Student Economic Review 2019

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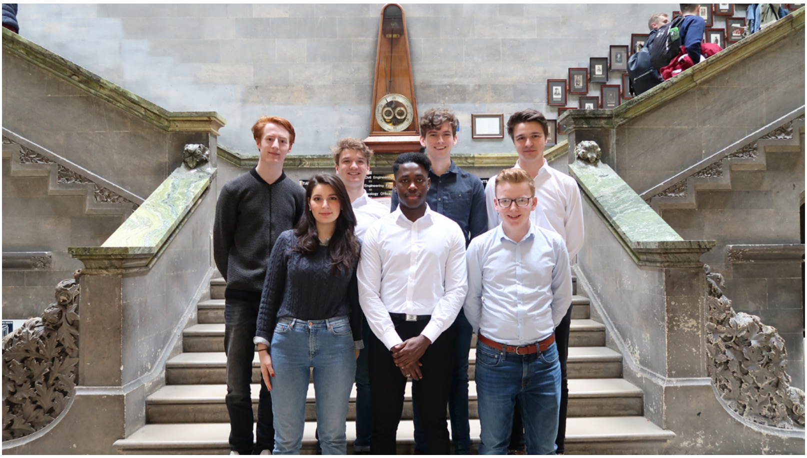

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Prize-Winning Essays of the Student Economics Review 2018/2019

Best Overall Essay: Dermot McAleese Medal

Turning Against Trade: Explaining American Appetite for Protectionism

Aaron McGowan

Best Applied Economics Essay:

Voiceless: The Economic Consequences of a Stammering Population

Jeff Dwan O'Rielly

EDITORS AND GENERAL MANAGERS OF THE STUDENT ECONOMIC REVIEW, 1987-2019

Year	Editor	General Manager
1987 (Vol. I)	John Fingleton	Paddy Waldron
1988 (Vol. II)	Kevin Carey	Finbar McDonnell
1989 (Vol. III)	Johnathan Wright	Joe Denehy
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 Mc Mahon	Niamh McDonagh
2000 (Vol. XIV)	Ana Carrie	Collette Murphy
2001 (Vol. XV)	Ronan Lyons	Charles Larkin
2002 (Vol. XVI)	Ivan McAdam	Janine Boyd O'Carroll
2003 (Vol. XVII)	Rowena Gray	Elaine Doyle
2004 (Vol. XVIII)	Denis Tkatchenko	Tara McInhoe
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 Ni Shúilleabháin

Year	Editor	General Manager
2012 (Vol. XXVI)	Tony O'Connor	Debbie Blair
2013 (Vol. XXVII)	Brian Higgins	Marielle Grigsby-Rocca
2014 (Vol. XXVIII)	Féidhlim Mc Gowan	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
2018 (Vol. XXXII)	Keelan Beirne	Aditya Garg
2019 (Vol. XXXIII)	John (Charlie) Walsh	Luisa Mostarda

GUEST SPEAKERS AT THE LAUNCH OF THE STUDENT ECONOMIC REVIEW, 1990-2019

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 Mc Rae	The Iindependent, 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
2003 (Vol. XVII)	Tomy 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 Mc Stay	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
2018 (Vol. XXXII)	Liam Delaney	U.C.D.
2019 (Vol. XXXIII)	Carmel Crimmins	Reuters
2019 (Vol. XXXIII)	Seán Barrett	Dáil Éireann

Student Economics Review Debates, 1996-2019

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 Resposibility	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 US Economic Dominance	Harvard
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	Trinity
2012	Harvard	The US 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	US Education System	Trinity
2015	Oxford	100% Inheritance Tax	Trinity
2015	Yale	Opening the Mexican Border	Yale
2016	Cambridge	Will the EU Benefit from Brexit?	Cambridge
2016	Harvard	Should we be Afraid of Cheap Oil?	Harvard
2017	Oxford	The EU is Unsustainable	Oxford
2017	Yale	Globalisation is Doomed	Yale
2018	Cambridge	Britain Should Pay Reparation to Former Colonies	Cambridge
2018	Harvard	The American Dream is Dead	Trinity
2018	Oxford	This House would unite Ireland post-Brexit	Oxford
2019	Yale	Protectionism is Failing America	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

"My involvement in the SER was an important defining point in my undergraduate experience at Trinity. It introduced me to the world of academia, the role and importance of academic publishingand the range of questions and depth of research possibilities in the discipline of economics. It has stood the test of time and grows stronger every year attracting the highest calibre of students."

Carol Newman
PhD TCD, Associate Professor TCD
General Manager, 1997 SER

"Ever since leafing through a copy of the SER in my JF year, my ambition to become involved in this prestigious student society could not be curbed. Leading the committee through the year from the first workshop to the launch was an experience dotted along the way with enduring memories. From a three-day discussion about which tablecloth should be used for the workshop, to finally holding a copy of the review at the launch evening. I'm sure our friendships will last as long as the memory of my scrupulous organisation!"

Cián McLeod
Strategic Operations Specialist, Google Ireland
General Manager, SER 2014

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STUDENT ECONOMIC REVIEW WELCOMES

Welcome from the General Manager

As the General Manager of the committee of the 33nd edition, I am honoured to welcome you to the 2019 Trinity Student Economic Review. The Trinity Student Economic Review is one of the world's oldest academic journals published by undergraduate students. Since 1987, the SER has published yearly the best work of Economics students in Trinity College Dublin. For thirty-three years, we have backed our peers and displayed their talent. What you are about to read is indeed the best Economics work we have had the privilege to read this year and we are enormously proud to present it to you.

Alongside the College Historical Society, the SER has organised debates on some of the most polarising economic issues of this year, hosting the teams from Oxford and Yale University. The themes that this two debates explored were a possible unification of Ireland and whether protectionism was in fact failing the US.

The two teams laid out their cases in a stimulating and inventive way, which impressed equally the audiences and the judges. The committee was extremely proud to continue this tradition, which not only offered a new perspective on hot topics, but well-researched fact-based arguments, which in these times are often hard to come by. Our Debates Manager, Niall Maher, must be accounted for the overwhelming success of the two events. He collaborated with members of the Hist to ensure that everything would run smoothly and he has been able to face last minute challenges excellently.

Another tradition the SER has started few years ago is organising workshops. This year in particular, we had a workshop that catered to Senior Fresh students planning to undertake the Foundation Sholarship Examinations. The workshop saw the participation of many Scholars that talked about their experience in facing the exam. During the second term, our Workshops Editor, Yannik Obeloeer, successfully organised a talk with Philip Lane, the Governor of the Central Bank of Ireland regarding the work that the Central Bank does, especially when it comes to dealing with the business cycle.

In 2019, we were very happy to see that the volume of submissions for the Review was exceptionally high, and were all of prime quality. The committee is very thankful to everyone who put time and energy into getting their essay ready and perfecting it for submission. Our Editorial team, comprised of Charlie Walsh, Yannik Obelöer and Cillian Bisset, was able to select a group of articles that will interest and inform the reader on a variety of economic matters. We are proud to say we are presenting a Review of the highest standard.

The 33nd edition of the SER would not be here in front of you without the hard work of Ciarán Mulqueen and Ryan Grunwell who lead the production and launch of the journal respectively. Mustapha Kokumo worked hard behind the scenes as our Financial Manager, allowing us to allocate resources effectively to all the projects the SER undertook. The Review you are reading today is the result of the combined effort of all the members of the committee, and for that I thank them all. I want to really highlight that our team efforts allowed the SER to succeed in achieving the goals we had envisioned at the beginning of our journey. I appreciate and respect every single one of you for your great qualities and your willingness to work together as a team. You are all very talented and I feel truly honoured to have worked with you.

The committee as a whole would like to say a warm thank you to our sponsors for their kind funding, without which the Review could not exist. I would like to thank our chief sponsor, Harry Hartford, for the immense support he has provided over the past ten years. I also want to thank our patrons, Dr Tara Mitchell, Dr Ronan Lyons and Dr Michael Wycherley for their advice in helping us navigate the intricacies of publishing a journal. I also want to extend our thanks to Professor John O'Hagan, without whom this journal would not exist. Our patrons' support was key in ensuring every event ran smoothly and turned out a success. Moreover, I want to thank the Economics Department and the Alumni Office, which have both readily helped in our queries on multiple occasions.

My wish is that the 33rd Student Economic Review will engage you, make you think differently and make you appreciate the talent of Trinity Economics undergraduate students. Our committee has strived for an excellent and exciting read, so we sincerely hope it will meet your high standards.

Luisa Mostarda,

General Manager, SER Vol. XXXIII

Welcome from the Editor

It is with pleasure that I welcome you to the Student Economic Review 2019. Now in its 33rd year, the Review continues to give Trinity undergraduate students the unparalleled opportunity to explore their own interests and experience publication in an academically renowned journal. One cannot overstate the benefits that this early exposure to the rigours of academic publishing can have on a budding economics student. Many world-renowned economists' first-ever "peer reviewed" pieces can be found amongst the pages of previous editions. However, I believe the Review's real value lies in providing an outlet for students to look beyond the scope of their courses. It enables them to pursue and discover what really interests them and promotes the sort of independent thinking we value so much in society.

With 93 submissions this year, the Review continues to capture the attention and imaginations of students across all years. Whilst some entries arise from course material and assignment work, others examine topics beyond the scope of modules, stemming from students' own desire to learn and explore. Regardless, the Review is nothing without its contributors, and I want to thank each and every person who submitted an essay. I can honestly say that it was an absolute pleasure reading them. The standard was exceptionally high with huge depth of analysis and quality of discussion. They provoked numerous debates amongst the editors, and there were many heated discussions regarding the final selection. While we could not include every entry, we hope that these essays inform the reader and raise questions for them to ponder as they continue through their day. I hope it provides a snapshot of the topics that are of importance to young people today. The Review is split into five categories which are briefly outlined below.

The first section is Economic History, which is of supreme importance, providing a wealth of information that economists and policymakers can learn from in order to avoid the mistakes of the past. Topics cover the advancements of economic epistemology pioneered by Ricardo in the 18th century, an analysis of the inherent barriers to women in the economics field and a discussion of Adam Smith's true achievement, as a synthesizer rather than an originator of theory.

The Economic Policy section uses economic theory to address policy concerns. The essays discuss exceptionally relevant topics such as the economic impact of the EU's common agricultural policy on African development as well as the wider impact unemployment has upon an individual's health and wellbeing. Aaron McGowan receives the Dermot McAleese Medal for best overall essay for his unique perspective and extremely well thought out discussion of the possible behavioural explanations for American voters' preference for protectionism. In contrast, the next essay turns to Brazil's past to explain its consistent position as one of the worlds most closed economies today. The last essay of the section provides a comprehensive criticism of the Melzter-Richard-Robson assumption concerning the development trends in social spending.

The 2018 Review included a Behavioural Economics category for the first time. We continue this tradition as the research in the field expands at an increasing rate. The sole entry into this section discusses whether standard models of consumer behaviour can still be considered "sound" in the face of behavioural insights. The essay then fluently addresses one of the strongest criticisms pointed at behavioural economics, its inability to mathematically incorporate its insights into models.

The Applied Economics section contains four essays, applying game theoretical and econometric analysis to a notably diverse range of contexts. The first essay is a game theory analysis of OPEC's incentives to cut oil supply given the economic and political consequences of US retaliation. This links nicely with a retrospective analysis of alternative outcomes that could have arisen from the US-Russia INF treaty debacle. This year's winner of the Donagh Lynch Medal for best Applied Economics essay is Jeff Dwan O'Reilly for his econometric analysis of the economic consequences of having a stammer. The section concludes with an econometric analysis of the impact of news on intraday stock prices. The model uses vast quantities of data, and the mathematical methods used to collate and sort the data are far beyond the level of a Junior Sophister student. This is an area of intense research and interest to investment firms.

The final section is Developmental Economics which contains two essays. The first is a thorough discussion of the impacts that Ghana's continued specialisation in Cocoa production is having on its development. Arguments about real wage and producer price developments are used to conclude that the specialisation is hurting Ghana's economy. Many tout the provision of microfinance as helping the less well-off increase their incomes in developing countries. The final essay shows that while micro-finance provision may have short-run benefits, there is little evidence to suggest long-run improvements in the economic welfare of recipients.

I would like to take the opportunity to thank my editorial team; Yannik and Cillian, for their continuous hard work throughout the editing process and over the year in general. A special thank you goes out to Mustapha, our Finance Manager, who gave up his free time to assist us in the editing process.

I would like to thank the Management team for their organisation of the workshops and debates throughout the year. The Review is only one part of the SER and their work was invaluable. In particular, Luisa, our General Manager, was a steadying presence who's organization skills maintained the smooth running of the operation throughout the year. Lastly, it was through Ciarán's tremendous efforts and late nights that the review ultimately came to publication, and for that I thank him.

Finally, I would like to thank the Economics Department for their continuous support of our publication. I would particularly like to thank Dr Ronan Lyons, Dr Tara Mitchell, and Dr Michael Wycherley for honouring me with the opportunity to be involved in such a prestigious journal. Your continued advice and expertise throughout the year was an indispensable resource, and the Review could not function without you.

Without further ado, I invite you to turn the page and begin reading the thoughts of some of the brightest Trinity has to offer. I hope they engage you and raise plenty of questions to be debated around the dinner table.

Charlie Walsh,
Editor, SER Vol. XXXIII

SER Debates 2018/19

Since their inauguration in 1996, the SER debates have played an invaluable role in presenting economic ideas in an engaging and accessible format. Of particular note is the ability of the debates to attract students who are unfamiliar with economic analysis. Most audience members arrive at SER debates with little prior knowledge of the motion but they learn quickly through the enjoyable cut-and-trust of the debate format. We started the year aiming to help students better understand the importance of economics as a means of analysis for the world's most topical events. The two debates we held this term, against Oxford and Yale Universities, succeeded admirably in this regard and inevitably left the audience returning home with a smile and an improved understanding of economics – a conclusion that we, as the SER, dearly love to see.

Our vision for the debates this year was to highlight discussions of the most pertinent economical events affecting Ireland and the world. Through engaging in these discussions, we hoped that students would leave the debates with an improved appreciation for how much of an impact economics has on domestic and global problems. With this in mind, we picked motions that reflected the economic aspects of two issues that look set to dominate popular discourse for the coming years – a United Ireland and the US's protectionist economic policies. While these debates often discussed complicated and sensitive issues, we were graced by excellent speakers who combined a mix of technical knowledge with rhetorical excellence to ensure that our audience was left informed and entertained throughout the evening.

The SER would like to extend its thanks to both Trinity teams and the Oxford and Yale teams for providing such compelling debates. We would also like to thank Dr. Tara Mitchell, Dr. Ronan Lyons, and Dr. Michael Wycherley for their boundless work in ensuring the debates took place to as high a standard as possible. The quality of the debates would also not have been possible without the co-operation of the College Historical Society, in particular, Correspondent Secretary Michael-John Gillen and Auditor Catherine Kelly. Finally, we would like to extend our most heartfelt thanks to our sponsors Viney Nair, Harry Hartford and Ciaran O'Neill of Endeavor Investments, Conor Killeen and Kyran McStay of Key Capital, and Frontier Economics.

Trinity vs Oxford

On November 7th 2018, the first SER debate of the year took place against Oxford University on the motion 'This House Would Unite Ireland post-Brexit'. This motion chosen because it examined the economic reasoning behind the long-standing argument over a United Ireland in the light of recent political events in the UK. We saw this as both an incredibly important topic for people from both Ireland and the UK, but also one that would gather a lot of interest from students who would not normally attend a debate on economic issues.

On the night of the debate, the packed-out chamber demonstrated that we had been proven right in our anticipation of huge popular interest in the debate. The debaters obviously enjoyed speaking to such a large and interested audience and made the best of it by giving highly-entertaining speeches on the topic. The Trinity team, represented by team captain Mark Finn (SS Economics & Political Science), Caoimhín Hamill (SF PPES) and Ryan Grunwell (JS Economics & Philosophy), proposed the motion by arguing that a hard Brexit would change the economic conditions in Northern Ireland to such an extent that it necessitated a union with the Republic of Ireland to stop economic collapse. The Oxford team, represented by team captain Imogen Edwards-Lawrence (Classics), Justin Graham (PPE) and Xavier Redmond (Law), countered this argument by questioning the possibility that a hard Brexit is certain to occur. The high quality of both teams ensured that the debate was a hugely enjoyable one to watch.

When the last speaker had finished, the chair for the evening, Professor Gail McElroy of Trinity's Political Science Department, invited the judges out of the chamber so that they could deliberate over the results. The audience was then treated to four extremely well-spoken floor speeches given by Sophie Furlong Tighe, Nicole O'Sullivan, Harry Hogan and Hugh Murphy. These floor speeches were more light-hearted than the formal speeches given earlier in the debate and the audience clearly appreciated the entertainment.

Once the judges had returned, the chair of the judging panel Dr Alan de Bromhead (QUB) commended both teams of speakers and announced the Oxford had narrowly won the debate. However, the judges awarded Caoimhín Hamill of the Trinity team the 'Best Speaker' medal for his insightful commentary on what would happen if a United Ireland occurred. Dr de Bromhead praised the successful communication of economics that had occurred over the course of the debate and acknowledged the support that had been given to him by the other members of the judging panel; Professor Imelda Maher (UCD), Dr. Johan Elkink (UCD), Emer Hunt (UCD), and Ronan MacGiolla Rua.

