating insight into how crime drives residential dislocation within cities, particularly amongst highly educated households and families. Similar studies have lent support to these results and individuals' tendency to *"vote with their feet"* in response to higher crime and perceived threats (Linden & Rockoff, 2008).

These findings have acted as a central motivation for this paper, based on the rationale that riots are likely to induce similar dislocation. Given the rigidity in the adjustment of the housing stock (Glaeser & Gyourko, 2001), this may place strain on the supply of properties in areas believed to be safe, thereby translating into premium pricing. However, as noted by Collins & Smith (2007) in relation to crime, such dynamics may hinge on how riots are perceived. In other words, if riots are perceived to be indicative of future trends in the long-term stability and desirability of a neighbourhood then it is likely that this will be reflected in property prices. In contrast, if the riots are believed to be a once-off disturbance, then one would expect their effects on housing markets to be transitory.

Housing Markets & Property Valuation

The final strand of the urban economic literature central to the analysis in this paper pertains to housing markets and property valuation. As with all assets, a property's value is a reflection of its intrinsic worth, based on the stream of utility that will stem from its ownership. Much has been written on the wide array of potential underlying factors driving residential property prices, with the majority of the literature reliant on traditional hedonic price analysis. This uses transactional housing market data to extrapolate about individuals' preferences for certain dwelling features, amenities and neighbourhood characteristics based on the notion of revealed preferences. Indeed, within this framework a given area's crime rate or propensity to riot may be viewed as a disamenity, as they are perceived to be less safe or secure, which will negatively impact property valuations. The relatively unexplored responsiveness of these safety premiums incorporated in property prices to the sudden shocks of riots is a central motivation of this paper.

An insightful body of research highlights the influence of factors as diverse as air quality (Harrison & Rubinfeld, 1978), better access to transport facilities (Debrezion, Pels, & Rietveld, 2007) and school quality (Stephen Gibbons & Machin, 2008) on property prices. This would be pivotal in informing any attempt to isolate the influence of riots on housing prices. In particular, those centred on estimating the impact of crime (Troy & Grove, 2008), socioeconomic status (Galster, Tatian, & Smith, 1999) and ethnic composition (Harris, 1999) are particularly informative.

While understanding the determinants of residential property prices is imperative, there are other strands of literature to consider such as those concerning proxies for perceptions of neighbourhood desirability and safety. For example, DiPasquale & Glaeser (1999) present evidence on the positive effects of homeownership on local communities, citing the increased residential stability and greater incentives to invest in social capital and amenities as key channels. In the context of riots, this may suggest that neighbourhoods with high levels of owner-occupancy have a lower propensity to riot in light of the negative effects it would have on their locality.

Furthermore, the analysis presented in this paper has been motivated by an emerging strand of research studying the significant price premium commanded by property located within gated communities in the United States (LaCour-Little & Malpezzi, 2001; Le Goix & Vesselinov, 2013), reflecting, at least partially, the greater sense of security they provide. This offers a fascinating insight into the dynamics of fear, identity and other (often irrational) emotional responses that influence households' locational choices — sentiments which may be heightened in the wake of urban riots.

Conclusion

In summation, this paper has sought to highlight the pertinent interactions between urban riots and property markets, by drawing extensively upon the literature of urban economics — and specifically those strands relating to crime, riots and housing dynamics. It is abundantly clear that these violent urban phenomena are likely to set in motion a series of chain reactions that will reverberate into other dimensions of our society and economy, with property markets offering a prime example.

A comprehensive study of the effects of urban riots on housing markets may be of interest for several reasons. The primary one amongst them is that developing a more in-depth understanding of the dynamics between urban riots and housing markets is imperative for policymakers. Given the role of residential segregation in creating a riot-prone environment, policymakers seeking both to mitigate the negative consequences of riots and to design interventions to prevent them from occurring in the first place must understand these dynamics. If there is evidence to suggest people crave a greater sense of security following urban unrest, for example, state actors may tailor policies to better reassure residents of their commitment to guaranteeing public safety. This paper seeks to further expand our knowledge in this vital strand of urban economic literature.

While the groundwork has been diligently laid, with formative studies establishing the adverse effects of riots on proximate residential property (William J. Collins & Margo, 2007; William J Collins & Smith, 2007), many questions remain unanswered. If, as the literature would suggest, riots and their inherent social and economic consequences are regarded by economic actors in a similar manner as crime, then there are ample dynamics to be explored with the existing literature on crime serving as a template. In particular, future research may seek to explore the extent to which property price variation is driven by surging demand for greater security in the wake of riots and, indeed, whether these demand preferences are driven by individuals' perceptions of threats relative to a riot's actual severity.

The phenomenon of urban riots certainly merits further study. The urban setting certainly has the potential to represent the ideal space for social and economic interaction but, if it is to do so, threats to its communities must be addressed.

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White Flight and Gentrification in Hyde Park, Chicago

Conor Bolger
Senior Sophister

Against a backdrop of increasing polarisation and racial tensions in the US, in this essay, Conor Bolger explores Hyde Park, Chicago as an oasis of diversity in what has been called America's most segregated city. He looks to historical factors and and demographic trends, examining the impact of policy decisions made throughout the 20th century to deepen our understanding of urban economic phenomena in modern day Chicago.

Introduction

Chicago is often perceived as one of America's most diverse cities. The Washington Times (2009) details the "*wealth of ethnic neighbourhoods*" there are to explore, from Little Italy to Chinatown and onto Greektown. This cultural diversity is exemplified in the Chicago Cultural Centre, which allows local artists to display their work and educate visitors on the cultural diversity of the "*Windy City*". Silver (2015) finds Chicago to be the 7th most diverse city in the U.S.

However, despite its diversity at a macro level, Silver identifies Chicago as the U.S.' most segregated city due to the low level of diversity at a neighbourhood level. This neighbourhood level segregation is evident from graphics that plot ethnicity onto a map of Chicago. One such example is Dustin Cable's Dot Map (Cable, 2013). The largely green South side of the city depicts predominantly black neighbourhoods, while the white neighbourhoods on the outskirts are symbolic of the 1950s "*white flight*". This segregation makes Chicago one of the most intriguing cities to study from an urban economics point of view with significant changes in its demographic makeup in the last century.

One neighbourhood of particular interest is that of Hyde Park. It is located on the south side of the city and contains the University of Chicago campus. It is an unusually diverse neighbourhood, making it unique on the South side of the city which is made up of mostly black neighbourhoods. In the early 20th Century, Hyde Park was characterised by a very high proportion of white people - 98% in 1930 (Rob Paral and Associates, 2014). A variety of legal constraints prevented integration for several years in the early 20th Century. Housing contracts were restricted to whites in some areas but these were abolished in the late 1940s. In addition, The Federal Housing Authorities and its affiliates such as the Chicago Housing Authority enforced regulations such as "*neighbourhood* *composition rules*" which set a racial composition to communities. However, by 1960, whites made up only 59.7% of Hyde Park's population (Rob Paral and Associates, 2014). Examining the dynamics of this change must be salient in understanding its current status as a "*cultural Mecca reflecting the social, cultural and racial diversity of its residents*" (Woods, 2016). Its vibrant atmosphere is a result of the current mix of students, faculty, entrepreneurs, writers, medics, businesspeople, retirees and families that has developed throughout the 20th Century.

A Rush for the Suburbs

The post-depression years were marked in Chicago by significant migration of African-Americans from the Southern States. Between 1940 and 1960, the black population in Chicago increased from 278,000 to 813,000 with blacks making up 23% of Chicago's population by 1960. Hirsch (1998) describes that there was, at this time, strong sentiment for legal segregation of blacks due to their portrayal as being uneducated and violent as well as a belief in their potential to bring about urban decay. Legal restrictions imposed as a result of these fears meant 75% of the black population was located in an area composed of 90% blacks. The creation of what Hirsch describes as the Second Ghetto meant that many whites from those areas and surrounding communities moved to the suburbs in what has been described as "*White Flight*".

Shertzer and Walsh (2016) find that White Flight began as early as the 1910s and accelerated throughout the following three decades. Their instrumental variable (IV) approach finds that one black arrival resulted in 1.9 whites leaving in the 1910s and 3.4 in the 1920s. Incentives such as the Home Owners Loan Corporation and the Federal Housing Association encouraged and supported white suburbanisation. "*White Flight*" left large areas vacant for black migrants to move into. The creation of a ring of slums in the Loop generated fear in Hyde Park that encouraged urban renewal by private parties, particularly the University of Chicago, which demolished 600 houses. Hirsch (1998) argues that physical deterioration was not really an issue, but rather that a fear of slum creation resulted in these actions. The Urban Community Conservation Act of 1953 and University of Chicago's interest in maintaining a "predominantly white and economically upgraded community" ultimately failed as increased diversity was established in Hyde Park, as previously discussed.

Boustan and Margo (2013) contend that the mass movement of whites to the suburbs increased the supply of housing near the city centre and resulted in more affordable housing for black families migrating into the cities. These families would have previously been on the cusp of buying a home and, with more affordable prices as well as favourable credit conditions, black home ownership increased. They find in their IV analysis that on average across the country, for every 1,000 white households that moved to the suburbs, 108 black households moved from the rented market to the owner-occupied market. Chicago, they find, demonstrated stronger results than the model predicted, with an increase of over 10,000 black owner-occupied houses throughout the 1960s. However, by the 1980s, the efforts of the University of Chicago proved successful as the black population in Hyde Park were largely limited to the northwest with the growth of a middle-upper class community through higher house prices and rents.

The University Hub

In more recent times, the University of Chicago has increased its influence on the surrounding Hyde Park. Its academic and hospital systems act as a hub of employment. The university employs 2,274 full time staff, while the hospitals employ over 9,000 (The University of Chicago, n.d; University of Chicago Medicine, n.d). This does not account for the 15,000 students on campus. While the increased employment of high-skilled labour may have had the effect of increasing housing prices, the growing student population from outside Chicago that spills over the capacity of on-campus accommodation has likely increased rents along the university bus routes. An important question to ask is whether the University of Chicago has exerted its influence to gentrify Hyde Park in recent years.

The University of Chicago has enforced a "*Wall around Hyde Park*" through its on-campus police force (Fan, 2014). The UCPD (University of Chicago Police Department) was formally created as a fully-fledged police department in 1968 (Larson, 2012). To Hyde Park's west is Washington Park, which has a poverty rate of 51% and experiences high levels of crime; between 2000 and 2009, there were 81 murders (Worley, 2011). It tops one list of homicides per 100,000 and Woodlawn, another border neighbourhood to Hyde Park, is not much further down that list (Moser, 2012). Despite this, it appears that the UCPD have created an increased sense of security in Hyde Park that has facilitated its maintenance as a relatively affluent area. In the last census, median income in Hyde Park was at $48,643 compared with $22,059 in Washington Park. This security comes at a cost, though, and there is a significant amount of anecdotal evidence of racial profiling (Fan, 2014). While Hyde Park may display high levels of diversity overall, this is not to say that divisions along racial lines are not prevalent. This may have been a factor in the 25% reduction of blacks living in Hyde Park since 1980 (Rob Paral and Associates, 2014).

Another factor in the development of a middle-class community is the maintenance of relatively high house prices in Hyde Park. The classical approach to understanding land values oriented itself around distance to the central business district (CBD). However, McMillen (1996) has found that Chicago has moved towards being more of a polycentric city, although still remaining monocentric in that land values do tend to decrease with distance from the CBD on aggregate. In particular, he identifies O'Hare Airport as a hub of employment, which has increased land values around the area. Similarly, the university system in Hyde Park is likely to have acted as a hub in the past century. Woods (2016) describes the great employment opportunities offered by Bernard Mitchell, University of Chicago Hospital and University of Chicago Children's Hospital. It can be expected that the faculty and surrounding medical centres attract middle to high income earners with a high-level of education, which must have had a profound impact on housing characteristics and pricing in the last century. Therefore, Hyde Park's distance to the Loop of Chicago may not play a role in housing prices but should be considered regardless.

In addition to employment opportunities, the university has had a profound impact on the demographic makeup of the neighbourhood, which acts as a significant social factor in determining housing prices. Naik and colleagues (2015) have attempted to understand the relationship between social and physical factors influencing a city. They find that denser areas and areas with a higher proportion of college educated individuals have higher StreetScores, a measure of how safe people perceive areas to be. Over 71% of the residents in Hyde Park have a BA or higher compared with just 18% in the nearby Washington Park (Rob Paral and Associates, 2014). This differential is likely to impact on perceived safety in the two areas, and also on wages which result in higher house prices in Hyde Park.

Hyde Park: Diversification or Gentrification?

Two key characteristics of gentrification are that it is more likely to occur in lower-income areas close to the CBD and in areas with a lot of pre-1940 building, as identified by Kolko (2007). The reason for the latter characteristic is that older buildings are more likely to be targeted in urban renewal programmes which usually increases their value and takes them out of reach of lower-income individuals. This is supported in their finding that gentrification is positively correlated with a higher growth of housing stock.

Lin (2002) has determined a method of identifying gentrification by testing the changes in residential property prices, a method also used in O'Loughlin and Munski's 1979 paper. Lin finds an extremely rapid increase in property prices from 1985 to 1991 of 98% signifying the realisation of gentrification. Lin also tests the wave theory whereby gentrification may start in one particular area, perhaps somewhere close to desirable amenities, and then spread out into neighbouring communities. Naik and colleagues (2015) also find that there is a tendency for clustering of areas experiencing urban change. Therefore, it would be expected that areas near the university, which received police protection earliest, would spread gentrification outwards throughout Hyde Park. It is possible that the expansion of the area under the UCPD's control since 1968 encouraged this wave of gentrification in Hyde Park also. This is supported by Kolko (2007) who also finds a spillover effect particularly in high density areas, suggesting a spatial proximity effect.

The fact that there hasn't been a significant change in the median income or even the proportion of individuals in high income brackets suggests that Hyde Park may be escaping the fate of gentrification. The housing stock in Hyde Park is in neither category that Kolko (2007) highlights as susceptible to gentrification, in that the housing stock is neither close to the CBD nor is it particularly old. This would strengthen the hypothesis that gentrification is not taking place. This is especially true for buildings in close proximity to the university which had been part of the 20th Century fight against racial succession and were therefore well maintained and updated to prevent urban decay. This topic merits further research, and with new datasets on house prices and features in Chicago in the 20th Century, there presents an opportunity for this question of gentrification to be addressed.

Conclusion

Hyde Park has certainly undergone much change over the past century. The racial makeup of this unique area has morphed from being almost exclusively white in the 1930s to the cultural melting-pot it is today. Legal constraints preventing integration being lifted and housing policy promoting diversity being introduced were important factors in urban change in Hyde Park, however the University of Chicago has exerted arguably the largest influence on the development of this area. While the University initially took direct responsibility through urban renewal schemes, it continues to exert an indirect but undeniable influence on everything from house prices to the socioeconomic makeup of the Hyde Park area. While Hyde Park is undeniably more diverse than other areas, this is not to say divisions and tensions along racial lines do not exist. In a city characterised by a lack of integration, it must do it's best to be the exception to the rule.

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ECONOMIC RESEARCH

Health is Wealth? An Econometric Analysis of Income and Mental Health

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In this econometric investigation, Sarah McDowell uses cross-sectional data to examine the effect of income on mental health in order to determine whether a causal relationship exists. She finds a significant positive relationship between these variables, and identifies other significant factors in determining mental health. An extensive discussion of the empirical challenges associated with determining robust relationships and causation makes this a thorough analysis of a very important topic for policy makers from both an economic and a health perspective.

Introduction

'When I was young I thought that money was the most important thing in life; now that I am old I know that it is.'