TRINITY VS YALE

On Wednesday 6th February 2019, Trinity faced Yale University for its second SER debate of the year. Once again co-hosted with the Hist, Trinity proposed the motion 'This House Believes Protectionism is Failing America', while Yale spoke in opposition.

The Trinity side were represented by Ruth Lennon (SS Economics & Political Science), Nicole O'Sullivan (SF Mathematics & Economics) and Ryan Grunwell (JS Economics & Philosophy), while the Yale side was represented by Deena Mousa (Ethics, Politics, & Economics), Arun Sharma (History & Philosophy) and David Edimo (History & Economics). The Trinity side argued that protectionism forced the prices of goods and services up by reducing competition, which in turn reduced demand for goods and services. The Yale side nimbly countered this point by pointing out political benefits of the policy for countering Chinese expansion and by outlying the advantages that this policy had for American firms that wanted to protect their intellectual property.

As the judges were deliberating, the audience was treated to highly-entertaining floor speeches from Catherine Kelly, Caoimhín Hamill and Ruairc O'Leary. The chair of the debate Caitríona Perry then gave her summation of the evening's events. Her experience as RTE's correspondent to the US was apparent in her informed and entertaining take on the proceedings, in which she discussed the allure of protectionism for people whose livelihoods have been lost due to economic affairs outside their control. Her work in the field of journalism was recognised by the Hist at the end of the debate through the award of a Gold Medal for Contribution to Discourse.

When the deliberation of the judges was complete, the Chair of the Judges Dr Adele Bergin (ESRI) gave her closing remarks to the audience. The judging panel had emphasised the closeness of the debate and commended both teams for their performance. It was acknowledged that the Yale team spoke excellently on the side of the motion that many economists would think was more difficult. As a result of their handling of this challenge, the Yale team were named as the winners of the debate. The Trinity speaker Ryan Grunwell was awarded Best Speaker of the evening for his ability to engage in the Yale team's arguments. Dr Bergin then offered her most sincere thanks to everyone in the judging panel that had helped form the decision; Hamish Forsyth of Frontier Economics and Sean Prior of the Irish Government Economic and Evaluation Service (IGEES).

Following the debate, everyone retreated upstairs to continue their discussions of the debate amid the reception prepared by the Hist.

To conclude, the SER would like to reiterate our thanks to our Patrons, Sponsors, debaters and audience, without whom two successful evenings would not have been possible. We look forward to seeing the future SER debates and how the series continues to shape the discussion of economic ideas in Trinity and beyond.

Niall Maher,
Debates Manager, SER Vol. XXXIII

SER Workshops 2018/19

In addition to the publication of the annual journal review, the Student Economic Review committee organises workshops for fellow students independent from the editing work. These are held to, on the one hand foster knowledge exchange between students of different years within Trinity and on the other hand to give students the opportunity to get in touch with Economics outside of the academic context. In the period of 2018/2019, two workshops were hosted by the SER. In Michaelmas term, a workshop to prepare Senior Fresh students for the Foundation Scholarship Examination which takes place at the end of the Christmas break, was organised. A second workshop was held in Hillary term where great insight into the work of the Irish Central Bank was given by its Governor, Prof. Philip Lane.

SER Foundation Scholarship workshop

6 November 2018

Every year students planning on sitting the Foundation Scholarship Examinations are given the opportunity to learn from students in third or fourth year who exeled in the scholarship exams one or two years prior.

During the highly successful workshop this year, five Sholars that sat the exams last year kindly volunteered to present insight about the exams in the fields of Business, Political Science, Sociology and of course Economics. Besides giving more technical advice on the different papers to students, more personal study advice was also presented. With regards to this, the most important takeaway for the Senior Fresh students was most likely that while studying techniques and resource material studied may vary between students, sufficient breaks from the studying process is what allowed the Scholars to reach such impressive results.

With participants of the workshop describing it as “insightful and enjoyable” the Committee was proud to be able to continue this series of yearly workshops and hopes that the participants were able to reach the results that they aimed for.

Student Economic Review hosts Governor of the Irish Central Bank Philip Lane

14 March 2019

In March the Student Economic Review was honoured to welcome one of its past editors – the influential economist Professor Philip Lane. Luckily Mr. Lane found the time to give a lecture for students from all disciplines before taking on his new position as the Chief Economist of the European Central Bank in Frankfurt. While studying economics at Trinity, he also served as the Editor of the SER 1990 edition. After finishing his undergraduate he received his doctorate in Economics at the Harvard University in 1995 with the title "Essays in International Macroeconomics". Following that, after some years at Colombia University as an Assistant professor and at UCD, he returned to Trinity as a Professor of International Macroeconomics before being appointed to the Irish Central Bank.

Professor Lane introduced his talk by linking his current policy decisions back to similar arguments he already presented in his essay publication of the 1989 edition of the Student Economic Review. Thus, he followed – moderately seriously – that the key knowledge one needs for most policy decisions is laid out in most good introductory economics textbooks. Apart for some nitty-gritty and modelling work, by thoroughly studying the first-year textbooks, one would already be able to work with most of the toolkit needed for economic policy decisions.

After a short introduction to the central bank Eurosystem with one core central bank and national central banks which are especially important in countries such as Ireland due to the relatively large financial sector, he commenced his lecture with a defence of the monetary union. While touching on the positive aspects of a shared central bank as a safe harbour, he also impressively countered the argument of beneficial national currency flexibility by emphasising the common economic and financial shocks that small countries might be disproportionally hurt by. Ireland and Iceland were given as examples and he discussed how Iceland's ability to devalue its independent currency actually contributed to a deepening of the financial crisis by further bloating its banking system and causing widespread inflation.

During the rest of the lecture, great insight into current macroprudential policies such as the Counter-Cyclical Capital Buffer (CCVB) was given by Prof. Lane. Moreover, he repeatedly pointed out the importance of credible macroeconomic policy in order to enact effective countermeasures to adverse economic developments. While he stated that a balanced budget "sounds great", policy must go beyond that in times of a boom to be able to make beneficial use of Keynesian economic policy once a downturn occurs. However, he also acknowledged the political difficulties this would entail.

Another key takeaway came through Mr. Lane's emphasis on the non-linearity of wage growth and the unemployment rate, followed by the case study of the revenue windfall allocated to an increased government spending shock.

All attendants seemed amazed by the clarity and simplicity with which Mr. Lane was able to describe the main macroeconomic policies within a presentation of just fifty minutes. Students were so fascinated by the talk that an informal question and answer session even took place outside of the venue after the event ended.

We would like to once more thank Professor Lane and his office staff for being so helpful and making this fantastic event possible.

Yannik Obelöer,
Assistant Editor & Workshops Convenor, SER Vol. XXXIII

Unequal Equilibrium: the Historical Foundations of Gender Inequality in Economics

Amy McGourty, Senior Sophister

In a world where female voices are still often not heard, Amy McGourty analyses the gender inequality present in the subject of Economics. She examines discrimination inherent in economic theory, in access to economic institutions and in method of analysis. This paper shows strikingly that the subject of Economics still has a long way to go to be fully inclusionary. Moreover, it shows that the subject would benefit from the positive effects of more equal access and inclusion.

Introduction

Neoclassical economics has been the subject of debate in recent decades, as commentators, academics and the public seek to understand the relationship between phenomena such as recessions, unemployment and inequality, and the dominance of the strand of economics theory that has enjoyed primacy for over a century: neoclassical economics. The emergence of neoclassical economics in the late 19th Century is often seen as a turning point for economics both professionally and academically, with many of the developments still forming the bedrock of economic scholarship today – from the widespread use of calculus, to the concept of marginal utility. But the adjustments were not universally positive, as this essay will demonstrate.

Some of the changes that distinguish neoclassical economics from its classical ancestors were enacted by Alfred Marshall and others to establish and consolidate economics as a respected scientific discipline, and indeed it can be said that this aim has been fulfilled. However, the effect of these changes on women in the discipline and in society at large are generally ignored. This essay will demonstrate that Marshall's actions in the broader context of neoclassical economics have hampered women's standing in the economics profession – through theory, access and method.

This paper will use the standard sociological definition of a profession, that is, a common set of theories, a commonality of educational attainment, and the existence of a professional body or representative organisation (Pescosolido, 1991), and take neoclassical economics to mean the body of theory emergent in the late 19th century which focuses on (among other things) individual or firm behaviour and the optimisation of utility or costs within the parameters of rational choice, asymmetric information and resource constraints. Thus, this paper will proceed in three parts: historical context, description and women's responses; and will demonstrate that actions taken over a century ago to consolidate economics as a respected, empirical, expert discipline have impeded gender equality within the economics profession and continue to do so today.

Neoclassical Economics in Context

Economics, or political economy as it was known in the 1890s, was a microcosm of Victorian society, with most economists at the time (and indeed today) being white, middle class men. This homogeneity was not coincidental: women were defined solely by their capacities as mothers and home-makers, but this unpaid labour which brought about social reproduction and the creation of the future workforce was classified as leisure at the time and, like today, not included in calculations of national product (Pujol, 1992).

Victorian morality can be understood as a strict code of social conduct, advocating sexual restraint, rigid gender roles, and a low tolerance of crime and cruelty (Merriman, 2004). Most relevant to this essay is the prevailing gender roles and norms during the Victorian era, which dictated that men and women should conform to rigid ideals and operate in 'separate spheres,' stemming from the concept of the pater familias, whereby the husband acted as head of the household, while his wife undertook to be obedient, caring and loyal, and to ensure the proper moral upbringing of the children, with no economic activity or involvement beyond that. This role was enshrined in law, whereby married couples were deemed a singular entity represented by the husband and with no property rights extended to married women (Perkin, 1979).

It could be argued that to hold economic thought from the 1890s to account using contemporary notions of equality and egalitarianism is not only reductive, but futile also. However, this argument does not capture the actual situation in economics. To brush inequality under the carpet of 'anachronistic analysis' would be to do a disservice to women both then and now, especially since several thinkers had expressed progressive views on gender equality in the 19th Century. The most notable of whom was John Stuart Mill. In his 1869 essay, 'The Subjection of Women', Mill noted that women need not occupy a lower social position than men, and that to argue that this was the natural order of things was false: "There was a time when the division of mankind into a two classes, a small one of masters and a numerous one of slaves appeared, even to the most cultivated minds, to be a natural and the only natural condition of the human race," (Mill, 1869, p.21). The views espoused by Mill were exactly those opposed by Marshall and other neoclassical economists of the day, and it is at these discriminatory elements of early neoclassical theory that this paper will begin its argument.

Threefold Discrimination

INEQUALITY IN THEORY

Early neoclassical human capital theory was inherently discriminatory towards women through an essentialist interpretation of human ability. Reflective of gender norms of the time, Marshall lent an economic argument to the entrenched gender differences in Victorian society. Arguing in Book IV of his Principles for a gendered division of labour, he made several suggestions to the benefit of an industrial, capitalist society and the detriment of women. He distinguished between material capital (machines, factories, equipment) and labour, due to the special role labour has in the production of material wealth, arguing that the former is accrued primarily investments made by parents in their children's education (Marshall, 1920). As such, Marshall proposed a gendered division of labour: women working in the home, caring for present and future workers and men engaging in paid work outside the home. He vehemently opposed the employment of married women, while failing to question the economic feasibility of single income households – expecting women to happily contribute to men's productive capacity while receiving no direct remuneration or status in return (Pujol, 1992). For those women who chose or were forced to work, Marshall implicitly advocated for a lower wage than that paid to men, in order to prevent the further 'injurious' rise of women's wages and diminution of their household duties (Marshall, 1920).

Feminist scholars emphasise both the exclusionary and androcentric nature of neoclassical economic theory, arguing that many of the assumptions underpinning neoclassical theory are also those which underpin the subjugation of women in the economy (Ferber & Nelson, 1993). Regarding the standing of women in economics, the link between Marshall's opposition to women in the profession and his theory of human capital is certainly clear. Not only does the theory provide the basis for his exclusion of women from the workforce, in that domestic work was regarded as essential to the production of the human capital of tomorrow, but he also succeeds in cementing gender-essentialist views in the minds of his readers. There are countless examples of gender stereotyping in his work. Given that Marshall's Principles were the pre-eminent economics textbook for decades, the effect that his views had on the young minds reading them should not be underestimated.

The interplay of gender and class in early neoclassical theory is worthy of discussion. Although contemporary scholars regard the unpaid caring and domestic work carried out mostly by women as being vital for economic output and deserving of recognition in the national income accounts (Folbre, 2006), Marshall was of the view that such work was not productive and therefore should not be included in any account of the national dividend (GNP), while the wages earned by domestic workers should be counted (Cunningham Wood, 1996). This differentiation between unpaid labour carried out in a household that arguably could not afford to hire staff, and the same labour carried out for a wage in a middle- or upper-class household reveals a stark class bias. This bias entails that the activity only becomes valuable when it is recognised as such by bourgeois households, not by virtue of the activity carried out by the woman. Further bias is visible in Marshall's veneration of middle-class childrearing and housekeeping practices, with blind preference shown to the concerted cultivation of middle-class children. This ignorantly normative stance is clearly contradictory of the empirical, scientific approach which Marshall claimed to advocate, as the paper will go on to demonstrate.

Methodological Discrimination

The reconfiguration of economics away from discursive, deductive methods and towards the empiricism employed in the natural sciences represents the second dividing line between neoclassical economics and its classical forebears. Marshall (1920, p.781) argued that if economic analysis was to adequately represent the phenomena it examined, it should adopt scientific methods grounded in empiricism and inductive reasoning but that there was "no room in economics for long trains of deductive reasoning".

This redirection of economics towards quantitative methods deserves consideration from a gender equality perspective, not because men or women possess 'essential' characteristics by virtue of their sex or gender, but because Victorian era norms dictated that men would enjoy better access to higher education than women and engage in the majority of paid work. If an individual is to be exposed to and acquire these research methods, that would need to happen through education or on-the-job training (in the case of accountants for example), neither of which were in ample supply for Victorian women. Furthermore, femininity in Victorian times was associated with gentleness, passiveness and emotion, while bravery, hardness and rationality were deemed masculine, a definition that is also well aligned with the stereotypical description of science at the time (Perkin, 1978).

Against this backdrop, Marshall sought to associate economics with rationality and objective scientific fact; a respected profession teeming with experts, and he viewed the empirical approach as the best way to achieve this end. If expert, professional status was to be achieved for economics, it certainly could not be associated with femininity. Thus, women were automatically deemed unsuitable for the profession and unceremoniously excluded from the professional association – the Royal Economic Society.

Unequal Access

The Royal Economic Society and the associated Economic Journal were established in response to increasing demand for economics to be demarcated as an academic subject in its own right. Prior to this, economics was taught alongside other subjects in moral science, and by professors with no formal training in the discipline. The move was reflective of broader trends in the late 1800s which saw several associations and journals established, and in turn these came to represent the hallmarks of an established and respected discipline (Hey and Winch, 1990). Given the breadth of theoretical approaches and critiques of accepted wisdom emergent in economics in the 1800s, it is no surprise that there was demand for such institutions.

Subsequently, the Economic Journal was established, with Francis Ysidro Edgeworth taking up the position of editor. It was envisaged that the Journal would facilitate economic discourse in Britain through the characteristically "British love of fair play and free speech, but also Economic in the character … which the term suggests of specialist knowledge and scientific accuracy," (Edgeworth, 1891). Although Edgeworth in these opening remarks states that voices from all schools of thought and political persuasions would be considered, the mention of specialist knowledge and scientific accuracy demonstrates the newfound demand for formal academic qualifications.

The admission of women into the newly founded Royal Economic Society and Journal was vehemently opposed by the upper echelons of economics in Britain (Preston, 2018). This served to compound existing inequalities, barring suitably qualified or talented women from obtaining positions in the academy, given that formal publishing had come to represent the archetypal seal of achievement and a requirement for university posts. Of course, the economic rationale behind male opposition to women entering the Royal Economic Society and from being published in the Journal is clear: competition for a relatively small number of positions was already stiff, and those already 'in' the discipline had an interest in maintaining the relative bargaining power of their labour and consequent high wages. An increase in competition in the form of female applicants could only spell relatively fewer opportunities and lower wages for men, and so it made sense to exclude women.

Women's Achievements Despite Discrimination

Despite the significant obstacles faced by women seeking a career in academia, let alone economics, three women in the USA forged successful careers around the turn of the century. While these women were American, it appears that similar barriers were faced by British women. Although women were admitted to the University of London in 1868 and to Cambridge in 1869, it would be decades (1947 in the case of Cambridge) until they could fully graduate, rather than receive a university certificate. A similar story is reflected in the USA, where the defeminisation of universities through gender segregation was prominent, and only three women had been conferred with PhDs in economics by the turn of the 20th Century (Hammond, 1993). Despite the barriers they faced for entry into economics, countless women made strides in the fields of social justice and academic disciplines other than economics.

None of the three female PhDs was able to secure a permanent position in academia, let alone in economics. While Hannah Robie Sewall's Theory of Value Before Adam Smith was sufficiently highly regarded to be published by the American Economic Association, she failed to obtain a permanent professorial position and instead worked as an Assistant in Political Science, a role created specifically for her, and office assistant at the University of Minnesota. Similarly, Sarah Scoville Whittlesey successfully defended her PhD at Yale at the age of 26, and although she taught several undergraduate courses on a temporary basis, she never secured a permanent position (Hammond, 1993). Furthermore, the topics studied by female economists tended towards education, labour markets and related topics in sociology. This underperformance is attributable to discrimination in a broad sense, but also to its manifestation in the marriage bar applied by many institutions. According to Rossiter (1982, p.195) women were expected to "vacate their positions once they married, and those already married were not shown equal opportunities". Even in female-only colleges, this bar was in place, while male staff in such institutions were "expected to be married" (Rossiter, 1982, p.15).