-Oscar Wilde

The predominant focus in quantitative studies often involves determining measures of prosperity such as growth and income levels. However, just as important to societal welfare are factors which are more difficult to measure, such as mental well-being. These non-monetary measures of welfare are also hugely important to policy makers. The interplay between income and mental health is also very important in understanding mental health issues in society today.

This paper will investigate the relationship between household income and mental well-being and will examine whether a causal relationship can or cannot be claimed. Aside from the obvious imperative to help those with mental health problems, poor mental health has huge economic disadvantages, costing UK businesses £30 billion per year through lost production, recruitment and absence' (WorldGBC, 2014:7). Understanding the factors affecting mental health is hugely important to improving the standard of life for those with mental health problems and society's overall welfare.

Literary Review

Sareen et al. (2011) outlines two theories behind the positive predicted relationship between income and mental health: social causation and social selection. Social causation proposes that the distress related with low incomes contributes to mental illness, whilst social selection states that sufferers of mental illness will be more likely to experience declining incomes due to reduced ability to work for example. If the latter holds true, reverse causality is likely to be present in this study.

A plethora of pre-existing studies has been carried out to address this question. Some of these have used longitudinal studies with a panel data approach (Sareen et al., 2011) whilst others have used a cross-sectional approach, such as the Slán Mental Health and Social-Wellbeing report (2007). A common difficulty in the assessment of psychological status is its inherently subjective nature; several methods have been proposed to combat this. In McMillan et al. (2010), a trained clinician asks questions tailored to three categories: physiological distress, mental disorders and suicide ideation/attempts. In others, the subject completes a self-assessment complying with an approved scale (Northern Ireland Health Survey, 2013). Clearly, a varying amount of bias or subjectivity is pertinent to both; in the former the clinician can influence the respondent's result by the manner in which they ask the question, whilst in the latter the answers depend on the individual themselves judging rationally. Unfortunately, focusing bias, whereby we overrate a certain factor, such as relationship status, in our happiness, often clouds judgement (McMillan et al., 2010).

The Slán study (2007) finds that those with higher incomes and higher levels of education reported better mental wellbeing. It also stresses a clear association between physical and mental wellbeing, and cites how males reported better mental health than females. Lorant et al. (2003) conclude that those with low socioeconomic status are more vulnerable to depression. Overall, previous study yields no definitive findings. In fact, many contradictory conclusions have been reached.

Empirical Approach

This paper uses the Northern Ireland Health Survey (2013) of data collected between 2010 and 2011 which is a cross-sectional study of 4,085 participants aged 16 years and older. Created with the aim of developing new health policies, the topics focus on mental wellbeing, physical health, alcohol and drug use. The dependent variable of interest is mental wellbeing, which is assessed by the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) a positive self-assessed scale consisting of fourteen questions with a five-part ordinal response scale (NHS, 2011). To assess the impact of income on mental health the following model is proposed:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{1i} * X_{2i}$$

Y_i = *WEMWBS* – a self-assessed measure of mental health on a five-part ordinal response scale

X_1 = *INCOME* – the gross household income, ordered in 38 ordinal categories

X_2 = *NUMCHILD* – the number of children in the household

X_3 = *GENDER* – a dummy variable taking the value of 1 if the respondent is male, and 0 if female

X_4 = *MARITALSTATUS* – this is a factor variable of 5 dummy variables, the baseline of which is 'Single, Never Married'. The five categories included in the regression are married, in a civil partnership, separated, divorced, and widowed.

X_5 = *HEALTHCHANGE* – this is a factor variable measuring the respondents health compared to last year. It consists of four dummy variables with a baseline of 'Much better now than 1 year ago'. The four categories included are somewhat better, same, somewhat worse and much worse.

X_6 = *ALCOHOL* – this indicates the average weekly total units of alcohol consumed

X_7 = *ACTIVITY* – the number of days the respondent completed moderate physical activity for at least ten minutes

X_1*X_2 = *GROSSCHILD* – an interaction term for the effect of income and number of children in the household on mental health.

Data and Expectations

Encompassing 874 variables, the Northern Ireland Health Survey was comprehensive in many aspects, yet lacking in others such as the omission of key considerations like age and changes in income. According to Lorant et al. (2007), the latter exercises a large influence on mental health, in particular an increase in financial strain leads to increased likelihood of depression. To attempt to account for these time-variant effects on mental wellbeing, I have included the regressor 'Health compared to last year'.

Marital status is included as an independent variable to attempt to control for focusing bias of individuals in their self-reported answers (McMillan et al, 2010). One would predict those in a 'stable marriage' would report better mental health than divorced or single people, partly due to societal expectations and focussing bias for example. One would also expect a negative relationship between the units of alcohol consumed and mental wellbeing, due to its depressant properties and due to the increased susceptibility of those suffering from depression to addiction.

The Slán study (2007) found strong positive links between physical and mental wellbeing. In this study this will be represented by the number of days in the past week in which the subject completed moderate activity for at least ten minutes, so that it will not be limited to vigorous exercise. It also found males to enjoy better mental wellbeing than females.

For the purposes of this analysis, gross income is divided into categories, the lowest (1) being less than £10 per week and the highest (38) being greater than £1000 weekly. Unfortunately, there is no upper bound, whilst a lower bound (£0) exists. Predictably, income is not evenly distributed, with the first 10 classes (up to and including £100 per week) captures only 7.68% of the sample, whilst the highest class captures 11.45%.

Although the subgroups are less defined than specific income figures, they have the advantage of highlighting more clearly the effects of changing incomes and socioeconomic status on the dependent variable. This uncapped upper category is common in most studies, as drawing a median while including the highest earner in society, an outlier, would be unrepresentative. To eliminate the 12% of the study's respondents with the highest incomes would reduce the statistical power of the study and as such would be unwise.

The unequal widths of the categories could also prove problematic. However, the decreasing marginal utility of income theory, whereby an additional unit of income to a low-income respondent would yield greater utility than to a high earner, means it is less likely to be an issue (Acocella, 1998). Furthermore, the Easterlin paradox highlights how increasing income makes us happier to a certain point but levelling off as we adapt to it (Tachibanaki, 2016). In order to account for these factors, the variable I*NCOME* is generated, which measures the log of gross income, and a further regression with this as the X_1 variable is carried out.

In the data set there are two measures of income: household and personal. Personal income holds dubious power in investigating the relationship between an individual's wealth and mental health, as certain subjects on paper will earn nothing e.g. housewives. Gross household income will therefore be used. However, the personal utility from household income will clearly vary according to the number of individuals sharing said income. To account for this an interaction term *GROSSCHILD* has been generated to investigate whether the number of children in a household influences the effect of income on mental wellbeing.

The *WEMWBS*, due to its self-reported nature, is inherently subjective, although the risk of this conveying unrepresentative results is lessened by its adherence to a professionally constructed scale. The following summary statistics describe the *WEMWBS* results in the data, with a mean of 49.69. The mean result for the Scottish population is 50.7, suggesting our survey sample is reflective (NHS, 2008).

Variable	n	Mean	S.D.	Min	.25	Mdn.	.75	Max
PHIRB_ WEMWBS	2517	49.69	8.99	14.00	44.00	50.00	56.00	70.00

Table 1:

Empirical Results

Table 2 outlines the results from the OLS regression:

Variables	OLS Coefficients
WEMWBS, mental well-being scale	0.0677***
Total gross household annual income	-1.650***
Number of children	0.378
Gender	2.419***
Marital Status:	
Married and living with husband in a legally-recognised Civil Partnership	2.001
Married and separated from husband	-0.708
Divorced	0.747
Widowed	2.903***
Health compared to one year ago:	
Somewhat better now (than 1 year ago)	-2.616***
About the same as 1 year ago	-0.715
Somewhat worse now (than 1 year ago)	-5.513***
Much worse now (than 1 year ago)	-11.04***
Average weekly total units of alcohol	-0.0140
Moderate activity	0.329***
Gross_children	0.0377**
Constant	47.55***
Observations	2,254
R^2	0.118
Adjusted R^2	0.112

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2

The intercept term implies that, holding all factors constant, the *WEMWBS* will be 47.55. Interpreting these OLS coefficients indicates that a one category increase in income leads to a 0.0677 point increase in the *WEMWBS*, significant at the 1% level. At the lowest income levels, from categories 1 to 16, an extra £220 per week increases WEMWBS by 1.016. Therefore, a positive relationship exists between income and mental wellbeing, as predicted. Correlation, albeit not causation, can be established.