In contrast, the third female economist to secure her PhD in the 19th Century, Helen Bates, joined the settlement house movement, a significant outlet for educated women. The first houses were established in 1889 by a group of Smith College Graduates in New York (Hammond, 1993). The movement emerged in response to rapid industrialisation and the consequent increase in immigration and poor standards of living and offered a broad range of services from childcare to education (Koerin, 2003).

In Britain, the prognosis for women hoping to eke out a career in economics was similarly negative. However, the career of British economist Joan Robinson is often heralded as a major success story given the breadth of her contributions to economic theory, most notably Keynesian and Marxist theory and Cambridge Capital Controversy (Cohen & Harcourt, 2003). Perhaps it is Robinson's successes which highlight the discrimination she faced, in that she failed to receive a Nobel prize despite being an eligible candidate and was only granted a professorship in Cambridge in 1965, the year her husband retired (Lotha & Sampaolo, 2018).

Objectively, the four women mentioned achieved great successes academically and also contributed to their communities in the case of Helen Bates and the other 'settlement women'. However, their stories beg the question: how further would they have progressed in a more equal society?

The current position of women in economics would suggest that the influence of Victorian gender norms and Marshall's actions are still present. The most recent report from Committee on the Status of Women in the Economics Profession (2018) finds that women remain a minority in academia, from PhD candidates to professors, and the higher up the tenure track, the lower the representation of women. The Committee also found that women appear to drop from the career ladder around the time of promotion to tenured associate, which appears to be unique in economics. Even at a more fundamental level, the fraction of women choosing to major in economics at undergraduate level is decreasing, and the share of women entering economics PhD programmes has not increased in the last 20 years, neither of which bode well for the future of gender equality in the discipline.

Clearly, something has gone wrong in economics, not only to bring about such stark divisions in subject matter, but to make the discipline fundamentally unattractive to women.

Conclusion

To conclude, the gender divisions we see in the economics profession can be traced back to early neoclassical economics. This essay, demonstrated that the advent of neoclassical economics contributed to the poor representation of women in the economics profession in three ways: in theory, in access to the professional body, and in method. While the weight of responsibility for this gender gap should not rest solely at any individual's feet – inequality and discrimination are too complex, and it is the responsibility of every generation to make progress - it is only by casting our minds back to the origins of the ideas we take for granted that we can understand the biases within them. While Marshall's Principle's and indeed other bodies of theory contained stark examples of prejudice, and the barring of women from the Royal Economic Society was blatantly unjust, it is my estimation that the neoclassical redirection of economics towards the mathematical and scientific approach rather than accepting a broad spectrum of research methods has had the longest-lasting effect on the economics profession, given that the archaic norms reflected in Principle's and by the early years of the Royal Economic Society are broadly dismissed today.

But does it really matter if men produce the bulk of the work in the economic canon, once the work is done? Disregarding the inherent importance of equal opportunity and representation, yes – studies have shown that women make different policy decisions to men. A recent study has found women were less likely to agree with measures related to austerity, and more likely to favour environmental protection than men (May, McGarvey & Kucera, 2018). Intuitively, individuals of different genders are bound to have different lived experiences to bring to the table, and surely any increase in the diversity of opinion can only enhance debate. With this diversity in mind, there is significant scope for future research taking an intersectional approach to this question, considering not only gender but also its interaction with class, ethnicity, sexuality and ability.

Fundamentally, if economics claims to study human behaviour, it should fully include voices from all of humanity, not just 49% of it.

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How Adam Smith's Lack of Originality Led to the Founding of Economics

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Adam Smith is often referred to as the Father of Economics, and to many, this logically means his ideas were the first of their kind in establishing the economic discipline. Luke Hosford refutes this claim and clearly shows that the ideas of Smith were rooted in the theories of earlier economists, including William Petty and David Hume. Luke goes on to outline how Smith's real genius wasn't in his originality but in his ability to synthesise the ideas of others to create a coherent whole. By organising its theorems and providing a hard border to the discipline, Political Economy could finally be recognised as a science.

Introduction

The Irish economist Liam Delaney described in a Kilkenny speech that "It is hard to say Adam Smith invented economics, but he was definitely the last person to invent it" (Delaney, 2018). Smith may not have discovered the concepts and ideas of political economy, but he did establish political economy as an academic discipline. He synthesised a great many ideas of his predecessors and grounded them in a natural law philosophy of the individual.

Defining an academic discipline as internally cohesive, but externally valid fits Biglan's Classification of an academic discipline along Hard/Soft and Life/Nonlife lines (Stoecker, 1993). I argue Smith gave the discipline a hard border, creating a body of theory that satisfied most in the discipline, through his ability to synthesise others' arguments in an internally coherent whole. His basis in individual motivations grounded political economy in a broader life science, making it externally valid at a time when this philosophy and method was popular, during the Scottish Enlightenment. I argue that Smith laid the foundation for future studies in political economy, independent of political or special interests and motivated by the quest to explain theories of value, distribution and competition through an economic science.

Roncaglia (2006) and Backhouse (2002) agree that Adam Smith founded economics as a science. Others, like Rothbard (1995), disagree as to his influence, but nonetheless, Adam Smith's legacy cannot be disproven. Answering who founded the discipline is important to trace the lineage of concepts we study and methods we use in investigating economic problems today, to see if the past can shed light on an issue previously misunderstood. Modern theories of value, distribution and equilibrium can be tested in older economists' theories to see if their thoughts are relevant. It is also important to ascertain who came up with these ideas, to ensure their methods set a good precedent and that subsequent developments were not influenced by ideology or special interests.

This essay argues that key ideas of William Petty and David Hume appear in Smith's work, but Smith's genius lies in his synthesis of these ideas into a coherent whole, that was popular with readers and inspiring to economists. Through his principles of sympathy, (which can be traced to David Hume's work) and self-interest, these individual emotions led to a general theory of the economy and a consistent discipline is seen in the Wealth of Nations (WoN). Whether these influences have been positive or negative is not for discussion, my point is that it was Smith's synthesis of predecessors' ideas that caused these changes and avenues of discovery.

1. Petty's Labour Theory of Value and Surplus

A major part of Smith's economics derives from the labour theory of value, which is seen explicitly in Petty's work. Petty's conception of wealth included stocks and flows, a durability hierarchy - money being the most durable - and providing output as the core meaning of wealth (Aspromourgos, 2008). These are seen in Smith's writings.

The importance of labour in Petty's determination of wealth is explicated through his calculation of national income. He hypothesized that it is made of human and non-human wealth, and that the inequality between national expenditure and income from non-human wealth can be explained by labour and its income (Murphy, 2009). He was the first advocate of an income tax, promoting the reallocation of resources away from labour, which induced inequality, and into land.

However, his lack of interest in exploring these macroeconomic opportunities he uncovered meant they went unexplored. He was not motivated to develop the field of economics. Due to his landholdings, he was interested in supporting a regime that had land interests at heart. Despite the lineage between this and Smith's Labour Theory of Value, Smith is given the credit for its foundational effect in political economy. It was part of an effort to make the field more cohesive, worthy of study in its own right and not motivated by special interests or policy agendas. With Petty, the only justification was that it helped him and his landowning friends.

In addition, Petty was one of the first to adopt a surplus approach to the subjects of production and distribution (Aspromourgus, 1996). He believed taxation was possible due to the surplus created within society. His concept of real value was defined in terms of the excess labour employed above the required labour needed to undertake a task. This was not an active theory of natural price.

This distinction between output and necessary input is the basic concept of surplus. If labour consumption was greater than subsistence, more people would become involved in the production of this good. There would be less labour time for other purposes, so part of this surplus labour was used to produce the extra consumption for workers. Smith's work on surplus does not advance this position much further. He had a concept of surplus theory of rents, seen in his distinction between productive and unproductive labour, and his ranking of industries according to their surplus created. Without a profit theory of surplus, Smith cannot be considered superior to his predecessors when it comes to surplus theory (Aspromourgus, 1996). He integrated the manufacturing industry into his production theory and placed capitalism at the centre of his distribution theory by including a rate of profit on capital (rent) as part of normal production costs. In doing this he popularised the idea of a surplus approach to value due to the predominance of the capitalist class at the time (Aspromourgus, 1996). Smith's model of the economy of markets is founded on his general theory of surpluses (Allais, 1992).

2. Why Smith?

Smith's work had much in common with his predecessors', so what is it about Smith's writing that makes him the founder? I've shown how his Labour Theory of Value was not new but contained original interpretations and synthesis. The popularity of the WON came from the method and organisation he brought to political economy. His natural law philosophy posits a positive view of human nature that differed with his predecessors and put the individual at the centre of his economic theory. These factors led to his economic influence that would lay the foundation for the discipline for years to come.

2.1 External Validity – The Theory of Moral Sentiments

Much of the WoN's success is explained by the grounding of his economic theory in a wider philosophy of human science, particularly natural law philosophy, which places the individual at the centre of his analysis. Previously, focus was on the objective nature of human socio-economic relations. Smith brought a subjective theory of motivations. His positive view of human nature highlighted how large-scale human cooperation and coordination can improve the situation of the poorest members of society, contrasting the Hobbesian and Lockean view of humans as combative and individualistic. His theory of individual behaviour is outlined in a ToMS and built on in WoN. The role of sympathy, self-interest and their combination explained key economic concepts, such as the 'invisible hand'. These emotions create the moral rules for a society and placed obligations on the state to protect them.

2.2.1. Sympathy

Smith's sympathy was his "cement of society" (Macfie, 1959) and based his economic theory on this social bond. Smith's conception of sympathy can be traced to David Hume. They both saw it operating at two levels – individual and society - and saw the desire for praise as intrinsic to human nature. They both sought to answer the question; how to base the moral rules of a society in human emotion if feeling is subjective and cannot lead to objective moral rules? They recognised the need to find an objective basis for moral judgment (Morrow, 1923). Hume found this in sympathy, as it communicated sentiments between individuals and transcended subjectivity. It was based upon individual feelings as they are influenced by other citizens' feelings towards their actions. While Hume saw a direct link between sympathy and motivation for moral rules, Smith added an original contribution by combining sympathy with reason. This is the 'impartial and well-informed spectator' (Macfie, 1961), the normative principle for the phenomena of individual sympathies. It personifies the permanent, universal, rational phenomena of sympathy in every individual. This is concern for the opinion of others when deciding how to act. It is an act of imagination that becomes habit through repeated interactions with fellow humans' praise or criticism (Levy & Peart, 2004). Smith's vision of sympathy was closer to how a commercial society could survive, as it allowed for the 'deceptions' of the economy to cause people to act in their own self-interest. This self-love was benefitting society, through the 'impartial spectator'. This 'impartial spectator' role gradually builds up to form a system of moral rules and customs for a society. It allows for selfish people to exist in a society together, as we never view our own actions without bias (Backhouse, 2002).

Sympathy allows for commercial society to prosper, despite members of society not showing affection for each other. This was a sound, individually motivated answer to a key emerging question of the day. Due to the selfish bias of individuals, they often need guidance as to where to direct their actions. Moral rules provide the backbone to this economic and political structure of Smith's, preserving the liberty and freedom of individuals. While his conception of sympathy is like that proposed by Hume, Smith's is united with reason in the operation of the 'impartial spectator'. This highlights Smith's originality in interpreting others' ideas. Sympathy's interaction with reason acts to create social institutions. As Macfie (1959) outlines, without sympathy, reason would be powerless, and without the 'impartial spectator', sympathy is useless. Social institutions are formed through this reflection of sympathy in public opinion.

2.2.2. Self-interest

However, Smith knew that concern for others' expectations was not enough for the functioning of a commercial society, as seen from this excerpt of Book 1 of WoN:

"It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages."(Smith, 1776)

This outlines the self-interest causing the economy to run according to his principles. The pursuit of self-interest leads to outcomes benefitting society (Roncaglia, 2006). He pointed out the complementary nature of the self-interest of individuals and moral rules in the sound operation of public life in a commercial society. This brought economics into the fold of social science. The ethical theory present in ToMS is often called the 'deceptive' theory, where the 'deception' of wealth and pleasures may be vain, and pursuit of them selfish, but these 'deceptions' find justification in the 'harmonious movement of the system'. The pursuit of wealth and material gains serves society by informing other members of society what is useful, appropriate, good. People's actions may be guided by faulty or undesirable motivations, but their gradual operation can be changed and formed by social experience, and eventually form social institutions (Macfie, 1959).

The role of the 'invisible hand' is related to self-interest and sympathy. The 'invisible hand' controls individual conflicts and the excesses of competition and safeguards the public good through healthy competition of free individuals in a market (Macfie, 1959). This theory is akin to a viewpoint of 'moral sense philosophers' who believe in a 'moral sentiment'. His theory of the 'invisible hand' leaves out the assumption of benevolence as it ran contrary to common sense. People serve the collective interest because they are guided by self-interest. This natural law philosophy played a significant role in the birth of classical political economy, and scientifically justified civil society, independent of a state power (Screpanti & Zamagni, 2005). This was different to the Macchiavellian and Hobbesian views that civil society begins through repeated acts of obedience. Smith is more optimistic about human nature and grounds his theory in a broader scientific and philosophical paradigm.

The reaction of economists across Europe following Smith shows the optimism he created with his new science (Screpanti & Zamagni, 2005). People like Godwin and Condorcet realised they were speaking the same language and had similar ideas. Smith created a theoretical homogeneity, and almost all economists making original contributions were working within one of Smith's components of thought. How this internal cohesion was created is examined next.

2.3 Internal Consistency – The Wealth of Nations

Writing just before the publication of WoN, in 1771 Verri noted how political economy was close to becoming a science, all it needed was method and organisation of its theorems (in Aspromourgos, 2008). This demand was met by Adam Smith five years later. The internal consistency Smith brought to the study of political economy is foundational on the scope of the discipline for future generations. Smith owes a lot to French economists of the 18th century, but his main achievement was his linking of theories together. It was a work of synthesis, not originality. He recognised general concepts and bases of modern analysis, paving the way for future investigations.

The absence of an ideological slant to his work can partly explain this impact. Before, there was a policy issue or special interest involved in the motivations of thinkers, including Petty. This work only served those interested in economics. He criticised government intervention and provided a theoretical justification for the classical liberal ideology that would dominate Europe (Allais, 1992).

The fundamental principle Smith believed government should act on was to protect the liberty of individuals. This underlines his passion for liberty and freedom. The central theme of Smith's work made him a forerunner of modern economic analysis (Allais, 1992). This core was, economic freedom and the operation of a decentralised commercial economy are necessary conditions for a prosperous economy and economic development. This concept motivated economists at the time and for many years. While his ideas were not original, he avoided the errors of his predecessors (Allais, 1992). Smith's work covered more subjects and ideas, fine-tuned the thoughts of previous writers, and grabbed the attention of various economists. He was the first to unite the discipline through a set of common ideas and practices. It was a motivating work that drew the discipline closer.

Conclusion

Smith may not have been the most original economic writer, but he effectively synthesised the ideas of many authors – including Petty and Hume which I have shown here. His original interpretations - such as combining Hume's sympathy with reason to conceive of the 'impartial spectator' - led to the development of a coherent internal method and organisation which the discipline had not seen before. His economic theory was grounded in a moral philosophy stressing the importance of individual behaviour, which was valued in human science circles at the time due to the influence of the Scottish Enlightenment. His interpretations inspired future economists, from Ricardo and Marx, to 20th century economists and started debates the subject had not experienced. While his ideas may have spawned theories that would later prove inaccurate or misleading, the legacy of his conceptions and syntheses are indisputable. Future work can examine whether this legacy was positive or negative to the development of the subject. Nonetheless, it was a perfect storm that led to the fame of Smith's writing, cementing his place in the foundation of Political Economy as an academic discipline.

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Ricardo's Essay on Profits and the Emergence of a Rational Economic Methodology

Aaron McGowan, Senior Sophistor

In this paper, Aaron McGowan presents an assessment of the economic epistemology demonstrated by David Ricardo in his 1815 Essay on Profits. The Essay, which argued against the Corn Laws, introduced a higher level of analytical discussion into the field of political economy. While later economists would criticise Ricardo's models for lacking an empirical basis, this future discourse was concerned with measurable economic quantities – the tools Ricardo worked to introduce. While Ricardo's Essay should not be interpreted as a linear progression in economic thought, it is a notable example of the introduction of deductive methodology to economic reasoning

Introduction

The idea of a 'turning point' or 'revolution' in economic thought presents a challenging epistemological question before one even begins to reference the works of a specific individual. As a body of knowledge, economics does not exist in a static state of known and unknown information where progress is the success of thinkers in lessening the divide between these two positions. Economies change and evolve over time as political and natural forces dictate. However, this does not invalidate the idea of progress in economic understanding. An objective economic reality does exist. The economist must dismiss postmodernist suggestions that there is no correct economic methodology or that theories are simply subjective while remaining conscious of the dynamic nature of his field of study. Ricardo's early works display an attempt to maintain this balance through the introduction of a rational, quantitative methodology to political economy. While Ricardo's model in the Essay lacks much of the dynamic sophistication familiar to theorists writing after the Marginal Revolution, it is nonetheless a notable example of how political economy turned from a focus on moral philosophy to uphold its findings against claims of subjectivity and against fundamental changes in the nineteenth-century economy.