Number of children is also significant at the 1% level, with a decrease in *WEMWBS* of 1.65 per additional child, perhaps due to increased stress or the tendency of subjects with a lower socioeconomic status to have larger families. The interaction term, significant at the 5% level, predicts that the positive effect of higher income on mental health is 0.0377 higher per additional child, probably because the additional income is of greater utility when shared between a greater number. Gender, though not statistically significant, predicts the better mental health typically reported by males.

Significant (at 1%) in the Marital Status category is that married respondents living with spouse reported a *WEMWBS* of 2.419 points higher than single counterparts, whilst widowed respondents reported 2.903 points higher, which perhaps simply reflects the omitted variable age.

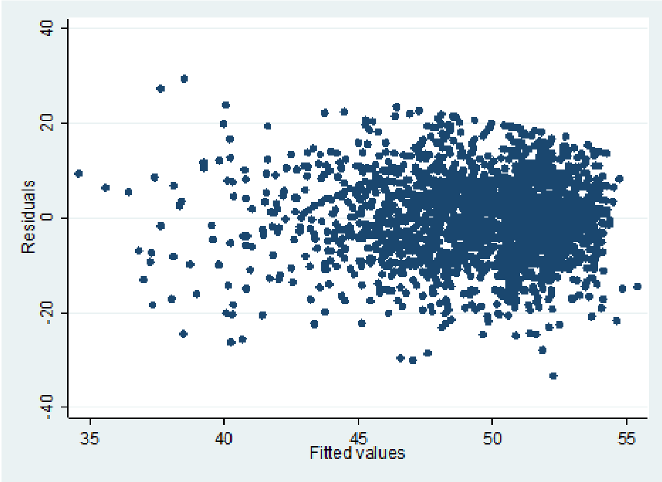
Predictably, compared with the baseline of much better health compared to 1 year ago, better, somewhat worse and much worse all decrease the *WEMWBS*, with much worse decreasing the *WEMWBS* by 11.04, significant at the 1% level. Mental wellbeing and alcohol consumption predictably have a negative relationship whilst exercise and *WEMWBS* have a strong positive relationship at the 1% level, with a one day increase of ten minutes of moderate activity per week increasing the score by 0.329. The adjusted R^2 is 0.1121; 11.21% of the variation in the scale is captured by the model.

On replacing gross with *INCOME*, the resultant β_1 is 1.36, significant at the 1% level. However, to run this regression the 30 observations in the lowest income bracket (1) must be dropped, as log1=0, thus we lose an important group, especially for policy considerations. This indicates that a one category increase in income increases *WEMWBS* by 1.36%.

Heterogeneity

The OLS assumptions rely on the constant variance –homoscedasticity- of the error term. If this is violated, i.e. the errors have the same variance irrespective of the value of the independent variables, the OLS estimates may be inefficient but will still be unbiased (Wooldridge, 2009). Plotting the fitted values of $\hat{y}$ against the residuals, we see that the dispersion of the error terms is clustered:.

Performing the Cook-Weisberg test for heterogeneity, a high chi-squared value (56.21) and a p-value of 0.000 are found, confirming the presence of heteroscedasticity in the model. This may be due to the presence of unmeasurable genetic factors in the error term, such as the genetic component of many psychiatric illnesses, or the omission of variables such as age. To combat this, heteroscedasticity-consistent (robust) standard errors must be used. Upon augmenting the original OLS regression to include robust standard errors, all of the aforementioned coefficients remain statistically significant at their previously stated levels.



Multicollinearity

When two or more regressors are so correlated such that they are nearly linear combinations of each other, multicollinearity is present, which hinders the isolation of the particular effect of X_i on Y_i (Wooldridge, 2009). To test for multicollinearity, the variance inflation factor can be used. As this command resulted in a mean Variance Inflation Factor of 2.63, we can conclude that multicollinearity is not present in this model (at a tolerance level of <0.03) (UCLA 2016).

Endogeneity

Endogeneity, which occurs when one or more of the regressors is correlated with the error term, can be due to three factors: omitted variables, measurement error or simultaneity. (Wooldridge, 2009: 842). Endogeneity is a problem inherent to the study of health economics, which can lead to biased and inconsistent OLS estimates. Reverse causality whereby mental health affects income is present and also affects other regressors such as exercise levels, alcohol consumption and marital status, as those suffering from poor mental health may generally engage in a more reclusive life. Sareen et al.'s (2011) social selection theory highlights how these persons' ability to work, and thus earn income, will also be reduced. As income and mental wellbeing are determined simultaneously, the presence of simultaneity bias cannot be denied. This could lead to upward bias in our regression coefficients i.e. overstating the effect of income on mental health.

Endogeneity can also be due to omitted variable bias. A weakness in this study is the omission of the age variable; Lorant et al (2003) highlight the U-shaped relationship between age and depression – the reverse is true of age and income. To test for functional misspecification - omitted variable bias or whether non-linear combinations of present regressors could yield explanatory power - we can use the RAMSEY reset test. The high p-value (0.3969) that the test yields suggests that there is omitted variable bias.

One way to deal with endogeneity would be to use an instrumental variable for gross income that is correlated with income but not with mental health, and thus only affects Y through income. Following this, a 2-stage least squares regression (2SLS) would be performed. After inspecting the dataset, it lacked any suitable instruments – age left full time education, for example, yielded illogical results with a negative coefficient on gross, and its modal age was 14, and so could be affected by the omission of age, as the older generations tended to leave school earlier. Using *NUMCHILD* as an instrument yielded similarly illogical results; both of these could be highly correlated with Y. Suitable instruments for future use could include IQ, which should be correlated with income but not with income. It is also worth noting that the majority of academic studies do not use an instrument for income.

Self-reported data from the respondents could be a source of measurement error. It is possible that the subjects from the lowest incomes, who have never experienced otherwise, in particular are unwilling (or unable to) fully assess the deprivation they experience, pushing the coefficients downwards towards zero. There is also the aforementioned focusing bias, which Homo sapiens, unlike homo-economicus, inevitably suffer from when assessing happiness or fulfilment levels. However, the *WEMWBS* performs favourably compared to other scales on self-deception bias (Stewart-Brown and Janmohamed, 2008).

Extensions

A helpful addition would be a ballpoint figure of last year's gross household income, to enable calculation of medians, adjustment for outliers etc. A larger panel data study would be instructive, focusing on one component of mental disorders, such as the National Epidemiologic Survey on Alcohol and Related Conditions (2002), rather than general wellbeing. An improved approach would be to use a study, which covered various years to facilitate a panel data treatment and allow for the 'examination of temporal relationships between income and mental disorders' (Sareen et al, 2001). A fixed effects model would then be used to control for serial correlation between the control variables and error term. A further advantage of this would be to control for omitted variable bias (Williams, 2015).

Conclusion

The aim of this paper was to show a positive relationship between income and mental wellbeing and prove this using a multi-faceted dataset and examining relevant variables of influence. From the coefficients produced by the model after adjusting the standard errors for heteroscedasticity, taking logs of income and generating an interaction term, it is more than reasonable to conclude that this positive relationship holds. The correlation between mental health and income has important implications for policy in that increasing the material standards of living and incomes of low-earners through redistribution may improve mental health outcomes.

While tentative policy recommendations can be made, further exploration of this topic is needed to ascertain causality. The presence of endogeneity and omitted variables - in particular the omission of age from the dataset – means that a causal relationship cannot be claimed. Indeed, reverse causality is, like many studies in health economics, a complication; Y affects several of the control variables. Ideally, two suitable instrumental variables would have been utilized in order to facilitate a 2SLS regression and thus account somewhat for the endogeneity present in the income regressor at least.