To assess Ricardo's contribution to economic thought, Section 2 begins by defining a set of criteria to understand how challenges to prevailing theories can occur. Section 3 builds on this to determine how Ricardo's Essay broke away from the moral philosophy of Adam Smith. Ricardo's quantitative, deductive development of Classical ideas justifies his status among those who altered the course of economics. In this vein, Section 4 proceeds by assessing Ricardo's Theory of Distribution and his dichotomy between rent and profits as an early stage theoretical model, intended to make simplified economic predictions in response to policy decisions. Finally, Section 5 concludes.

The Dynamics of Change in Economic Thought

The frontispiece of Denis Diderot and Jean d'Alembert's eighteenth-century catalogue of the Enlightenment, the Encyclopédie, personifies Reason as a noble lady unveiling Truth (Outram, 1995). This image of reason cutting through ignorance exemplifies the ultimate standard for economic thought. However, the path to this realisation is populated with debate over methodology and assumptions, which confuse any attempt to define a singular theory of what constitutes a revolution in economic thought. In the early nineteenth century, a theory could rarely be judged by its empirical power alone simply because the resources necessary to do so did not exist. Yet, one should not dismiss early economics as an era of thought lacking any revolutionary moments. On the contrary, this paradox illustrates the importance of separating actuality from potentiality in the study of economic thought. Many early thinkers, including Ricardo, made their contributions through well-reasoned theories which, although lacking in an empirical base, would provide the theoretical and methodological foundations on which later schools could build. Thus, a realistic first condition for classifying a detour in economic thought can be established by focusing not on a theory's initial empirical contribution alone but on its capacity to challenge prevailing consensus by introducing what Schumpeter termed a "pre-analytic cognitive act" – locating a problem which could eventually be determined by later, more empirically adept, schools (Roncaglia, 2005).

Furthermore, a new theory can pose a challenge to consensus by introducing new methods of analysis to older or more established schools. The development of economic thought is not unidirectional. Ricardo demonstrates this, taking inspiration from David Hume to formulate his new theory of profit determination while still challenging the philosophical methodology of Smith's 1759 work, The Theory of Moral Sentiments (Roncaglia, 2005). Drawing on a more modern illustration, the emergence of the New Keynesian School in response to the Lucas critique exemplifies this application of new methodological assumptions. The nominal rigidities of the old Keynesian macroeconomic model remained intact but were turned towards a greater foundation in micro-based concepts of individual optimisation (Snowdon & Vane, 2005). Thus, the second suggested criteria for classifying a turning point in the history of economic thought is the introduction of new methodological tools. Focusing on locating an economic problem rather than empirically proving its existence and the introduction of new methodological innovations therefore provides a basic framework for analysis in a period where many of the benchmarks of modern economic theory did not exist.

The Break from Moral Philosophy

One of Ricardo's most significant contributions to economic thought was to detach the subject from the moral philosophy favoured by Adam Smith. Smith's method of inquiry was first clearly demonstrated in The Theory of Moral Sentiments (1759). While Smith was not isolated from the influence of the philosophes and their metaphysical applications of Newtonian physics, he found himself unable to reconcile theories of human action in economic affairs to any mechanical or mathematical system. Instead, Moral Sentiments demonstrates Smith's understanding of man's actions as driven by 'passions' and 'interests' (Roncaglia, 2005). Even the idea most often associated with Smith – the role of self-interest in economic decisions – could be described by altruistic factors such as a concern for the feelings of others rather than selfishness alone (Smith, 1759). Thus, an a priori element of Smith's thought centres on the role of the individual acting according

> Were it possible that a human creature could grow up to manhood in some solitary place, without any communication with his own species, he could no more think of his own character, of the propriety or demerit of his own sentiments … than of the beauty or deformity of his own face. (Smith, 1759)

to some natural determination of their 'passions' (Linden, 1969). In this epistemology, such 'passions' were determined largely by the individual's environment.

As the above quote from Moral Sentiments illustrates, Smith saw human action as a product of society and ultimately, moral philosophy – the force he saw as driving human behaviour. Ricardo's Essay challenged this methodology, introducing a more logical, mechanical approach to the dynamics of economic interaction. Unlike Smith, Ricardo demonstrated a limited tolerance for questions of 'sentiment'. In fact, the empirical approach of the Essay suggests the influence of an earlier Scottish philosopher – David Hume. Ricardo avoided moralist interpretations of economic interactions, arguing that the scope of human morality was likely unknowable (Cremaschi & Dascal, 1996). This form of "Humean Scepticism" permeates the Essay as Ricardo demonstrates a cautious approach to moral behaviour. Thus, to strengthen his analysis, Ricardo adopts a methodology that is value free, a methodology that does not rely on moral knowledge. A clear example of this approach is Ricardo's description of no-arbitrage profit equalization. Central to the Essay's description of how profits are eroded by increases in

> …when the profits on agricultural stock, by the supposition, are fifty per cent the profits on all other capital, employed either in the rude manufactures …. will be also, fifty per cent, (Ricardo, 1815)

rent is the assumption that profits, or returns to capital, in one sector will equal the returns to capital in another sector in the long-run.

Ricardo derives this dynamic in logical, deductive terms. A deductive approach formulates a general statement or hypothesis and proceeds to derive logical conclusions from this assumption. In Ricardo's case, the assumption is the no-arbitrage condition – the theory that no difference in fundamental return or profits can exist simply due to a misallocation of resources. If profits in manufacturing were fifty percent, then any greater return on capital in agriculture would lead capitalists to re-allocate their resources until profits in both sectors were equalised (Cremaschi & Dascal, 1996). Supporting this theory is not an assumption on the moral behaviour of man but an understanding of rational action. According to Samuel Hollander, this form of Ricardian thought reflected an "approximation to contemporary business reality" and the actual behaviour of capitalists in early nineteenth-century Britain (Hollander, 1987). Having worked for over thirty years on the London Stock Exchange, Ricardo was far better positioned to understand the rationale of the markets than Smith or his contemporaries (Roncaglia, 2005). Thus, Ricardo's methodological process was based not on assumptions regarding man's moral behaviour but an understanding of the realities that governed business decisions.

A Dynamic Model for Profit Analysis

Post-1817 opinion recognised this Ricardian shift in methodology. After Ricardo's death, the logical abstractions demonstrated in the Essay and his other works became a frequent target of criticism with Simonde de Sismondi describing them as "speculations" and Jean-Baptiste Say complaining that such methods suffered from weak empirical foundations (Hollander, 1987). However, many of these criticisms were excessive and while his methods did break from those in the Wealth of Nations, Ricardo was consistently aware of the limitations of his approach. His parliamentary colleague Lord Brougham believed Ricardo spoke as "if he had dropped from another planet", yet, Ricardian models were both innovative and comprehensible enough to offer a limited yet useful predictive power.

The core of the Essay comprises of a dynamic model illustrating the effects of population and economic growth on rents and profits. Ricardo was concerned not simply with understanding overall welfare or accumulation but with the distribution of profits. The Essay demonstrates this by modelling a steady-state economy producing wheat with plentiful agricultural land (Ricardo, 1815). Given this, Ricardo performs a simple calculation of profits which can be described by equations 1.1 and 1.2 below. Identifying capital employed as both fixed in buildings and implements and "circulating" in labour $K(\alpha, w*L)$, profit ($\prod$) is determined from the residual value (v) by calculating the initial value of wheat (V) after these "outgoings belonging to cultivation" have been deducted.

$$v = V - K(\alpha, w*L) \qquad 1.1$$

$$\prod = vK(\alpha, w * L) * 100 \qquad 1.2$$

Profits can then be calculated as a percentage return on the capital invested (1.2). Introducing growth into this model, Ricardo describes how increasing population pressures are likely to raise the value of wheat (V) in the market while putting downward pressure on wages (w) as labour becomes less scarce. Provided productive land is still abundant, this dynamic increases profits to capitalists. Even in its preliminary stages, this model is a clear demonstration of Ricardo's deviation from earlier economic methodology as he focuses on the proportional returns to factors of production rather than gross output. Nevertheless, quantity and cost factors remain exogenous as Ricardo follows Smith's assumption that outputs will be subject to the "natural course of things" and do not need identification within his model (Kurz, 2017). While this limitation has been used to demonstrate the "Ricardian Vice" of creating overly-simplistic models, this view is based on dubious grounds of historical teleology. It is hardly challenging to critique Ricardo's model with the hindsight of the marginal revolution – nowhere does the Essay provide first order conditions for profit maximization or allow a game theoretical scenario for the determination of output. However, such criticism is asinine. As described in Section 2, Ricardo's model satisfies the conditions for introducing new methodological tools and the foundations of a dynamic model of analysis on which later more quantitatively adept economists could build (O'Brien, 1981).

This becomes clear as Ricardo introduces the rent-profit dichotomy. Postulating a growing economy, where wheat is produced solely within domestic borders and there are no advances in agricultural technology, increasing population growth is likely to bring into cultivation land which has a higher capital input requirement for a given output quantity. Ricardo rationalised this within a simple framework. If land surrounding the original settlement has become scarce, to sustain a growing population, agricultural lands further away must be cultivated thus incurring a higher capital requirement in the form of horses and labourers to transport wheat (Ricardo, 1815). Here, wages are assumed to be constant as a comparative static analysis is applied where only capital requirements are increased. This additional capital lowers the profit on a given quantity of wheat in the distant lands as rent emerges. Providing a numerical example, Ricardo states that on original land, initial capital has a value of 200 bushels of wheat and nets a residual value (v) of 100 bushels at a 50% profit. However, with a 10 bushel equivalent rise in capital costs, this return declines as capital now accounts for 210 bushels, resulting in a 90 bushel residual value as market prices are assumed constant. Therefore, returns on the newly cultivated land are 43%. Assuming no-arbitrage, the producer must face the same profit opportunity on the nearby and distant lands. Thus, as the original land returns a profit of 50%, rent of

7% will be paid on this land to reduce profits to 43%. The wheat farmer on the distant land will therefore receive the same net profit as if they were to cultivate the original land and pay rent. Rent therefore acts as an equalizer for profit rates across capital intensity differences. Under this dynamic, rent and profits invariably oppose each other.

> ....in a progressive country, rent is not only absolutely increasing, but that it is also increasing in its ratio to the capital employed on the land. (Ricardo, 1815)

> ...at a later period, every accumulation of capital will be attended with an absolute, as well as a proportionate diminution of profits" (Ricardo, 1815)

Rent emerges in this model as land well-adapted to cultivating wheat cannot be procured at the same rate of capital intensity on an increasing scale. As a solution to this rent-driven profit erosion, either the variable costs of labour (wages) must fall, allowing the farmer to cultivate the distant land at the same profit level and compensate for the increased transport costs, or new market access must be provided such that the need to cultivate the distant land never arises in the first place. It is on this latter point that Ricardo hinges his opposition to the Corn Laws which proposed tariffs and import restrictions on grain in Britain. Thus, the Essay presented a new model explaining potential economic outcomes in a deductive framework. While Ricardo's approach remains largely logical rather than empirical, his methodology drove a shift in economic thought where debate over policy was determined not by discussions on man's moral incentives but a rational, more mechanical model of action and consequence.

CONCLUSION

Under the framework presented in this paper, Ricardo altered the course of economic thought towards a more mechanical method of analysis. Even if the Essay demonstrates a 'Ricardian Vice' of oversimplification and lacks an empirical base, the tools presented by Ricardo were to form the very language of criticism for later thinkers. Thus, Ricardo provided the epistemological foundations for a more quantitative form of economic thought – a legacy that directed economics towards the discipline recognisable to scholars today.

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Turning Against Trade: Explaining American Appetite for Protectionism

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The U.S, once a champion of free trade, has made a stark turn toward protectionist policies under the Trump administration. In this paper, Aaron McGowan examines why sections of the electorate have gained such an appetite for protectionism, despite a wealth of economic theory outlining the detriments of such policy. He first outlines that while theory does exist pointing to increased wage inequality stemming from free trade, its effect is minimal and cannot explain the extent of voter preferences. Instead, he suggests that voters preferences for protectionist policies can be explained by incorporating employment preferences into consumer utility functions. Through voters' loss aversion, the potential downside of unemployment is weighted heavier than the potential benefits from free trade. The role of welfare programmes as a safety net in an open economy is also examined to determine how the U.S. welfare system may contribute to voters willingness to support or resist free trade policy

INTRODUCTION

Barack Obama's 2014 State of the Union Speech to Congress outlined a proposal to lower trade barriers between the U.S. and Europe. The following year, the president again emphasised the benefits of free-trade, arguing that access to larger and more economically diverse markets would benefit American workers (Irwin, 2015). However, on both these occasions, leaders from across the aisle in the Senate and the House dismissed the president's requests and voiced their opposition to any further "job-exporting free trade agreement[s]" (Irwin, 2015). Explaining this political opposition, one can either focus on the role of lobby groups in U.S. politics or examine the voting preferences of individual citizens, as influenced by their economic conditions. However, in the current political environment, where populist policies have gained traction in the United States and globally, understanding why workers feel so hostile towards trade, and elect officials to voice these views, has become a more pressing question. Thus, this essay will focus on the role of individual voter preferences in determining political opposition to free trade.

As O'Rourke and Sinnott (2001) have highlighted, existing economic literature has generally attempted to explain political divergence from trade theory within a rational choice framework. Politicians supply policies to the public based off a demand grounded in economic conditions. Under this model, it becomes increasingly difficult to reconcile the outcomes of recent national elections with the real effects of trade in the U.S. over the long run. Individual voters choose a political bundle that overweights trade policy relative to the real economic effects these policies have on their income. Low-income American workers demonstrate this phenomenon – voting for candidates who support economic nationalism alongside a platform aimed at reducing welfare benefits and redistributive policies (Colantone & Stanig, 2018). If a decline in wages could be attributed predominantly to trade effects, then this support for protectionist policies would be an understandable political outcome. However, to explain political hostility to free trade, it is necessary to look beyond measures of wage inequality in isolation and to consider the wider economic context in which voters value these changes.

Thus, Section 2 presents a critique of the Stolper-Samuelson theorem applied to the relative distribution of wages between skilled and unskilled workers in the United States. While historical data illustrates a reduction in the proportion of wages received by low-skill workers, as Krugman and Lawrence (1994) demonstrate, the magnitude of this decline attributable to trade is, on average, negligible (Krugman & Lawrence, 1994). Section 3 proposes a solution to explain why workers may choose to support protectionist policies even when trade has no net effect on their income levels. Concepts from behavioural economics are applied to voter decision making. Section 4 further argues that voters perceive a strong welfare state and benefits system as a hedge against any economic losses that could occur from removing trade restrictions. Finally, Section 5 concludes.

Section 2: Stolper-Samuelson and the Wage Divergence Puzzle

Upon first inspection, the Stolper-Samuelson (SS) theorem appears to offer a robust explanation for popular opposition to free trade. A framework capable of connecting growing wage inequality to trade provides a rational explanation for why voters may choose to elect protectionist representatives. However, only a fraction of the wage divergence predicted by the SS theorem can be attributed to trade effects. Operating in the Heckscher-Ohlin (H-O) universe, where countries export goods which intensively use the abundant factor of production, the SS theorem implies that wage inequality should grow when an economy opens to trade (Stolper & Samuelson, 1941). Modifying Stolper and Samuelson's original model[1] to examine an economy with two factors of production – unskilled and skilled labour – this relationship can be derived empirically. Increasingly, unskilled labour constitutes the scarce factor of production in the United States. From 1992-2016, the proportion of U.S. workers with a Bachelor's Degree followed an upward trend while the proportion of workers who did not complete high school fell below 10% in 2004 (U.S. Bureau of Labor Statistics, 2018). Thus, according to the H-O model, the U.S. should export[2] goods or services that are skill intensive and import unskilled labour-intensive products (Wood, 1995). Where two products exist, A, which intensively uses unskilled labour (U), and B which intensely uses skilled labour (S), the aggregate labour supply, economy wide relative demand, and relative supply $\underline{U}/\underline{S}$ (of unskilled labour are shown by equations 2.1 – 2.4.

$$U_A + U_B = \underline{U} \tag{2.1}$$

$$S_A + S_B = \underline{S} \tag{2.2}$$

$$\frac{U_A}{S_A} > \frac{U_B}{S_B} \tag{2.3}$$

$$\frac{\underline{U}}{\underline{S}} = \frac{S_A}{\underline{S}} * \frac{U_A}{S_A} + \frac{S_B}{\underline{S}} * \frac{U_B}{S_B} \tag{2.4}$$

Exporting good B will increase the output and relative price of this product in the U.S. market. Conversely, the total production of good A will fall. Assuming full employment, skilled and unskilled labour transfer towards the industry producing good B and the economy-wide relative demand for unskilled labour shifts towards the relative demand for unskilled labour for good B. Industry A is

1 Their 1941 paper deals with a two-factor economy where labour and capital are used to produce wheat and watches.

2 It should be noted that there is no complete specialization in the H-O model. Assuing diminishing marginal returns to factors, there is a cost to increasing specialization not present in the Ricardian model of Comparative Advantage.

unskilled labour-intensive and therefore a production decline releases relatively more unskilled than skilled workers into the labour market. This changes the relative factor proportions in the exporting industry. While the proportion of skilled labour released was sufficient to employ an unskilled labourer in the production of good A at a wage), this is not the case in industry B where there is a higher skill intensity. Where full employment is maintained, wages for unskilled workers must fall. There are not enough skilled workers entering the labour market to keep the relative proportions in industry B constant. This logic holds for any scarce factor of production in the Heckscher-Ohlin universe.

This wage divergence is demonstrated in empirical data. Figure 1.1 illustrates the gap in household income between high skill and low skill workers. Median income is used as an imperfect proxy for wages as it includes wages and transfer payments but excludes proceeds from capital gains (United States Census Bureau, 2018). Educational attainment is used as a proxy for skill. Data from 1990 onwards is not comparable due to changes in the educational attainment definitions in subsequent census years. Figure 1.1 shows the ratio of low-skill to high-skill workers' median income declining over time. This is consistent with the Stolper-Samuelson theorem where the scarce factor (low-skilled labour) sees a relative decline in its returns.

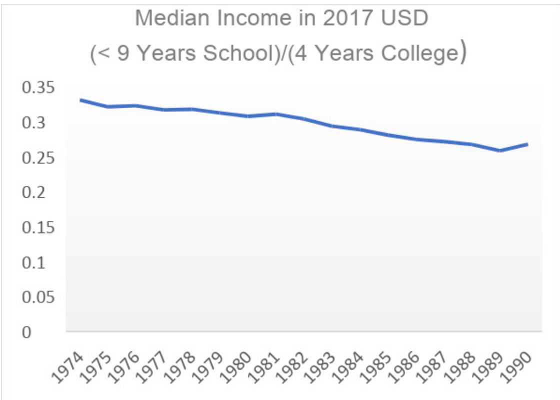

Figure 1.1

The evidence presented thus far seems to suggest a causal theoretical and empirical relationship between wage inequality and free trade. However, in reality, the Stolper-Samuelson theorem presents a puzzle rather than a solution. Krugman & Lawrence (1994) ran a simulation model allowing the U.S. current account to balance between 1970-1990. They found a downward trend in the relative size of the U.S. manufacturing sector would still have occurred, yet at a less severe rate, when trade effects were removed. They further calculated a $42 billion manufacturing value-added deficit for the U.S. in 1990. With each employee in this sector creating an average of $60,000 value-added, this corresponds to 700,000[3] U.S. jobs lost with a wage loss estimated at $3.5 billion, or 0.07% of National Income (Krugman & Lawrence, 1994). Often described as America's most vulnerable sector to openness, manufacturing losses from trade thus represent only a fraction of overall National Income and fail to demonstrate a fully trade-based explanation to wage divergence (Irwin, 2015). Krugman and Lawrence do not dismiss the role of trade in lowering unskilled wages. Yet, they reiterate the key caveat to Stolper-Samuelson – there are more factors at play than can be observed within this restrictive framework. Thus, it is necessary to widen the criteria for assessing why voters, and hence the political establishment, place so much emphasis on trade policy

SECTION 3: BEHAVIOURAL ADAPTATIONS OF TRADE THEORY

With wage divergence only partially explained by trade, the question remains as to what real economic variables form an individual's decision bundle. Voter preferences can be considered in a utility maximization framework. Subject to the constraint of one vote per person, individuals are assumed to choose which candidate to elect based on who they believe will best serve their interests. However, as Adam Smith noted in his 1759 work The Theory of Moral Sentiments, a person's interests need not be purely selfish and thus a vote may be cast altruistically and still maximize individual utility (Smith, 1759). Focusing on the economic determinants of the voter maximization problem, this section will introduce concepts from behavioural economics to explain why, if trade has a negligible direct effect on an individual's real economic welfare, they may still express protectionist views. This approach is foundational to bridging the divide between the insights of traditional trade theory and the reality of public opinion. While Alston et al. (1992) found that over 71% of U.S. economists agree that tariffs reduce welfare, the U.S. National Election Survey the same year found 67% of Americans were supportive of placing "new limits on foreign imports" (Kemp, 2007). If this divergence is to be explained, factors outside of the rational-agent framework need to be assessed.

A first approach to revising this existing framework is to reconsider how consumer welfare is measured. New Trade Theory applies consumer preferences for variety to models of monopolistic competition and increasing returns to

3 $42,000,000,000/$60,000=700,000

scale. Trade is beneficial under this model as it adds to variety and, as firms have increasing returns to scale, greater access to foreign markets allows companies to grow output at a decreasing cost level (Dixit & Stiglitz, 1977). While these models provide a robust theoretical argument for the benefits of free trade, they again fail to explain why individual voters would oppose openness when trade typically improves their utility. However, revising consumer utility to incorporate preferences for employment may offer an explanation to this puzzle. Behavioural research suggests that employment impacts utility more than the purchasing power of income (Kemp, 2007). Evidence of this has been presented by Lucas et al. (2004) where a 15-year study was conducted on 24,000 individuals' satisfaction levels. Unemployment was found to cause a negative movement form baseline individual satisfaction with this deviation not fully returning to previous levels, even when employment was re-attained (Lucas, et al., 2004). This suggests that periods of unemployment have persistent effects longer than their de facto duration. Controlling for income, unemployment is likely to carry a large negative weighting, explaining preferences for protectionist politicians even when these parties propose cutting transfer payments (Colantone & Stanig, 2018). If trade results in temporary unemployment, then the negative utility effects of these layoffs are both greater and more persistent than would be predicted under the Heckscher-Ohlin or New Trade Models. This utility modification is similar to the approach taken by Tversky and Kahneman in their 1991 paper on Loss Aversion, where the utility function is adjusted to account for greater disutility to negative outcomes. Workers endowed with employment are therefore more averse to losing their jobs than they are pro gaining trade benefits from variety or higher aggregate welfare (Tversky & Kahneman, 1991). Loss Aversion has significant implications for trade economics as it suggests that while trade may provide financial benefits, these need not necessarily be associated with positive utility gains.

Section 4: Openness and the Welfare State

As Colantone and Stanig (2018) have shown, where unskilled U.S. workers support protectionist candidates, they are frequently voting against their aggregate financial interests by choosing a representative hostile to increases in transfer payments (Colantone & Stanig, 2018). Where trade and welfare policy are independent goods, this choice seems to indicate a preference for trade protectionism over income transfers. However, as this section will argue, this phenomenon may be explained be reassessing the relationship between trade and welfare payments.

Firstly, protectionism and welfare state growth are assumed to be substitutable options to the voter. Welfare payments to citizens act as a social security net, allowing taxpayers who have become unemployed to claim a government allowance and retirees to access state pension payments. In the U.S., federal programmes take the form of food, medical, housing or energy subsidies. Government spending on social programmes therefore acts to mitigate downside risk to citizens' income and utility. Opening an economy to trade introduces this risk. Melitz's (2003) model of heterogeneous firms illustrates this risk potential. As firms are assumed to have different marginal productivities, those with low productivity will be unable to export and, even if they continue to produce for the domestic market, they will incur a decline in revenues from import competition. Only productive exporting firms can make up for this loss of domestic sales (Melitz, 2003). There is therefore a non-zero probability that trade will cause a material decline in an individual's wages or result in unemployment as these less efficient firms exit the market. Here, voters are likely to view welfare programmes as a strong safety net to guard against any of these adverse effects.

Rodrik (1998) provides empirical evidence to support this theory, finding a positive correlation between an economy's exposure to trade and the size of its government. Openness in the 1960's was a statistically significant predictor for the subsequent expansion of government spending (Rodrik, 1998). This suggests that voters are not always opposed to free trade but likely require a strong social insurance net to protect against negative trade effects in an open economy. While in theory, the downside risk from trade should be diversifiable if domestic voters hold a portfolio of international assets, as Lewis (1995) has shown, persistent domestic bias in investment patterns amplifies the government's role as a risk manager (Lewis, 1995).

Given this relationship, it is possible to rationalise voter preferences for protectionism as a means of mitigating trade risk. Free trade becomes less objectionable when voters face greater government assurances against adverse effects. If a partial loss of income, or decline in working hours can be compensated for through transfer payments and government subsidised healthcare then, within this model, voters appear more likely to accept increasing openness. This argument is reinforced when one considers the gap between U.S. and European social welfare provisions. Social expenditure as a percentage of GDP in the U.S. has historically lagged below the OECD average (OECD, 2014). Relative to GDP, Europeans spend five times more than Americans on unemployment insurance and other programs (Alesina & Glaeser, 2006). Whereas Denmark's unemployment insurance covers 90% of previous earnings for up to 104 weeks, the U.S. insures from 40% to 50% of earnings for up to 26 weeks, depending on the state. (Alesina & Glaeser, 2006) The structure of the U.S. government often makes it more difficult to achieve welfare reform. The new 116th Congress once again sees the House and Senate controlled by two different parties for the third time since 2011, rendering significant legislative change unlikely. With social welfare levels lacking in the US, this model helps explain voter preferences for protectionist policies.

Section 5: Conclusion

This paper has presented two theories to explain why U.S. voters express a preference for protectionist policies. What initially appears as a puzzling choice under traditional models can be explained in terms of unemployment aversion among workers. Further, where welfare programmes offer a safety net for the risks posed by trade, the strength of these programmes in the U.S. is likely to play a determining role in sentiment towards free trade. These arguments offer a more plausible explanation for why we observe a marked emphasis on trade in the voters choice bundle, above what theory would suggest.

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Old Habits Die Hard Import-Substituting Industrialisation and Brazilian Trade Policy

Daniel Ferreira, Senior Sophister

With protectionism being a highly relevant topic in world politics, Daniel Ferreira presents an analysis of Brazil's history to explain its position as one of the world's most protectionist nations. The paper provides a comprehensive overview of the Brazilian Import-Substituting-Industrialisation policies and how they have impacted the overall protectionist stance of the country. It finds two main justifications for the longevity – one rooted in policy-making processes and another in the negative effect an inclusion in the global supply chain might now have.

Section 1 Introduction

Magical realism is a form of storytelling pioneered in Latin America that blends reality and fairy-tales in a compelling narrative. In this spirit, this paper notes some parallels between the tale of Jack and the Beanstalk and Brazilian trade history; Firstly, both Jack's family and Brazil rely on selling livestock for their income. Secondly, both parties are known for their consumption of beans (though admittedly, not always the magical kind). Lastly, and crucially for our purposes, both have very good reason to mistrust any trade deals they are offered. Humour aside, Brazil's scepticism of free trade has underpinned the protectionist policies that have led to its position as one of the world's most closed economies today (Canuto, 2015). It begs the question, why has Brazil offered significant political resistance to free trade in the past? Furthermore, how does this affect trade policy today? These are particularly relevant questions in the aftermath of the 2018 presidential election, as the incoming cabinet faces an internal conflict between economic liberalism and military corporatism (FT, 2018). This essay argues that Brazilian protectionism was shaped by a period of successful Import

Substitution Industrialisation (ISI) following World War II, and the remnants of this rhetoric continue to shape modern trade policy. The essay is structured as follows; Section 2 offers a brief context of ISI in Brazil, from the conditions that led to its implementation to its use in the latter half of the 20th century. The subsequent sections tackle the central question of how ISI has shaped modern policy; Section 3 argues that ISI strengthened the economic and political power of key interest groups that oppose free trade, and cemented a nationalist ideology that informs foreign policy decisions; Section 4 posits that ISI prevented Brazilian integration into global value chains, thus reducing its global competitiveness and making trade liberalisation challenging. Section 5 concludes the argument.

Section 2 – Isi in 20th Century Brazil

Isi Context – Fall of an Export Economy (1880-1930)

In the late 19th and early 20th century, Brazil's economy was characterised by export-led agricultural growth. Its wealth of natural resources and favourable climate led to the role of a world-leading exporter of commodities like coffee, sugar, and rubber. Coffee was by far the most important of these, in both a domestic and international sense. Brazil supplied most of the world's coffee during this period - at its peak in 1906, it accounted for >80% of global coffee exports (Absell & Tena, 2015), which constituted >10% of GDP, and >50% of total exports (Abreu, 1994).

The coffee trade thus profoundly shaped Brazilian economic development, most notably in regards to policymaking and government finances. This was also the era of "café com leite" (coffee with milk) politics, where policy was dictated by the dairy and coffee producers in the south-east. Their desire for low labour costs led Brazil to be the last western country to abolish slavery in 1888 and to introduce government-subsidised immigration to replace this cheap labour (Abreu, 1994). Crucially for our purposes, in 1906 the government agreed to purchase surplus coffee in an effort to keep global prices high, an expense financed by state borrowing (Ribeiro, 2010).

This agrarian export dependency was severely hit by the Great Depression – at the time, the US market was the destination for 50% of Brazilian exports (Abreu, 1994). The sudden fall in US and global demand was disastrous for Brazilian commodities, and the financial collapse made government support for these industries challenging, with balance sheets already at precarious levels (Ribeiro, 2010). Brazil's dependency on (and valorisation of) coffee exports were largely at fault, leaving it vulnerable to overseas crises in demand and destabilising federal balance sheets (Brazil later defaulted on its debt in 1937). To many, 1930 was a turning point in Latin American trade, marking a change in an outward to an inward looking rhetoric . ISI was largely a response to this lack of external financing and demand.

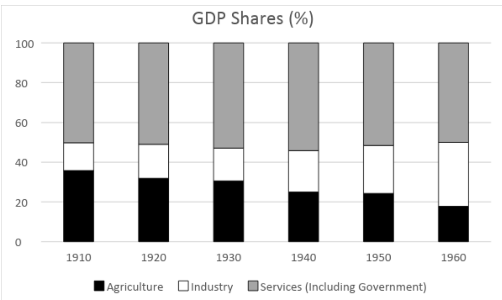
SUCCESSFUL ISI – (1930-1970)

In an economy characterised by agricultural export, the rise of protectionism overseas raised concerns about Brazil's dependence on select exports, and its underdeveloped manufacturing sector. The goal of autonomous industrialisation was thus developed for two reasons. Firstly, to increase per capita wealth - as Bergsman (1970) notes, a large and growing industrial sector is virtually a prerequisite for such growth. Secondly, to strategically reduce its dependency on trade, particularly the import of manufactured goods, in the hope of fostering economic independence from foreign interests.

Infant industry arguments were used to justify ISI – Many industries were too young to compete on a global scale, but given time to mature, they would be able to compete in future, and potentially generate knowledge spill-overs to benefit the wider economy (Feenstra & Taylor, 2011). The tools used to protect domestic manufacturing were import licensing, tariffs and quotas among others. These primarily targeted intermediate and finished consumer goods for strategic sectors, like metal products, where vertical integration gave Brazil a natural advantage (Bergsman, 1970). In particular, high trade barriers were placed on goods for which domestic substitutes were available.

ISI was largely successful in industrialising the Brazilian economy and accelerating growth, particularly in the post-war period. It managed to establish a successful steel and automotive industry, among others (Cardoso, 2009). Most of this additional manufacturing was for domestic use, given the lack of competitiveness of infant industries globally. The GDP share of industry increased significantly (Figure 1), as did GDP and GDP per Capita over 1940-1970 (Maddison, 2018).

Figure 1



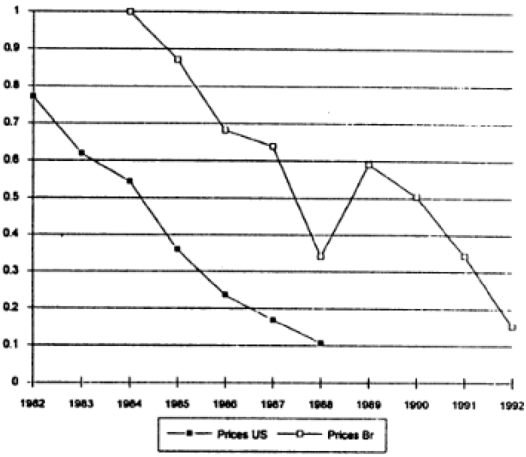
(Abreu, 1996)

ISI AFTERMATH – (1970-1990)

The success of the ISI policy was both unique and temporary. Brazil's scale ensured a sizeable market for the domestically produced goods, permitting cheaper and more diversified industrialisation than similar smaller countries (Bergsman, 1968). Veiga & Rios (2015) maintain that ISI promoted structural transformation up until the 1970's, but stalled thereafter – Nevertheless, it explicitly governed trade policy until the Uruguay round of GATT negotiations in the 1990's. Continued ISI created economic imbalances through increased debt levels in the pursuit of fully inducing competitive integration into international markets (Cardoso, 2009). Sachs (1995) further emphasises these imbalances by positing that such inward-looking policies financed by borrowing were a catalyst in the Latin American economic crises of the 1980's.

The case of Brazilian personal computers (PC) in the 1970's and 80's exemplifies the failure of ISI. PC imports were banned, and Brazilian firms produced their own, mimicking IBM models popular in the US, but using components from national suppliers (Feenstra & Taylor, 2011). Due to regulation and expensive silicon chips, Brazil was never able to produce computers competitively and match US prices (See Figure 2), the success metric for ISI. This raised costs for consumers and for Brazilian firms who required PC's for their own manufacturing. This policy was eventually lifted in 1990.

Figure 2



(Luzio & Greenstein, 1995)

The persistence of ISI could still be seen in trade liberalisation negotiations in the 1990's, as only select industries were liberalised, with traditionally insulated industries like automobiles and textiles remaining protected (Veiga & Rios, 2015). Oliveira (2009) argues that the supposed liberalisation in the 1990's was simply a necessary response to economic shocks, and did not represent a change in the ruling protectionist ideology. Regardless, the economic impact of liberalisation was promising – both Hay (1997) and Gonzaga et al (2006) observe positive results, with the former noting increased firm-level productivity and the latter finding a reduction in skill earnings differentials.