In conclusion, there exists both the scope for further econometric research in this area and, more importantly, the imperative for a greater understanding of factors influencing mental health and their crucial implications for policy makers today.

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An Econometric Investigation of Attitudes Toward Sexism

Gillian O'Connell
Senior Sophister

Addressing direct and indirect forms of discrimination towards women in the workplace and beyond continues to represent a struggle for policy makers. In this econometric investigation, Gillian O'Connell examines the determinants of a belief that sexism is indeed a persistent problem. She finds that gender and education have a statistically significant effect on attitudes as well as personal experience of discrimination at work and political affiliation. Exploring a wealth of future research possibilities in this area, this paper adds to the discourse on the factors underlying attitudes towards sexism and policies surrounding it

Introduction

The past century has seen huge political and social changes in the position of women in society. To illustrate the magnitude of these changes consider the United States, which will be the focus of this paper. In 1912 women in the US could not vote or own property and they worked, with very few exceptions, in the home. Clearly huge improvements have been made since then, with many of the institutional barriers having been removed.

However despite the magnitude of these changes the progress that has been made, sexism is a continuing feature in modern society. A 2009 report by the International Trade Union Conference found that the average global gender pay gap is 17% with a range of 3% to 51% (ITUC, 2009). In many parts of the world institutional barriers to female empowerment remain in place, while in more western countries, which have by and large made huge progress, more subtle forms of discrimination persist.

These inequalities must continue to be addressed at all levels of society and for this to take place there must be acknowledgement that gender inequality is a continuing problem; people need to think that there is a problem if they are to take action against it. In light of this need for awareness, understanding the beliefs people hold and why they hold them is important. Shedding light on which characteristics of an individual might determine these beliefs is crucial as it is by understanding this that one can seek to change people's attitudes and promote further equality in society.

People's responses to sexism will be determined by their attitudes towards it, and these depend on whether or not it is perceived as an issue in society. This paper will seek to identify some of the determinants of whether or not people believe that women experience discrimination in the United States today. This question is an important one because understanding who holds certain beliefs, and what causes them to do so, will facilitate the design of more effective interventions targeting behaviour change.

Literature Review

To investigate the determinants of people's beliefs and attitudes about sexism, we need to understand how attitudes are formed. According to findings from social psychology people construct their attitudes based on three sources of information; cognitive, affective and behavioural. Cognitive information is what we know about the attitude object, affective information is how we feel about it and behavioural information is knowledge about our own and other people's interactions (both past and future) with the attitude object. The weights given to these sources of information vary depending on the individual, their experiences and the attitude object in question, however each source of information plays a role in any given attitude (Smith and Mackie, 2007).

Research about sexism has largely focused on the determinants of sexist behaviour, rather than an awareness of sexism as a problem. However attitudes and behaviour are closely linked as, wherever possible, people seek to act in a way that is consistent with their attitudes, as incongruence between attitudes and behaviour produces a state of uncomfortable mental tension (Gawronski, 2012). Given that this required congruence is bi-directional[1] we can look at literature on the determinants of sexist behaviour and assume that they will also have an effect on people's attitudes.

One factor, which is frequently found to have an effect on sexist attitudes and behaviour is education. A study by Glick and colleagues (2002) found that level of education is negatively correlated with people's willingness to endorse both hostile and benevolent sexist beliefs, explicitly demonstrating that education has an effect on how people respond to sexism.

In general, literature on sexism takes the view that it is socially constructed and focuses on broader social patterns and how these might affect people, rather than more micro-level individual experiences or characteristics. The validity of this approach is not in question but if we are to affect change in individuals' attitudes – which have already been shaped by social forces - it is also important to consider individual determinants, which this paper will seek to do.

Model

In order to determine what might cause an individual to believe that sexism is a continuing problem in society the following model is specified:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i}$$

Where the variables are as follows:

Y_i = *SOC_EQUAL* - a binary dummy variable which take on a value of 0 if the individual responds that men and women are treated equally to the question "*Do you think society generally treats men and women equally, or does it favour women over men, or men over women?*". It take on a value of 1 if the respondent says men are favoured over women and a value of 0 if the respondent says men and women are treated equally
X_1 = *AGE* - a continuous variable measuring the age in years
X_2 = *SEX* - a binary dummy variable which takes on a value of 0 if the individual is male and 1 if they are female
X_3 = *EDU* - a binary dummy variable which takes on a value of 0 if the highest level of education achieved by the individual is a High School Diploma or less. It takes a value of 1 where they have pursued tertiary education
X_4 = *DISC_WORK* - a binary dummy variable which takes on a value of 1 if the individual indicated that they have been discriminated against in the workplace on the basis of their gender. It takes a value of zero if this was not the case
X_5 = *DIFF_OCC* - a binary dummy variable which takes on a value of 0 if the individual believed that pay discrepancies between men and women were the result of men and women having different occupations and a value of 1 if they responded that this is not the case
X_6 = *DIFF_HOURS* - a binary dummy variable which takes on a value of 0 if the individual believed that pay discrepancies between men and women were because men and women work different hours, and 1 if they responded that this is not the case
X_7 = *DEMO* is a dummy variable which takes on a value of 1 if the individual identified themselves as a democrat and 0 otherwise
X_8 = *REPUB*[2] - a dummy variable which takes on a value of 1 if the individual identified themselves as a republican and 0 otherwise

Empirical Approach

The key thing to note about this model is that the dependent variable is binary and this places limitations on how the model can be estimated. We are interested in the $P(y=1\,|\,x)$, or the probability that an individual believes that sexism is an issue in society, given the explanatory variables. One possible estimation technique would be the Linear Probability Model (LPM), which uses OLS estimation procedures to estimate the model where the dependent variable is the response probability and is linear in the parameters β_j. However, the use of LPM in estimation raises a number of issues, the most serious of which being that, where our dependent variable is a probability we require that $0 \leq \hat{Y}_i \leq 1$, but under the LPM there is no reason for this to be the case.

This model will therefore be estimated using a probit regression, which takes the form

$$P(Y=1 \mid X)=\phi(Z), \text{ where } Z=\sum_{k=0}^{j} X_{ij}\beta_j$$

and ϕ is the cumulative distribution function (CDF) for the normal distribution. Imposing the CDF on the model ensures that all values of the dependent variable will fall within the desired range (Wooldridge, 2014).

Data and Expectations

Data for this study was taken from a survey on Gender, Higher Education and Work carried out by the Pew Research Centre (2014). The survey was carried out by telephone interviews (both landline and mobile) in October 2013. The sample is made up of 2,002 people, aged over 18 and resident in the United States.

The dependent variable was taken from a survey question "*Do you think society generally treats men and women equally, or does it favour women over men, or men over women?"* to which there were four possible responses; men and women equally (=1), women over men (=2), men over women (=3) and don't know/refused (=9). The research question for this paper is concerned with attitudes people hold regarding inequality involving discrimination against women. It intends to determine the factors underlying the belief that sexism is indeed a problem. Respondents who indicated that they believe women are favoured over men are an interesting group that merit discussion, but are beyond the scope of this paper, which seeks to identify characteristics of individuals who believe that discrimination against women is a problem. The independent variables discussed here might also play a significant role in determining why people believe women are favoured over men, but other factors would need to be considered.

Therefore, in order to obtain a binary dependent variable, respondents who indicated that they did not know (and therefore held no belief) and those who believed that men are unfairly treated were dropped from the dataset. Table 1 gives the frequencies of each of the four possible responses, with the dropped respondents (2 and 9) making up a small but not inconsequential percentage of the data.