SECTION 3 – ENTRENCHMENT IN POLICYMAKING

ECONOMIC & POLITICAL INTEREST GROUPS

The Stolper-Samuelson model of trade outlines how trade liberalisation increases the return to a country's abundant factor and reduces the return to its scarce factor. In a Brazilian context, this theory suggests that liberalisation is advantageous to sectors like agriculture (i.e. the 19th century commodity exporters), and damaging to industries like manufacturing, which are more capital intensive. A period of successful ISI strengthened the economic and political power of the latter (Oliveira, 2009). Protectionism designed to encourage industrialisation resulted in large swaths of the population being employed in capital-intensive sectors (e.g. automobile manufacturing), increasing both their role in the Brazilian economy and the political influence of their owners. It thus strengthened import-competing sectors at the expense of exporting sectors, effectively entrenching protectionist measures in Brazilian trade policy. As Rogowski (1989) notes, industries with scarce factors of production tend to lobby for protectionist policies, while owners of resource abundant factors lobby for trade liberalisation. As trade liberalisation is against the interests of these empowered key groups, it is politically challenging to implement. Additionally, there are traditionally significant short-term costs associated with trade liberalisation for those inefficient industries. Their increased economic importance from ISI makes the removal of protection an unpopular option, despite the potential long term reward. This increased influence can be seen in the aforementioned trade liberalisation in the 1990's (where key import-competing sectors remained protected).

An interesting complement to the above argument was made independently by Abreu (1994). He observed that pre-war tariff levels in Brazil were already high, despite the dominance of coffee and other export commodities. This seems to contradict the above conclusion, which implies an export focus would encourage trade liberalisation. However, despite a rising cost of production in coffee as tariffs increased, Brazilian coffee exporters were minimally impacted. As Brazil accounted for most of the world's coffee, it was a price-maker – the increase in production costs was reflected in the higher price of coffee globally. Brazil's effective monopoly, combined with the price inelasticity of demand for coffee (Astorino, 2012) meant domestic policy influenced world coffee prices, and this increased cost was passed off to the consumer. This left little incentive for the export lobby to fight against protectionist policies, as occurred in other commodity exporters like Argentina (Abreu, 1994). The passivity of key export groups combined with the rising influence of import-competing industry illustrates how ISI was able to entrench protectionism into Brazilian trade policy.

Nationalist Ideology (Developmentalism)

It would be erroneous to imply that Latin American protectionism began with ISI - Coatsworth & Williamson (2002) highlight rising tariffs in Brazil during the belle époque period of globalisation, and that such policies were commonplace in post-colonial Latin America. The roots of this economic nationalism have been attributed to a myriad of factors. For instance, the historical revenue-maximising concerns for weak governments (Coatsworth & Williamson, 2002), and the belief that economic self-sufficiency is a prerequisite for true political independence (Behrendt, 1941). Regardless of its genesis, it is a rhetoric that continues to underscore modern policy decisions, and its persistence is likely a result of ISI's success over the 20th century.

It accomplished this in two ways – firstly, by tying the concept of autonomous industrialisation to the national development project, ISI made self-sufficiency in manufacturing a primary policy goal thereafter (Veiga and Rios, 2015). This link is not without foundation; manufactured goods tend to have higher margins, and the potential dynamic benefits of fostering industry could boost productivity, education, and economic growth, as seen in the comparable region of South-East Asia (The Economist, 2014). Additionally, the previous system of specialising in select agricultural exports and relying on the import of manufactured goods was shown to be unsustainable in the post-Depression era, where international trade collapsed. Secondly, ISI further cemented a distrust of foreign powers into economic policy. The scepticism of alien interests in the country was by no means novel; from colonialism to the exploitation of natural resources, Brazilian nationalism has been shaped by its desire for independence from foreign interests (Gordon, 2003). International involvement was seen as a threat to "the national project", and trade policy as a tool to neutralise that threat. ISI was thus central to this developmentalist rhetoric, furthering the industrialisation that was intertwined with economic growth at the time.

This overarching sentiment is epitomised in the "Carta Testamento", the suicide letter of President Getúlio Vargas in 1954, who pioneered protectionism and ISI in Brazil:

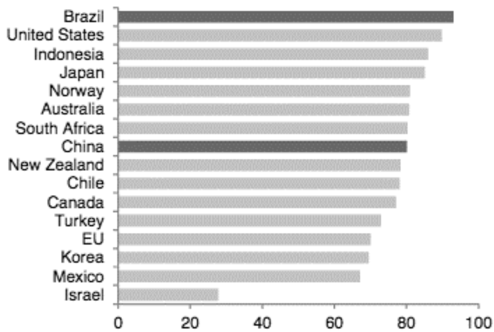
> After decades of dominance and exploitation by international financial and economic groups (...) I have returned the government to the people. (Vargas, 1954)

The letter goes on to condemn the "subterranean campaign of international groups" that opposed Brazilian ownership of natural resources, destroyed the coffee trade, and brought in fraudulent multinational corporations. It embodies the antagonism between Brazil and international forces, and its release renewed support for protectionist policies like ISI (Skidmore, 2010). The opposing political movements of the time, which favoured free trade, were thus seen as acting against the interests of the people, and foregoing national development. The prolonged era of contemporaneous high tariffs and high growth in 20th century over a period of reduced foreign influence on the economy served to reinforce this dichotomy between national and international interests.

SECTION 4 – GLOBAL VALUE CHAINS

The economic aftermath of ISI has presented significant challenges for Brazil's potential to open up trade. Perhaps the most salient of these is Brazil's lack of integration in global value chains. ISI, almost by definition, involves building a domestic supply chain in lieu of a global alternative. As a result, when the dispersion of global value chains occurred in the 1980's, Brazil was largely excluded as a result of its trade policy and high cost of business (Canuto, 2015). The resulting production chain density can be seen in the high domestic value added in manufacturing exports of 93% (Figure 5). This exclusion has hampered Brazil's global competitiveness through increased costs and reduced productivity, thus complicating trade liberalisation and fostering continued support for protectionist policies.

Figure 3



(World Bank, 2014)

The phenomenon of "Custo Brasil" (Brazil Cost), is well known among the population. The significant tariffs placed on foreign goods inflate costs – anecdotally, Brazil is the most expensive country to buy an iPhone, at twice the US price (Forbes, 2014). More broadly, "Custo Brasil" represents the high cost of doing business in the country, which encompasses regulation and costly logistics as well as tariffs. This increased cost is partly responsible for Brazil's exclusion from global value chains - it is consistently ranked among the worst countries to do business (WTO, Annual). Ironically, this very exclusion inflates costs by preventing cheaper imports for production. Brazil's aforementioned attempt to manufacture computers exemplifies this phenomenon which has considerably impacted its export sector. Empirically, Canuto (2015) has shown that Brazil has an unusually low number of exporters, with the top 25% of firms making up 98% of exports. The increased costs of production mean that only the most efficient firms are equipped to overcome sizeable export barriers and compete in international markets. This, in combination with high bureaucratic costs, results in few new exporting firms and a highly concentrated export sector (Canuto, 2015). This implies the benefits of liberalisation would be concentrated among relatively few firms unless accompanied by significant changes in regulation.

Brazil's exclusion from global value chains contributes to its comparatively poor productivity in recent years (Canuto et al, 2013). Trade openness is generally accepted to benefit productivity through a variety of dynamic mechanisms - It gives firms the opportunity and incentive to increase productivity/efficiency by offering cheaper production and more competition, and opening new markets abroad for export (Coelli et. al, 2016). Crucially, it also exposes the economy to new technologies which spill-over to other industries, and increases productivity through "learning by doing" (Arrow, 1962). Integration in international supply chains would likely reallocate skilled labour and other scarce resources to more productive activities, increasing overall productivity (Canuto et al, 2013).

ISI resulted in Brazil's exclusion from global value chains by using import tariffs to favour domestic production chains. Baldwin (2011) argues that the fragmentation of global supply chains had two main effects; it facilitated industrialisation for developing countries, and consequently, reduced the significance of industrialisation to economic development. Exporting industrialised goods was no longer the hallmark of a developed economy, but merely signified its stage on the production line. Ironically, this undermines ISI's developmental goal of autonomous industrialisation. In the Brazilian case, its continued use increased business costs, reduced the competitiveness of its export sector, and hampered productivity growth. These factors reduce global competitiveness, complicating trade liberalisation – i.e. significant change is needed, and the short term costs will likely be severe (Canuto, 2015).

Section 5 – Conclusion

There is a common saying among Brazilians – Brazil is the country of the future, and always will be. Its abundance of natural resources and geographical advantages should provide the ingredients for a thriving economy. Its consistent failure to achieve this has inspired developmentalist policies like ISI. This essay argues that ISI shaped Brazilian protectionism, and continues to influence trade policy today. The paper first illustrated the circumstances in which ISI became a useful trade policy tool, described its successful implementation, and outlined its effects in the late 20th century. Subsequently, two different explanations are offered to justify its persistence – firstly, that of entrenchment in policymaking. The period of ISI cemented the power of interest groups who opposed trade liberalisation, and fuelled a nationalist rhetoric that defines trade policy. Secondly, ISI excluded Brazil from global value chains during a crucial period of globalisation, thus making it difficult for Brazil to compete internationally. This favours the protectionist status quo by requiring significant structural adjustments and short term costs to successfully liberalise trade and reap the associated benefits. In conclusion, though ISI is not the root of Brazilian protectionism, it has undoubtedly strengthened this rhetoric in a modern policy context. It remains to be seen how the incoming government will contribute to this trade history.

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EU's Common Agricultural Policy - a Blight on African Development?

Gemma Bewley, Senior Sophister

The Common Agricultural Policy (CAP) is the centerpiece of the European Union's agricultural policy and is arguably their most protectionist programme. In this essay Gemma Bewley analyses whether this system, designed to support EU farmers, has had external consequences on the economic development of African nations. She does this through the application of three trade theories before turning to the empirical evidence to further support her argument.

Introduction

In order to determine whether the EU's agricultural trade policies has had an adverse impact on African development, we must first examine what the agricultural trade policies of the EU consist of now and what they have consisted of in the past. our analysis must not be limited to tariff barriers but also non-tariff agricultural policies implemented by the EU as these can be highly restrictive and costly to less developed countries. We will then consider these policies in the context of the international trade theories and determine what these theories predict for the implication of EU agricultural trade policies on African migration. The theories of international trade that will be addressed are the Ricardian model, the Specific Factors model, the Heckscher-Ohlin model and the Stolper-Samuelson theorem. We must analyse the numerous case studies and reports from various African countries and see if the expectations that arise from the theories of international trade are witnessed in African communities. Finally, we must address the arguments in defence of the EU and their agricultural trade policies before concluding whether those policies have been significant push factors in African migration to the EU.

What Is The Eu's Agricultural Trade Policy?

The EU's current agricultural trade policies have been evolving as part of the Common Agricultural Policy (CAP) since its introduction in 1962. The main ambitions of the CAP are to support farmers and rural communities across Europe. For years, the CAP has been seen as a highly protectionist piece of legislation which heavily distorted international agricultural markets to the benefit of large farm owners and food producers in Europe. Some of the protectionist policies implemented over the years up to 2013 included import tariffs which inhibited entry into the European market for other countries and subsidies which resulted in European farmers receiving a guaranteed high price for their produce while the world price was lowered as a result of surplus European production. Over time, the tools used to achieve the goals of the CAP have progressed to become fairer for farming communities around the world. For example, in July 2013, the export subsidy rates set by Europe were reduced to zero (Matthews et al., 2016). However, the EU continues to apply tariff rate quotas (TRQs) which see a certain amount of imports enter the EU at a low 'in-quota' tariff and the surplus imports enter at a higher 'out-of-quota' tariff. According to Matthews et al. (2016), more than 20% of agricultural imports enter the EU under a tariff rate quota.

Non-Tariff Agricultural Policies

As trade barriers in agriculture all over the world have declined with each World Trade Organisation (WTO) meeting, non-tariff measures (NTMs) are becoming increasingly more influential in directing international trade. NTMs include sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT) which are put in place to achieve various public policy objectives. The measures that are required to be taken to comply with NTMs are often costly and can put foreign competitors at a disadvantage (Matthews et al., 2016). Bertow and Schultheis (2007) show that as agricultural products from Uganda can be exported to the EU duty- and quota-free it is non-tariff barriers like SPS that are more inhibiting to export growth. They say that in Uganda, improving the SPS measure of the quality of a product is costly as Uganda has few inspection units and none of the four laboratories in Uganda are recognised internationally as testing centres (Bertow and Schultheis, 2007). Keijer and King (2012) argue that food safety and SPS measures can have a discriminatory effect on less developed exporting countries as they raise the costs of trading considerably. However, Matthews (2017) argues that many of the obstacles facing Less Developed Countries such as the difficulties in meeting and certifying food safety standards are their own responsibility yet the EU is helping them to overcome the various barriers with initiatives such as 'aid for trade'.

Some of the aims of the 'Deep and Comprehensive Free Trade Agreements' (DCFTAs) that the EU is negotiating with North African countries is to tackle non-tariff barriers, to guide the liberalisation of services industries, and to align the regulations for the production of goods with respect to labour rights and environmental standards of North African countries with those of the EU (Langan, 2015). However, some political analysts of the region predict this type of liberalisation may destabilise the economic foundations of these countries and deepen the political tensions and social inequalities. There are also concerns that further liberalisation in these countries will see the regions manufacturing sectors be undermined by competition from Europe, like the agricultural sectors have been in the past (Langan, 2015).

What Do The Classical Theories Of Trade Present?

In order to understand what the consequences of the EU's agricultural trade policies are, we begin by looking at what the models of trade theories predict. To begin with, the Ricardian model of trade proclaims that each country's comparative advantage determines the flow of trade between countries. A country has a comparative advantage in producing a good if the opportunity cost of producing it domestically is lower than the opportunity cost of making it in a foreign country (Feenstra and Taylor, 2014). The distribution of subsidies to European farmers under the CAP distorted the market of certain goods for many years and this would have eliminated the comparative advantages that some African countries would have had naturally from endowments such as the climate or the higher availability of land. The Ricardian model asserts that the utility to each country from engaging in trade is at least as high as it would be in autarky, which implies that engaging in trade never makes a country worse off. According to the Ricardian model of trade, a country's wage level is determined by its absolute advantage, which is the amount a country can produce with its labour. This is why countries with highly advanced technological capabilities still import goods from countries that have less advanced technology because the lower productivity levels in those exporting countries will appear in the form of lower wages and ultimately in lower prices. As we would expect European countries to have higher levels of technology and more advanced capital resources we would expect them to have higher wages than many African countries, and thus we would expect African food products to be cheaper to import for Europe. However, as we have seen, the CAP imposed tariffs on agricultural imports into the EU for many years and subsidised EU exports which completely altered the effect from the differences in wage levels.

A country's terms of trade are the ratio of its export prices to its import prices. Higher export prices or lower import prices result in higher terms of trade which is beneficial to workers as it implies higher real wages (Feenstra and Taylor, 2014). As EU subsidies led to the reduction in overall world prices for many agricultural goods, foreign consumers would pay less for importing them and thus increase their consumer surplus. These lower export prices result in a fall in the EU's terms of trade. The EU also experiences consumption and production losses, and these are not offset by the increased consumer surplus experiences by foreign countries, thus, on the whole, there is a deadweight loss for the world. Feenstra and Taylor (2014) argue that the overall reduction in welfare across the world as a result of these inefficient reallocation effects are reflected in a lower GDP level for Europe, as well as in the reduction of the EU economy's purchasing power.

The Ricardian model tells us that overall there are gains from trade so some individual or entity must be better off as a result of trade taking place. However, in order to determine the effects of agricultural trade policies on African economic development, we need to go beyond the Ricardian model and determine who is not better off as a result of the changes that occur in relative prices because of trade.

The Specific Factors model examines the returns to labourers, landowners and capital proprietors. In keeping with the predictions of classical economists, the Specific Factors model concludes that in the short run, factors of production that cannot move between industries and are in an industry competing with imports will lose the most from trade. Thus, in an import-competing industry which opens up to trade and then experiences a reduction in the relative price of its good, there will be a knock-on effect in reducing the real earnings of the specific factor of that industry. Conversely, export-focused industries which see an increase in the relative price of their goods after opening to trade also see a rise in factor earnings (Feenstra and Taylor, 2014). One of the assumptions this model makes is that there are two industries, manufacturing and agriculture and that labour is mobile between them meaning there will not be dramatic changes in wages when one industry does better than the other from trade. However, it seems unlikely that labour is mobile between these industries as they require very different skills that take time to learn. So, in reality, we can expect there to be significant changes in the wages of the two industries when they open to trade.

As farmers in African countries will receive lower world market prices for their produce as a result of the market intervention by the EU through the CAP, they will experience income loss and unemployment as their farms may go out of business if they cannot compete with such low prices. As we have said, the reality of moving from the agricultural to the manufacturing industry is unlikely to be easy, and those that are left without work may see little future for themselves in the domestic job market. This could lead to large scale migration, further reducing the productivity and innovative capacity of the country's workforce. In fact, McKeon (2018) finds that much of the migration to Europe from West Africa is rooted in decades of policies which have left rural communities impoverished as smaller producers failed to compete with prosperous exports. While in North Africa, Langan (2015) estimates that the ad valorem tariffs of 26% on fish and fish products and 20.8% on fresh fruit and vegetables have prevented the creation of 115,000 jobs in Morocco and 66,000 jobs in Tunisia.