Do you think society generally?	*Frequency*	*Percent*	*Cumulative*
1	*780*	*38.96*	*38.96*
2	*174*	*8.69*	*47.65*
3	*924*	*46.15*	*93.81*
9	*124*	*6.19*	*100*
Total	*2,002*	*100.00*	

Table 1

Most of the survey questions took a similar form to the dependent variable question, with participants asked to respond either "yes" or "no" or presented with a limited choice and asked to respond "1 if ...," "2 if...," etc. Thus, the explanatory variables estimated in the model are dummy variables. These explanatory variables examine whether education, political ideology, experience of workplace discrimination and the rationalisation of examples of inequality as benign contribute to the probability that an individual believes sexism to be an issue in modern American society and are summarized in Table 2.

Variable	*Obs*	*Mean*	*Std Dev*	*Min*	*Max*
AGE	*1,704*	*44.14319*	*19.47314*	*18*	*99*
SEX	*1,704*	*.4876761*	*.4999948*	*0*	*1*
EDUCATION	*1,704*	*.6971831*	*.4596116*	*0*	*1*
DISC_WORK	*1,674*	*.1356033*	*.3424692*	*0*	*1*
DISC_OCCUPATION	*1,704*	*.2975352*	*.4573081*	*0*	*1*
DIFF_HOURS	*1,704*	*.4906103*	*.5000586*	*0*	*1*
DEMOCRAT	*1,704*	*.3080986*	*.4618431*	*0*	*1*
REPUBLICAN	*17,04*	*.2470657*	*.4314319*	*0*	*1*

Table 2

AGE is not expected to have a statistically significant effect and is included as a control variable in order to reduce omitted variable bias.

SEX is expected to have a positive effect, as it seems reasonable to expect that the probability that a woman, who experiences sexism, will believe it to be present will be higher than the probability of man doing the same.

EDUCATION is expected to have a positive effect as pursuing post-high-school education might lead to a greater awareness of current events, and perhaps lead an individual to take a more critical view of society, thereby increasing the probability that they will believe sexism to be present.

DISC_WORK is expected to have a positive effect on Y_i. Of the respondents who reported that they had been discriminated against based on their gender, 69% were women and we, therefore, expect that experiencing discrimination in the workplace increases the probability of Y_i being equal to 1.

DIFF_OCCUPATION and *DIFF_HOURS* are both expected to have positive effects on $P(Y = 1)$. Where these dummy variables are equal to zero, people are attributing inequality in the form of pay differences to choices that women make. This is consistent with the idea of rationalising evidence which contradicts beliefs to achieve cognitive consistency. When people do not think that these differences are voluntary, they may be more likely to believe sexism is a problem in society.

The variable for *DEMOCRAT* and *REPUBLICAN* measures the effect of these ideologies, relative to someone who identifies as an Independent. Given that the Democrat party is generally associated with socially liberal positions and the Republican party with more traditional and conservative values, we expect to see a positive effect on $P(Y_i = 1)$ for

DEMOCRAT and a negative effect for *REPUBLICAN*.

Empirical Results

The results of the probit estimation, which is carried out using STATA, are presented in Table 3. The command probit gives the probit coefficient estimates and standard errors, which can be used to cWomment on the direction and significance of the relationship between X_j and the dependent variable. From Table 3, we can see that the effects of *AGE, DIFF_HOURS* and *REPUB* on *SOC_EQUAL* are not statistically significant.

As was expected *SEX, EDU, DISC_WORK* and *DEMOCRAT* each have a positive effect on P(Y=1) and each of these effects are significant at the 1% level. *DIFF_OCCU* also has a positive effect, with a 10% significance level. We can therefore say that being female, having post-school education, experiencing discrimination at work and not attributing pay differences to different occupations all increase the probability that an individual believes that sexism is present in society.

Variables	*SOC_EQUAL*
AGE	0.000764 (0.000658)
SEX	0.119*** (0.0252)
EDUCATION	0.133*** (0.0273)
DISC_WORK	0.121*** (0.0362)
DIFF_OCCUPATION	0.0503* (0.0287)
DIFF_HOURS	0.00921 (0.0263)
DEMOCRAT	0.220*** (0.0276)
REPUBLICAN	-0.0159 (0.0313)
OBSERVATIONS	1674

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.

We can see from the likelihood ratio chi square statistic and its associated p-value, which are presented in Table 4, that the model is significant at the 1% level, meaning that it is explaining some of the variation in the response probability. The pseudo R^2 is 0.0681, meaning the model explains 6.81% of this variation. While this is low, given that this model dealt only with workplace discrimination and excluded violence, harassment and other forms of sexism which may be encountered, this relatively low pseudo R^2 is not surprising, especially considering that much of what determines attitudes and beliefs is largely unobservable (e.g. cultural learning and affective responses).

Number of Observations	1,674
LR Chi-Squared (8)	157.15
Prob > Chi-Squared	0.00
Pseudo R^2	0.0681

Table 4

In order to comment on the magnitude of the effects the STATA command dprobit must be used. Using dprobit gives the maximum likelihood estimates of the marginal probability effects of the explanatory variables, in other words it gives the effect of each Xj on the probability that an individual believes sexism is present in society. Using dprobit instead of probit doesn't have an effect on standard errors or significance levels; these are as they were in Table 3. The marginal probability effects of the explanatory variables are presented in Table 5. Because the explanatory variables are dummy variables, the marginal probability effects are interpreted as the effect of $X_i=1$ on $P(Y=1)$, all else being equal.

Variables	*SOC_EQUAL*
AGE	0.000764 (0.000658)
SEX	0.119*** (0.0252)
EDUCATION	0.133*** (0.0273)
DISC_WORK	0.121*** (0.0362)
DIFF_OCCUPATION	0.0503* (0.0287)
DIFF_HOURS	0.00921 (0.0263)
DEMOCRAT	0.220*** (0.0276)
REPUBLICAN	-0.0159 (0.0313)
OBSERVATIONS	1674

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.

Possible Extensions

The data used in this paper is drawn from an American sample and therefore this discussion and the findings of the model can only be applied to western society. This is because the factors that determine the attitudes people hold and the ways in which these attitudes are expressed are, to a huge extent, culturally determined, and therefore seeking to extend the above beyond Western culture would be inaccurate and misleading. Caution should also be employed when considering these findings as they relate to non-US Western countries as there will exist cultural differences, however given the America's cultural hegemony it should be possible to apply these findings, as long as it is done so in a manner mindful of possible differences. Given this, the first area suggested for future research would be to examine whether the determinants of beliefs about gender (in) equality might be different in non–western cultures, an area of particular importance given the more entrenched and institutional forms of discrimination women in many of these cultures face.

Secondly, in order to work with a binary dependant variable respondents who indicated that society favours women over men were dropped from the data to facilitate the desired analysis for this paper. A full understanding of attitudes towards gender in society must also consider this alternative perspective and so future research should seek to identify those who believe this to be the case, and why they do so.

The model here found that tertiary education had a significant, positive effect on the dependent variable. However the quantifying of education here was imprecise as the dummy variable $X_3 = 1$ included everything from third level certificates to PhDs. In order to better understand the effect that education has on this belief, it might be worthwhile to look at whether the type of education pursued has an effect or whether it might be attributable to the duration of education.

Finally, a significant positive effect was found for *DISC_WORK*, suggesting that people who experience gender based discrimination in their workplace are more likely to think it is a problem in society. It would be interesting to examine whether discrimination must be personally experienced to have an effect, or whether seeing instances of it would have the same effect and an investigation into this possibility would potentially yield valuable insights for attitude change.

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Notes

1 - Just as people need to behave in manner consistent with their attitudes they also need to hold attitudes which are consistent with how they behave.

2 - In the survey people were asked to classify themselves as Republicans, Democrats or Independents. Independents are used as the baseline category they are taken to be the most central, and so it allows us to more clearly analyse the effects of more polarised beliefs, be they left or right wing.

Okun's Law: An Empirical Investigation into Eurozone Growth and Unemployment

Stephen Garavan

Senior Sophister

The financial crisis has had a profound impact on the Eurozone in terms of monetary and fiscal policy. In this econometric investigation, Stephen Garavan examines whether the relationship between growth and unemployment stipulated by Okun's Law has continued to hold during this period of economic turmoil. He uses panel data and a fixed effects regression to analyse this and to determine whether there is asymmetry in the short-run relationship between economic growth and changes in unemployment, concluding that Okun's Law remains an important rule-of-thumb for policymakers.