Moving to a long-run framework where labour and capital can move between the industries without restrictions, we look at the Heckscher-Ohlin model. This model predicts that a country will specialise in exporting the good which uses the factor of production most abundant in that country more intensively and will import the other good and so, the relative earnings for the factor used in the production of the exports will increase. The Stolper-Samuelson theorem says that when the relative price of a good increases, the earning of the factors used in making the good will move in contrast with one another. Taken as one, the Heckscher-Ohlin model and the Stolper-Samuelson theorem predict gains for the abundant factor of production and losses for the scarcer factor of production when a country opens to trade (Feenstra and Taylor, 2014). The Heckscher-Ohlin model assumes technology levels are the same across countries which in reality is not true. When we account for trade-distorting appliances such as export subsidies, the most abundant factor of production of a country becomes redundant in the face of such low prices so the predictions of the Heckscher-Ohlin model and the Stolper-Samuelson theory, with respect to the most abundant factor of production, are not expected to be found in the case of trade between the EU and countries in Africa.

Evidence From Case Studies

The extent to which the CAP impacts countries in Africa depends on the different economic, trade and poverty characteristics of each African country (Boysen et al. 2016). Some African countries may be net exporters of agricultural products and thus be negatively affected by the CAP while others may be net importers of agricultural products, thus benefiting from the impact of the CAP.

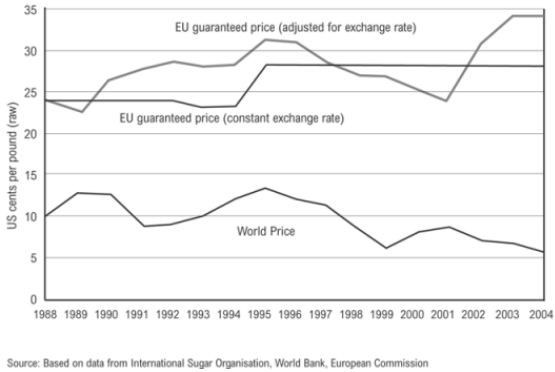
Within countries that are net importers of food, the poorest members of society may be net sellers (McMillan et al., 2006). Clearly to understand fully the effects of the CAP on the different communities in Africa we will need to examine various case studies.

In Cameroon, frozen chicken from Europe flooded domestic markets in the late 1990s at prices as low as €1.44 per kilo, which local producers could simply not compete with. An organisation known by its French acronym ACDIC meaning, Citizens Association for the Défense of Collective Interests, selected a random sample of 100 poultry farmers in 1996 and found that by 2002 only 8 of these farmers were still in business. As prices dropped so sharply, farmers could no longer cover their costs nor pay back outstanding loans. They found the fall in production of poultry farming had a knock-on effect resulting in job losses for the producers of chicken feed and local butchers. Overall, it is estimated that 120,000 jobs were lost as a result of this crisis (Aprodev, 2010). Senegal reduced their tariffs on chicken imports from 55% in 1998 to 20% in 2002 which resulted in local chicken farmers having to compete with a rise in frozen chicken imports from the EU. Organisations representing agricultural producers estimate that since 2002, 70% of poultry farms in Senegal have closed down because of the competition from subsidised EU exports (Dupraz and Postolle, 2013). The scale of job losses in these regions of West Africa is dramatic as they show the near total ruin of a sector of the agricultural industry where workers may not have many transferable skills and so end up in long term unemployment and poverty.

For many years, the EU has been accused of dumping its annual surplus of approximately 5 million tonnes of sugar overseas through the CAP system of direct and indirect subsidies. In 2004 the EU was estimated to be spending €3.30 in subsidies for every €1 worth of sugar exported (Oxfam International, 2004). Large export subsidies and high import tariffs resulted in a wide gap between EU guaranteed sugar prices and world market prices. Graph 1 illustrates the difference between the guaranteed price received by European producers and the world markets price between 1988 and 2004. The Everything But Arms (EBA) agreement allowed LDCs to sell Europe a volume of sugar equal to 1% of their total annual consumption. Mozambique and Ethiopia were allowed to sell a combined total of 25,000 tonnes to Europe in 2004 which is less than what just 15 of the largest sugar farms in Norfolk, England produce in one year. Oxfam International (2004) estimated the costs of restriction for three African countries, Ethiopia, Mozambique and Malawi, from the beginning of their EBA agreement with Europe up to 2004 at $238 million. Overall, they estimated that for every

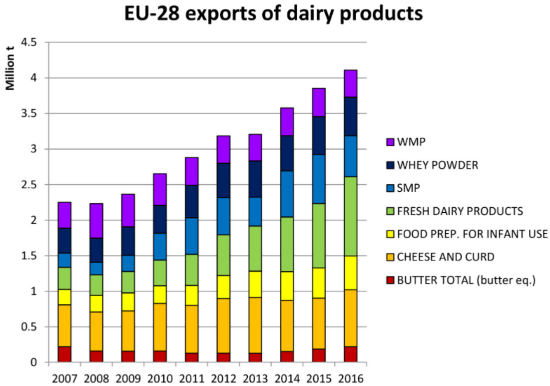
$3 Mozambique received in aid from the EU, they lose $1 due to restrictions to the European sugar market. In 2009 the EU gave partnered countries under the EBA agreement duty-free access to export.

Graph 1. Source: Oxfam International



In 2009 there was a slump in dairy prices across the EU which led to the re-introduction of export subsidies. Many have argued that this led to the dumping of dairy products in developing countries. A USDA review of the European dairy sector found that exports of skimmed milk powder (SMP) grew 63% in 2010, this growth can be seen in Graph 2 (Engel and Klavert, 2011). In 2014 Russia enacted an embargo on European food and agriculture products which put pressure on European dairy producers to find demand for their produce. As seen in Graph 2 exports of skimmed milk powder increased again in 2014. Livingstone (2018) reports that large European dairy multinationals expanded into West Africa after the 2009 dairy crisis in Europe and ship skimmed milk powder to the region and then transform it into liquid milk. Senegal's dairy association, FENAFILS, say that local milk producers struggle to compete with global firms such as Danone, Arla and FreislandCampina and the region is at risk of completely losing the local industry (Livingstone, 2018).

Graph 2. Source: European Commission



THE EU'S DEFENCE

The European Commission believes there are many exaggerations made about the persistent effects of the CAP on the developing world. They point to a number of other possible causes that could result in the reduction of domestic agricultural production in developing countries. Some of these causes include government policies, supply chain issues, animal or plant health issues, e.g. avian influenza (European Commission, 2018). They also acknowledge that there are other large countries, such as the United States, China or Brazil who may also impact the domestic agricultural production of the developing world.

In the case of dairy products in Africa, the European Commission claims that African production of skimmed milk powder does not meet the demand. They point to the differing self-sufficiency rates across Sub-Saharan Africa from 79% in Malawi to 39% in Nigeria (European Commission, 2018). Furthermore, the trade agreements, or EPAs, that Europe has with many partner countries in Africa allow the partner countries to declare 'sensitive' agricultural products which they can protect from liberalisation. This results in whole sectors of the agricultural industry being excluded from the EPA entirely and ensuring local production is not hampered by competition from European imports. Finally, the European Commission argues that Europe is, in fact, the largest importer of agricultural products from Least Developed Countries (LDCs). Their imports in 2017 amounted to €3.5 billion which was more than the combined value of all imported agricultural goods from LDCs to the United States, Canada Russia, China and Japan (European Commission, 2018).

Engel and Klavert (2011) also argue that many developing countries do not want EU exports to become more expensive as they provide cheaper alternatives for consumers and depress inflationary pressures. This explains why prior to the EU completely scrapping export subsidies in 2013, many developing countries kept their import tariffs low despite disadvantaging the agricultural sector. As a counterargument to this perceived benefit of providing cheap food to consumers of developing countries at the detriment of their domestic agricultural producers, Bertow and Schultheis (2007) argue that these countries will always be vulnerable to external food price fluctuations. Without a strong domestic sector, developing countries may become dependent on the agricultural industries of their importers.

CONCLUSION

It is clear that with each passing of another WTO meeting, the EU's CAP has been evolving substantially. Export subsidies are no longer in use and most low-income countries and all LDCs can now export to the EU market duty-free (Matthews et al., 2016). Despite this, Goodison (2007) describes the future of Africa as being determined by its trading relationship with Europe. Goodison reflects on how Africa has been defined by Europe in the past, through the slave-trade and colonialism, to how, in recent times, Africa has suffered from market outcomes which have been shaped by Europe's CAP. Goodison argues that the EPAs currently in place have left Africa dependent on Europe as they pressured African countries to open up to trade and embrace liberalisation. Under EPAs, the European Commission prioritises the idea of regional trade and trade within African regions has increased since they have opened trade with Europe, but it is often in the form of re-exports and thus it doesn't benefit regional producers (Goodison, 2007). However, it is also clear that consumers often benefit from EU exports, regardless of the negative consequences for the agricultural industry. Overall, consequences that limit the ability for growth in value-added areas of the agricultural sector are negative as these are areas in which growth would be beneficial to the development of a country's economy.

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An Analysis of the Meltzer-Richard-Roberts Assumption

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Rising inequality is an issue that has plagued modern society for generations. In this paper, Navika Mehta provides a comprehensive critical analysis of the Meltzer – Richard – Roberts Assumption, that rising inequality will lead to greater redistribution of social spending. This has been widely used to explain the rise in social spending in the 20th century. However, the paper argues that voting behaviours, elite influence, concepts of social mobility and fairness, and the irrational human nature disproves the real-world application of the assumption. In doing so she shows that social spending is impacted by a myriad of factors that cannot simply be reduced to rising inequalities.

Introduction

In an interview with the Rolling Stone Magazine on his book The Price of Inequality, Nobel Laureate economist, Joseph Stiglitz explained that "High levels of economic inequality leads to imbalances in political power as those at the top use their economic weight to shape our politics in ways that give them more economic power." (Bernstein, 2012). He asserts that in the United States, outcomes of political processes seldom reflect the interests of citizens. The problem of 'asymmetric information' and disillusioned citizens is also highlighted as a contributing factor that enables the use of economics for political agendas. Having said that, equality is a pillar of democracy but inequality is a fact of life. Democracies help in providing equal opportunities to all citizens; including equality in the form of universal suffrage, in front of the law and through the absence of discrimination based on race, religions, sexual orientation, gender, class etc. Essentially, democracies across the world have seen rising inequalities and in particular, income inequality. In short, the rich are getting richer and the poor, poorer. Through recessions and depressions, social movements like the Occupy Wallstreet have attempted to highlight this inequality with slogans like – "we are the 99%".

That said, the idea of inequality and demand for support from the state is a contemporary issue. Meltzer, Richard and Roberts give the assumption that rising inequalities will lead to greater redistribution or social spending (Meltzer and Richard, 1981 & Roberts, 1977). This essay attempts to refute this assumption and show that although this makes sense in theory, in reality, it does not apply. It begins with explaining the Meltzer-Richard-Roberts assumption in detail and evaluates how it is used to explain the rise in social spending during the 20th century. It then gives three main arguments against this theory. Firstly, it highlights the importance of turnout in an election and elite control influencing who the median voter is and thus the outcome of the elections. Secondly, it shows that the idea that economic growth will lead to increased redistribution because of high inequalities does not apply in the developing world. Finally, it evaluates the role of the concept of social mobility and individual beliefs about 'fairness' that go beyond economic interests and influence people's choices. Hence proving that the Meltzer-Richard-Roberts hypothesis is, essentially, flawed in reality.

The Meltzer-Richard-Roberts Assumption

A highly influential prediction about income inequality and redistribution, based on the Median Voter Theorem was given by Meltzer and Richard. The model, known as the Meltzer-Richard Model emphasizes how elections are important in ensuring social and economic equality (Meltzer & Richard, 1981). They use the Median Voter Theorem, which shows that with universal suffrage and majority rule, the median voter is the decisive voter (Roberts, 1977). They also use studies regarding the distribution of income to show that the income distribution is skewed to the right, i.e., the mean income lies above the median income, in order to prove their argument. The assumptions are that there is a unidimensional policy space, that is redistribution, and all citizens are paying a flat tax rate that is used to finance this redistribution. Moreover, all citizens receive the same tax transfer and they are voting for their preferred tax rate. The implication of their hypothesis is that the distance between the mean income and the income of the decisive voter (median voter) is what determines the size of the government. With a skewed income distribution as mentioned above, there are more people earning income lower than the mean income, which incentivises greater redistribution of income financed by incomes of higher earning citizens. This implies that higher taxes and redistribution lead to a reduction in the incentive to work in the first place, thereby lowering income and increasing inequality (Meltzer & Richard, 1981).

They set out a static model, that individuals chose between consumption and leisure and this choice is dependent on the tax rate and the size of transfer payments. This tax rate and the size transfer payments further depend on the voting rule and income distribution. Essentially, their argument follows two main assertions. First, income inequality determines the amount of redistribution. Second, the greater the inequality or distance between the median and mean income, the greater will be the redistribution or social spending. This implies that in a general equilibrium model, the government has only two functions of redistribution and taxation (Meltzer & Richard, 1981). If the budget is balanced and voters are fully informed, the decisive median voters' choice is what determines the size of the government. They explain that voters earning below the median voter will prefer higher taxes and greater redistribution while those earning above the median voter will prefer the opposite. Thus, as mean income rises relative to the median voter income, taxes will also rise. Roberts gives an argument that is similar in essence. He explains that the marginal tax rate chosen by majority voting will be the highest possible due to the fact that if the median voter earns less than the voter with the mean income and income distribution is skewed, then people with low income will prefer a high tax rate (Roberts, 1977). The overall argument is used to explain the rise in social spending in the 20th century.

AN EXPLANATION FOR THE RISE IN SOCIAL SPENDING

Meltzer and Richard use their argument to explain the rise of social spending in the 19th and 20th century with the rationale that as the number of voters earning below the mean income increased, it shifted the median voter position and increased redistribution and taxation. They also connect this to economic growth leading to greater inequality and therefore to greater redistribution (Meltzer & Richard, 1981). In the introduction of their paper, they mention that the share of redistribution and income tax has increased in western European countries in North America, and specifically in the US and Britain and that this rate of tax proportional to income has existed for over a century. However, they do not claim that this theory is limited to these countries, in their view, it is largely universal. That said, the rise in social spending in the 20th century mainly occurred in the democratic countries of Western Europe and North America. Meltzer and Richard use the spread of the franchise to argue that in the 19th and 20th century, this led to an increase in voters with low income and it sh ifted the median voter down to a lower income bracket and so taxes rose and as a result, social spending increased. Lindert argues that Meltzer and Richard fail to explain two facts about this rise. First, the differences in the share of GDP between countries is not explained. Second, there is ambiguity whether countries with higher redistribution and low incomes will glow slower than countries with lower redistribution and high incomes (Lindert, 1996). He offers 'competing hypothesis' that give alternative explanations for the rise in social spending and its eventual decline. He presents the argument that the dispersion of income below the median voter matters in determining redistribution. He highlights the influence of socialism, socialist democratic parties and labour union as a factor that led to the rise in social spending in the 20th century. Moreover, he argues that the age distribution of voters can also influence the government's redistribution policies, as the elderly are more likely to be in favour of contributions to health and pension. He uses the deadweight costs theories to argue that high social spending in the long run and the rising costs of increasing the size of government will eventually limit social spending (Lindert, 1996). This is because the rising deadweight costs will reach a point where it will eventually stop income growth. Dispersion of income is another factor that influences social spending. The increase in inequality below the median voter will lead to greater redistribution. After testing these hypotheses on a sample of 19 countries between 1960 and 1981, Lindert finds that although the Meltzer-Richard model seems theoretically plausible, there is little empirical evidence for it having an impact in the 20th century. He explains that growth in social spending is impacted by various factors like the diminishing age or income effect. He predicts an end to this growth in the 21st century (Lindert, 1996).

Critique of Meltzer- Richard – Roberts Assumption

Voting Behaviour and Turnout

The following section gives three further arguments to counter the Meltzer-Richard-Roberts Model. Firstly, the importance of turnout and the reality of elite control influencing voting decisions and outcomes. An important argument countering the claims made by the Meltzer- Richard and Roberts Model is given by Larcinese (2007). He explains two opposite effects of the rise in inequality. First, increased inequality would lead to the median voters' preference for greater redistribution. Second, increased inequality would mean differences in turnout, wherein the rich and privileged citizens are more likely to vote than those living in extreme poverty. This could be due to illiteracy, work restrictions, lack of interest or awareness. Thus, the overall impact is that inequality would not actually lead to more redistribution (Larcinese, 2007). He argues that although it seems theoretically logical to say that countries that are poor and have greater inequality are not growing due to excessive social spending, it is misleading in reality. Meltzer and Richard do highlight the extension of voting rights as leading to an increase in voters below the median voter, however, they do not take into account that the turnout is not 100% (Meltzer & Richard, 1981). Larcinese studies 41 countries between 1972 and 1998 and does not find a clear correlation between redistribution and inequality; explaining that country-specific factors are influencing this relationship (Larcinese, 2007).

ELITE CONTROL OF DEMOCRACY

This argument is supporting Acemoglu and Robinsons' idea of 'captured democracy', which describes elite control of the political system after democratization. The elites use their economic power to invest in their de facto power, they influence parties through lobbying and control political ideology through the media. Acemoglu and Robinson explained that the elites must contribute to the collective de facto power that must be larger than the de jure power of poor voters (Acemoglu & Robinson, 2008). For example, in a study on Clientelism in India, Anderson et al. (2015) find that in the state of Maharashtra in areas where Maratha landlords have power in the form of landholdings, democratic decisions are pro-landlords and opposed to the poor because of their elite clientelist ties to political parties. Furthermore, Luebker (2014) conducts an empirical analysis of 110 observations from 26 countries and found no relationship between inequality and redistribution. He explains that factors such as unemployment rates, an increase in an ageing population are more effective in explaining the rise in social spending. Further critiquing, that the Meltzer-Richard-Roberts model uses rational choice and portrays humans as rational which is indifferent to the argument in behavioural economics that humans take into account society, shared values, ideas of social justice and fairness that further influence their economic decisions (ibid).