Introduction

Okun's Law (Okun, 1962) describes a simple stylized fact: in the short-run, there is a tight negative relationship between economic output and changes in unemployment. This simple observation became a fixture in most undergraduate macroeconomic textbooks (see for example Sørensen and Whitta-Jacobsen, 2010). Okun's Law, which describes how unemployment can fall by a fixed proportion as output grows above a certain rate, contains within it two basic implications of interest. Firstly, pro-growth economic policy is immediately justified under an assumption that low unemployment is a desirable outcome for policy-makers. Secondly, if this condition does indeed hold, economic growth is required ceteris paribus in all time periods in order to maintain, or indeed decrease, nominal unemployment level. The necessity for perpetual growth is built in to Okun's framework for understanding the short-run relationship between growth and unemployment.

The purpose of this paper is to offer a reassessment of Okun's law for the Eurozone between 2002 and 2013. This period not only saw the onset of the Great Recession but also sharp structural change within the currency block. Recent literature (IMF, 2010) has indicated that Okun's Law broke down during the Great Recession and for the U.S. finds little correlation between output growth and unemployment. Of particular interest to this paper will, therefore, be an empirical investigation into whether Okun's Law did indeed undergo a structural change following the Great Recession for the Eurozone countries. Similarly, an empirical investigation into asymmetries within the relationship between output growth and unemployment will be attempted. In effect, an assessment of whether the relationship between economic growth and unemployment differs during periods of expansion and contraction will be conducted.

Literary Review

Okun's Law has been estimated by a number of different methodologies in economic literature. For example, Knotek (2007) gives an assessment of the various methodologies by which Okun's Law can be calculated. The difference method provides the empirical methodology, which this paper will attempt to follow. In effect, this method captures a contemporaneous correlation between output growth and unemployment. By regressing real output growth on changes in the unemployment rate, a simple ratio of the coefficient for output growth to changes in the unemployment rate can be found. This provides the rate of output growth that is consistent with a stable unemployment rate.

Moosa (1997) has shown that the magnitude of Okun's Law tends to vary. The country and time period chosen for study, as well as the model specifications and controls chosen, were all shown to affect the magnitude of Okun's Law. The variation in Okun's Law between countries is also presented by Ball et al. (2013). Importantly, they assert that Okun's Law remains valid following the Great Recession of 2008. Economou and Psarinos (2013) show that the short-run relationship between output growth and unemployment is weaker for countries with labour market protection. Given the relative level of labour market protection in Europe, this finding might indicate that a weaker short-run relationship between economic growth and unemployment could be found in the Eurozone compared to the U.S.

The heterogeneity within the short-run relationship between output growth and changes in unemployment is further explored by Silvapulle et al. (2004). Okun's Law is shown to be asymmetric, where the short-run relationship between positive and negative cyclical economic growth and unemployment are shown to be quantitatively different. Virén (2001) asserts that this is of particular importance within the European Monetary Union as the various countries within it could be on different stages within their own business cycles. Various methods have been used to attempt to estimate and control for this asymmetry. Giovanni Busetta, and Dario Corse (2012) create a Heaviside step function into which the economic growth rate is econometrically split into its positive and negative effects.

Empirical Approach

In an attempt to evaluate Okun's law for the Eurozone between 2002 and 2013, a panel dataset was selected. Its advantage over time-series data is that it allows for the control of unobservable time-invariant factors. This is a considerable advantage when one imagines the cultural and other time invariant factors which effect the labour market across the Eurozone. Firstly, a simple difference version Okun's Law, as described by Knotek, will be discussed.

$$\Delta U_{i,t} = \beta_0 + \beta_1 GDPg_{i,t} + a_i + \varepsilon_{i,t} \quad (1.1)$$

The variable $GDPg_{(i,t)}$ is the main explanatory variable. The estimator β_1 should show the basic relationship between GDP growth and a change in unemployment. This should be expected to be negative, that is, as GDP growth increases, unemployment should be expected to fall.

The variable a_i captures the unobserved time invariant factors within the model. This parameter should capture factors such as country-specific labour market or cultural features which do not change across the time period in question. If such features were not controlled for, spurious relationships could be generated during econometric estimation.

From equation 1.1 it will be also possible to estimate the level of output growth that the Eurozone would on average need in order to maintain stable unemployment, in accordance with the method proposed by Knotek (2007).

$$\overline{g}_1 = -\beta_0 / \beta_1 \quad (1.2)$$

Under ceteris paribus conditions, $\overline{g}_1$ is the rate of output which policy makers will need to achieve in order to avoid rising unemployment.

Equation 1.2, through the inclusion of additional variables, can be used to test for whether Okun's Law underwent a regime change following the Great Recession. It can further be used to test for asymmetry within the relationship between both positive and negative economic growth and unemployment.

$$\Delta U_{i,t} = \beta_0 + \delta_1 dY(2008\text{-}2013)_t + \beta_1 GDPg_{i,t} + \beta_2 (+\Delta yDUMMY)_{i,t}$$
$$+ \beta_3 POSITIVEGROWTH_{i,t} + \alpha_i + \varepsilon_{i,t} \quad (1.3)$$

The variable $dY(2008\text{-}2013)_t$ is a dummy variable, which takes on a value of zero if the observation is between 2002 and 2007 inclusive, and a value of one if between 2008 and 2013 inclusive. The variable $(+\Delta yDUMMY)_{i,t}$ is a dummy variable, which is given a value of zero for years with negative growth (i.e. recession years) and a value of one for years of positive growth. To avoid perfect collinearity, for both measures only one temporal dummy variable is included (Wooldridge 2013).

The variable $\beta_3 POSITIVEGROWTH_{i,t}$ is an interaction term between $(+\Delta yDUMMY)_{i,t}$ and $GDPg_{i,t}$. If the estimated coefficient on this term β_3 can be shown to be statistically significant, the short-run relationship between economic growth and unemployment can be shown to be asymmetric. That is, positive and negative economic growth rates have a statistically different relationship to the change in unemployment.

Equation 1.1. and 1.2 were first estimated using both the Random Effects (RE) estimation and Fixed Effects (FE) estimation methods. A Hauseman Test (Wooldridge 2013) was conducted to test for the most appropriate method. The Fixed Estimation method (Wooldridge 2013) was shown to be preferable, and so this was used for estimating the above model. This method of estimation also makes econometric sense from a theoretical perspective. FE estimation removes the unobserved time-constant factors within the model that vary across Eurozone countries. By theoretical definition, this variable contains serial correlation since it is constant across time, which supports its removal by FE estimation. Furthermore, RE estimation relies on the assumption that $Cov(\alpha_i, x_{it})=0$ (Wooldridge 2013). By intuition, it would appear likely that those country-specific time-invariant factors such as labour-market regulations would be correlated with economic growth. The grounding assumption of RE estimation would appear violated. Both theory and empirical testing therefore both supports this paper's choice of FE estimation.

A further issue that requires attention is the possibility of autocorrelation within the panel time-series unemployment and GDP data. A test for first-order autocorrelation on STATA failed to show any at any reasonable significance level and so this potential problem was discounted due to lack of immediate statistical evidence.

Data

All data was obtained from the IMF online database (IMF 2015). The panel consists of the 19 current European Union member states who use the Euro as their legal tender. These are as follows: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovak Republic, Slovenia and Spain. The time period in question is from 2002 to 2013 inclusive. Some of these countries such as Latvia and Lithuania only joined the Eurozone in 2014 and 2015 respectively. It is important to note that this paper is not an attempt at understanding the impact of the Euro on the short-run relationship between economic growth and employment. Rather it is a simple exploration of this dynamic for the countries that currently make up the monetary block. For this reason, Lithuania and Latvia, along with the other countries which joined the Eurozone during this papers years of study, were included.

Some data series required for this paper were not immediately available on the IMF database and required come calculations. The change in unemployment was calculated manually by taking the unemployment percentage of the previous year away from the unemployment percentage of the current year in order to calculate a panel dataset as follows.

$$U_{i,t} - U_{i,t-1} = \Delta U_{i,t} \qquad (2.1)$$

This method required obtaining panel statistics on the year 2001 from the IMF database in order to calculate the 2002 time period. One can certainly imagine unobserved statistical variations within this method of calculation, such as the change in unemployment being as a result of high migration of members of the labour force and so this can only serve as a rough guide for this paper. The time dummy variable, $dY(2008\text{-}2013)_t$ was calculated on excel as was the positive growth dummy variable, $+\Delta yDUMMY$. The panel interaction term between the positive growth dummy and GDP growth rate, $POSITIVEGROWTH_{i,t}$, was created using STATA statistical software. The GDP growth rate was readily available on the IMF word data base.

Variable	Obs	Mean	Std. Dev	Min	Max
Change in Unemployment	228	.2832719	1.803206	-4.382	9.8
GDP Growth	228	1.835285	4.098916	-14.814	11.621
dY 2008-2013	228	.5	.5011001	0	1
Positive Growth Dummy	228	.7850877	.4116652	0	1
Positive Growth	228	2.670184	2.68373	0	11.621

Table 1. Summary Statistics used in this paper.

Table 1 gives a list of summary statistics used in this paper. A quick visual examination of the nineteen Eurozone countries can also be presented. The graphical representation indicates, as expected, a faint negative relationship between a change in unemployment, $\Delta U_{i,t}$, and the growth rate of national Gross Domestic Product, $GDPg_{i,t}$.

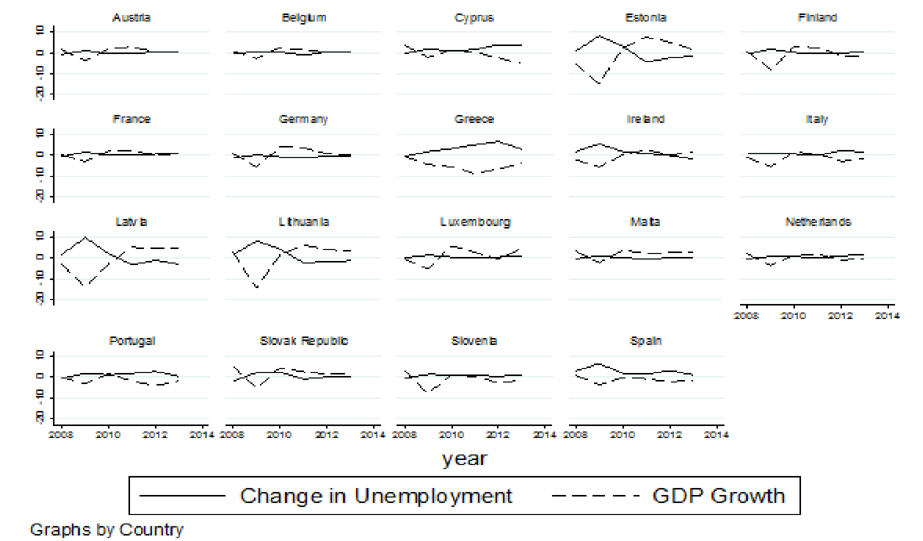

Figure 1: Relationship between $\Delta U_{i,t}$ and $GDPg_{i,t}$ for the Eurozone countries between the years 2002-13.

Empirical Results

The results from the FE estimation of equation 1.1 are shown in Table 2. An R-squared of 0.633 is obtained. 63.3% of the variation within the change in unemployment for the Eurozone is explained by the economic growth rate. The growth rate itself is seen to be statistically significant at the 1% level. The coefficient is listed as -0.356. This appears to confirm the working assumption that there is a negative short-run relationship between output growth and changes in unemployment.

Fixed Effects Estimation Variables	changeunemployment
GDPg	-0.356***
	(0.0188)
Constant	0.936***
	(0.0798)
Observations	228
Number of countries	19
R-squared	0.633

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Fixed Effects Estimation Regression Output for model 1.1.

Given the statistical significance of the estimated sample coefficients from equation 1.1., the growth rate that the Eurozone would be required to maintain in order to achieve a stable rate of unemployment $\overline{g_1}$, can be estimated. Following the methodology discussed by Knotek (2007), this paper found that on average the Eurozone would require annual growth rates of 2.6%, when rounding to a single decimal point, in order to maintain a stable unemployment rate.

The results from the FE estimation of equation 1.3 is similarly shown in Table 2. The inclusion of the dummy variables and the interaction term appears to improve the models ability to fit the data sample. The R-squared obtained is 0.665, which is a small increase on the R-squared of 0.633 obtained from the simple regression of equation 1.1.

Fixed Effects Estimation Variables	changeunemployment
GDPg	-0.531***
	(0.0465)
dY 2008-2013	-0.171
	(0.182)
Positive Growth Dummy	0.429
	(0.277)
Positive Growth	0.259***
	(0.0724)
Constant	0.314
	(0.311)
Observations	228
Number of countries	19
R-squared	0.665

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Fixed Effects Estimation Regression Output for model 1.3.

The negative short-run relationship between economic growth and changes in unemployment is similarly seen again. The coefficient on the economic growth variable remains statistically significant at the 1% level. A coefficient point estimate of -0.531 was obtained. Ceteris paribus, this implies that an economic growth rate of ±1% should lead to a corresponding inverse change in unemployment of ±0.531%. The interaction term between the positive growth rate dummy variable and the growth rate, $(+\Delta yDUMMY_{i,t})$ is also seen to be statistically significant at the 1% level. This paper shows some evidence of asymmetry within the short-run relationship between economic growth and changes in unemployment. In effect, the relationship between positive growth rates and the change in unemployment is statistically different from the relationship that exists between negative growth rates and changes in unemployment. The time dummy variable $dY(2008\text{-}2013)_t$ is not statistically significant at any reasonable significance level. Thus, this paper cannot conclude with certainty that the statistical short-run relationship between economic growth and changes in unemployment underwent any sort of regime change between the two temporal phases of 2002 to 2007 and 2008 to 2013.

Conclusions

The analysis presented in this paper appears to confirm the working assumption that there is indeed a negative short-run relationship between changes in the growth rate and changes in unemployment for the Eurozone within the period of 2002 to 2013 inclusive. This relationship however, was found to be asymmetric. Positive and negative economic growth rates were found to have statistically different short-run relationships to changes in unemployment. However, no significant change to Okun's Law can be observed for the years preceding and the years following the onset of the Great Recession. In other words, the findings of this paper support the literature that there was no regime change involving Okun's Law over the period in question.

This paper therefore, supports the view put forward by Ball et al. (2013) which advocated the idea that Okun's Law remains a valid rule-of-thumb for policy makers concerned with unemployment. The importance of pro-growth economic policy remains as valid to the Eurozone today as it was during the last years of the Great Moderation following the turn of the millennium. Despite the economic upheavals and dislocations which accompanied the Great Recession, ceteris paribus growth remains a vital component to maintaining a stable employment level. As briefly discussed in the introduction, economic predictions of a low-growth future, advocated by those such as Gordon (2012), paint a stark prediction for changes to unemployment in the context of the relationship between growth and employment explored by this paper.

This paper provides a platform upon which much more extensive work could be completed. An interesting extension could be to apply a more focused approach to assessing whether the Euro itself had an impact on the short-run relationship between economic growth and unemployment. This could perhaps be attempted by increasing the sample size of countries to include a weighted-average of non-Eurozone European nations to act as a control. Further investigation into the effect of country-specific labour-market characteristics could be attempted by controlling for levels of unemployment assistance or minimum wage. Controlling for inequality within each member state could also be of interest. This field of study provides many opportunities for further investigation to deepen our understanding of macroeconomic variables such as growth and unemployment in the wake of the financial crisis.

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