EVIDENCE FROM DEVELOPING COUNTRIES

Secondly, the Meltzer-Richard-Roberts model has been critiqued widely in relation to the developing world. Keefer and Khemani (2005) argue that the Meltzer-Richard-Roberts model does not hold in low income countries. Here, the median voter is extremely poor and evidently, social services are lacking. They highlight three market imperfection causing this outcome – "lack of information about the performance of politicians, social fragmentation and identity-based voting, and absence of credibility of promises made by politicians" (ibid). They provide evidence that in developing countries, governments tend to prefer investing in infrastructure and government jobs rather than social services. For example, in India, when disadvantaged groups comprise of the vote bank more emphasis is laid on increasing access to government jobs and welfare transfers to gain support in the short term rather than investing in education and healthcare, which would not cost as much and would be beneficial in the long term (ibid). However, if politicians are concerned with only winning elections, short-term appeasement is the chosen strategy.

Affinity-Based Voting and the Right to Vote

Moreover, Keefer and Khemani (2005) state that countries like India and Nigeria experience 'affinity-based voting' which means that people are more likely to vote on caste, religious, tribal or racial lines. This is not evidenced in the United States or Western Europe. In order to explain their critique, they refer to a study conducted to examine the disparity in outcomes of health and education in two states in India – Kerala and Uttar Pradesh (UP). Between the 1960s and 1995, in each decade the average per capita public expenditure spending in Kerala was more than two times that of UP. UP allocated a large amount of resources to state administration and very little to health and education while Kerala did the opposite. They argue that these differences are due to the market imperfections mentioned above. Moreover, citizens in Kerala are better informed and parties compete on offering social services. UP, on the other hand, relies on clientelist influence. High literacy rates in Kerala and relatively lower caste-based discrimination compared to UP affected the outcome. Essentially, the Communist Party in Kerala influenced and increased party competition for the dominant Indian National Congress Party (INC), while in UP, the INC did not have a strong competitor. In UP social services remain weak and people tend to vote on caste-based lines. Thus, in a democracy, several different forms of electoral competition can impact the outcomes of redistribution. Keefer and Khemani (2005) conclude that although poor voters are highly active, the credibility of politicians in providing basic social services without pursuing clientelist agendas is needed to ensure greater redistribution. Ahuja and Chhibber (2012) validate this by questioning the reasons for the large turnout of the poor in elections in India. They conduct a series of focus groups and open-ended interviews to find that although the poor are not the ones gaining from elections, they see voting as a right more so than a civic duty or a way to get economic benefits. They find that voting is an affirmation of citizenship (Ahuja & Chhibber, 2012). Thus, there are several factors influencing turnout and income inequalities in developing countries. Even with high turnout, social spending is still very low.

The concept of Social mobility

Finally, another criticism of the Meltzer-Richard-Roberts Model comes from the perspective of political sociology in the form of the concept of social mobility and fairness. People with income below the average, do still hope that in future they will move up on the income scale. In a democracy, this is a valid possibility. This idea of upward mobility is constructed in the form of expectation that in the future their children may be the high-income earners and will lose from high taxes. Benabou and Ok reflect (2001) on the "prospect of upward mobility" (POUM) hypothesis. If citizens have low-risk aversion and they expect to have higher income in future, then they would be less inclined to vote for higher social spending. Alesina and Angeletos (2005) go a step further and question the idea of the statement – "people get what they deserve and deserve what they get". The idea of fairness in the level of distribution is questioned. They focus on the differences between Europe and the United States. While European countries tend to have more effective redistribution policy, possibly due to the history of class struggle, in the United States, the perception is that the wealthy have earned their place. They also talk about the racial struggle in the US after the end of slavery, they highlight that the reason for "poor deserves to be poor" idea is that the median income voter is white and the low-income voter is black (Alesina & Angeletos, 2005).

Fairness and irrational human behaviour

Piketty (1995) further explains the social mobility argument in shaping political attitudes and electoral outcomes. The argument follows that people have varied experiences and they learn and believe differently about how taxation impacts the society. He argues that it is important to look at these different beliefs and ideas about the role of the government in the economy (Piketty, 1995). The exposure to different information based on their socio-economic background can highly impact the outcome, even if they are fully informed. It is important to go beyond the economic interests of the citizens (Piketty, 1995). A study conducted in the Slums of New Delhi by Banerjee et al. (2011) offers evidence for this argument. The level of awareness and information that voters have are limited. They divided areas into treatment and control groups. The treatment groups were given newspapers along with report cards that gave information about the performance of the legislators running for elections (Banerjee, et al., 2011). Public readings of the report card were conducted in the treatment areas. They found that providing this information influenced the perception of the benefits from voting and led to changes in turnout relative to the performance of the legislator.

CONCLUSION

In conclusion, the claim that greater inequality will lead to greater redistribution because the Median voter will have a low income and so will vote for higher taxes is not convincing. This assumption is flawed on several grounds. Voter turnout is not taken into consideration, which is especially important as for the majority of the 20th century, several low-income groups and women did not have voting rights. Today, in developing countries, even if the poor are coming out to vote in large numbers, social services are still lacking. Elites control the economic power used for campaigning in elections, they influence voters through the media, use lobbying and clientelism to influence the government. Developing countries have large income inequalities that are not addressed with large social spending, even if there is a high turnout. Governments are more interested in spending on infrastructure than education and health. Moreover, Identity-based voting is rampant. Factors including social mobility or expectations of having higher income in future prevent people from voting for politicians who promise higher taxation and greater redistribution. The culture of a country and perceptions of 'fairness' influence citizens voting decisions. Finally, human beings must not be looked at as rational profit maximising agents, because they typically are not. Humans are influenced by the social fabrics of their society and the information that form their beliefs and ideologies. These highly influence their voting behaviour. Hence as Stiglitz explained, political and economic power go hand in hand and till the time a few influential high-income earners exist in a capitalist system, social spending can never be a priority for governments.

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The Wider Impact of Unemployment on the Individual

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Unemployment is an issue of vital importance to economists and the public alike and is one of the main indicators used to judge the health of an economy. The economic impact of unemployment has been well theorized. Instead, Sorcha Sheil looks at the psychological nd physical health impacts unemployment can have on the individual. She first looks at the position work occupies in our society, before using Jahoda's theory of deprivation to analyse the negative psychological impacts unemployment can have on an individual. She distinguishes these effects between class, sex gender, and age. Following this is an analysis of the physical impact unemployment can have and a discussion of how liberal social welfare schemes like that of the UK and Ireland, can actually worsen the mental wellbeing of the unemployed

Introduction

Work is an essential human activity which shapes our perceptions of self-worth and social identity. Employment forms a major component our daily lives and, is arguably, the basis on which the life course plays out. Unemployment is not merely an economic issue, but has significant psychological implications which impact levels of wellbeing and life satisfaction. The psychosocial effects of unemployment have detrimental impacts on levels of wellbeing, often causing clinical levels of distress amongst the unemployed. In this essay, I begin by examining the meaning of work and its connotations with the moral values of society. I then turn to Jahoda's theory of deprivation, paying particular attention to the way in which experiences of unemployment vary in terms of differing social categories, looking specifically at class, gender and age. A brief analysis of the physical health effects of unemployment and how social circumstances can be translated into biological outcomes will also be provided. The power of state intervention in influencing levels of mental wellbeing amongst the unemployed will be discussed, with particular attention paid to the impact of the liberal contractarian framework on levels of mental wellbeing in society. A comparative approach is taken and the effect of the Liberal welfare regime in Ireland and Britain is compared to the Nordic Model in place in Sweden and discrepancies in levels of life satisfaction are evaluated. I argue that employment occupies a significant role in society today, assisting in shaping the psychological, physical and emotional wellbeing of individuals.

The Concept of Work

Throughout history the majority of individuals have worked to survive and it has become an integral component of the human existence. Work is not only essential for economic gain but plays a significant role in the formation of perceptions of self and social identity. Throughout the ages, work has been associated with the moral values of society, from Plato's republic and his theory on the division of labour, to the Reformation and what Luther termed 'the Protestant work ethic' (Applebaum, 1992). Ties between work and social worth are present in Adam Smith's 'The Wealth of Nations' in which he argues that those who perform productive work are, 'instead of gold, the most valuable assets in society' (Applebaum, 1992). This view not only emphasises the utilitarian principles of liberalism and the economic necessity of work, but also draws attention to the moral values associated with work and the integral role that it plays in shaping perceptions of self-worth and identity. Today, work forms a major component of a person's daily routine, and for most can be described as the foundation on which the life course plays out. The meaning of work and the sense of identity we derive from it can have immense consequences for individual wellbeing and can impact our sense of attachment to our own humanity. Unemployment is harmful to one's economic, social and psychological wellbeing with evidence pointing strongly towards the psychosocial impacts of job loss outlined by Jahoda, in helping understand the psychological distress often experienced by the unemployed.

Jahoda's theory of deprivation

Unemployment is a relatively new concept which came about with the advent of industrial capitalism and wage labour. Today, employment is viewed a principle human activity, a crucial determinant of one's sense of social, economic and moral value. Jahoda's 1930's Marienthal study pays particular attention to not only the economic desperation that comes with unemployment but also the psychological meanings attached to it. This was apparent in many different aspects of the study, for example, Jahoda (1981) found that instead of spending more time partaking in leisure activities, the unemployed became depressed and disinterested in life, losing all sense of time and structure in their daily routine. Jahoda analysed the latent aspects of unemployment including; time structure, social contact, collective purpose, identity/status and regular activity, and examined how these elements vary in terms of different social categories (Jahoda, 1982). Work provides individuals with psychological and emotional support and when unemployment occurs this leads to a myriad of issues which reach far beyond economic deprivation (Edgell, 2012). Examining the ways in which social categories differing in terms of class, gender and age react to unemployment provides us with a clearer understanding of the true effect of job loss. Although there have been some critiques of Jahoda's theory of deprivation, it has stood the test of time offering useful insights into the issue of unemployment.

Class

All social classes to a certain extent identify with their work, however middle classes are more likely to be employed in occupations which they enjoy and derive status and identity from (Ashton, 1986). This results in middle class groups experiencing a greater sense of loss and shame when unemployment occurs, with individuals often finding the stress and stigma of becoming unemployed difficult to manage. An example of this can be seen in the occurrence of the middle class, unemployed 'salarymen' in Japan who leave their homes every day pretending to go to work in an effort to guise their employment status (Edgell, 2012). Middle class workers who enjoy the extrinsic and intrinsic benefits of work are those who experience the worst psychological impacts of job loss. This is reflected in the higher rate of suicide amongst the unemployed middle class when compared to other class groupings (Edgell, 2012). Those in working class groups who are employed in low paid service occupations experience more adverse economic impacts of unemployment. The sharp decline in the flow of economic resources into working class families can have serious impacts on levels of stress and wellbeing, however unemployment amongst this group has been shown to be less likely to trigger a crisis of identity.

Gender

Relative to studies on male unemployment, there has been little attention focused on female unemployment, reflecting the persistence of patriarchal structures, such as the male breadwinner model in society. Female unemployment can be more complex to analyse due to the discontinuous nature of female work patterns. Hakim's preference theory accurately describes these work patterns, outlining the three main options for women – a full time career, part time work career or full time homemaker (Edgell, 2012). Men and women have similar experiences of unemployment, however Coyle (1984) suggests that the main difference between how men and women experience unemployment is that for men, unemployment can trigger a crisis of gender identity (Edgell, 2012). The male breadwinner model seeks to legitimise male dominance in society, and when a man becomes unemployed this puts his dominance in question. Employment forms an integral component of the male identity and with unemployment comes feelings of humiliation, uselessness and isolation. Women also experience these feelings, however the issue of gender identity tends not to occur. The male breadwinner model effects levels of wellbeing amongst unemployed women as they become financially dependent on their partner, triggering a 'crisis of autonomy', however this is less well documented due to the tendency of women to take the title of 'housewife' instead of 'unemployed person' (Edgell, 2012).

Age

Prolonged unemployment amongst young people can have serious impacts on levels of happiness, health and job satisfaction as the time taken to transition into the next stage of life becomes longer and more uncertain (Edgell, 2012). Findings from a study carried out by Bell and Blanchflower confirmed that youth unemployment has the potential to affect the health status and life satisfaction of young people for over twenty years (Edgell, 2012). Youth unemployment leads to a greater sense of social exclusion from the rest of society and increases the likelihood of young people forming a 'peer group identity' instead of an 'occupational identity'. This plays a role in increasing levels of youth crime and juvenile delinquency in areas characterised by high rates of unemployment. This is in line with Merton's 'anomie theory' which states that when the means of becoming successful are taken away, illegitimate means are instead made use of (Edgell, 2012).

Unemployment and Health: How the Social Impacts the Biological

Unemployment can have both direct and indirect health effects largely induced by the detrimental psychological effects of unemployment which have the potential to manifest into physical health conditions. Social roles are central to Siegrists theory of 'self-regulation' which emphasises the importance of purpose in society and its influence on health behaviours (Blane, 2013). When unemployment occurs, social roles can often be called into question, resulting in negative health behaviours such as smoking and alcohol abuse (Bartley, 2008). Direct health effects occur due to chemical responses triggered by psychological distress. When individuals are exposed to the environmental stressors associated with job loss, such as economic deprivation, reduced social interaction and feelings of shame and humiliation, the body responds through the release of adrenaline which produces fibrinogen in the blood. This results in high blood pressure and an increased risk of heart disease (Bartley, 2008). This is what has been termed the 'fight or flight' response and it is through this that we can analyse the link between the psychological distress associated job loss and the negative health outcomes of the unemployed.

SOCIAL WELFARE POLICY: A COMPARATIVE PERSPECTIVE

State intervention can have significant effects on the economic and psychological impact of unemployment, however it is an area which has received limited attention in varying national and policy contexts (Layte et al., 2006). The need for state intervention can be understood through examining the PEN Model (Psychosocial and Economic Need for Employment). This model incorporates both the psychosocial approach presented by Jahoda along with the agency approach presented by David Fryers in which he argues that restrictions on the private economy reduce individuals' autonomy resulting in lower levels of life satisfaction (Layte et al., 2006). Layte et al (2006) have carried out significant research on the welfare systems in Sweden, Ireland and Britain. This analysis was underpinned by Esping Anderson's classification of welfare states into: conservative welfare, liberal welfare (Ireland and the UK) and social democratic welfare (Sweden) states. Longitudinal data for Sweden was sourced from the Long term Unemployment Project and was complemented with telephone surveys, for Ireland, information was derived from the Living in Ireland panel survey based on a two stage clustered random probability sample, and for Britain, data from the British Household Panel Survey was used (Layte et al., 2006). The results found that the flat rate system in place in Ireland and the UK has worse overall economic and social outcomes for the unemployed and this reduces levels of mental wellbeing in society as benefits are not correlated with actual need. Sweden follows a more progressive universalistic social welfare regime which ensures benefits are individualised though tying the level of social welfare received to previous earning levels (Gallie et al., 2000). In Sweden, the unemployed were found to have significantly better psychological wellbeing compared to those on flat rate benefits in Ireland and the UK, indicating that income replacement benefits have more positive effects on the mental wellbeing of the unemployed. The type of welfare regime in a country can also have social class effects with those living in flat rate systems, who previously earned high incomes experiencing a greater drop in living standa rds resulting in higher levels of psychological distress (Layte et al., 2006).

Russell et al (2013) reached similar findings when they carried out a cross regime variation analysis on the impact of financial distress on levels of mental wellbeing. Their analysis of the period before, during and after the 2008 financial crash indicates that falling levels of GDP assists in explaining the lower levels of life satisfaction amongst the unemployed, particularly in the Liberal regime. Russel et al. (2006) found that worsening economic conditions are a significant source of psychological distress amongst the unemployed, contributing to approximately half of the unemployment effect[1], with their being little variation across European countries except for Nordic countries where the link between economic situation and psychological distress is less pronounced. This is largely due to the more generous and progressive welfare system in place in the Nordic regime.

Analysis of the Liberal Contractarian Framework

Neo liberal social welfare policies and the notion of a 'self-regulating market' have characterised the experience of unemployment for many. Tony Blair's 2001 Speech entitled to the unemployed. In the years following the financial crash in Ireland people were faced with violent levels of austerity, with the negative impacts of this visible in the rising levels of 'The rights we enjoy reflect the duties we owe' accurately depicts the ideals underpinning the Liberal Contractarian Framework which seeks to discourage welfare dependency amongst the unemployed (King, 1999). This framework emphasises an interventionist system which seeks to push the unemployed into the low paid service economy and out of the welfare system (King, 1999). This theme has formed a major component of British and Irish social policy towards the provision of social welfare benefits over the past 150 years. The Liberal model presented by Esping Anderson is concerned with enabling, not modifying, the manner in which the market performs and thus these welfare strategies attempt to socially engineer the unemployed back into the labour force. One can draw comparisons between the strategies used in the 1834 threat of confinement in the workhouses under the Poorhouse regime described by King (1999), to the 2017 campaign launched by the Taoi-

1 The unemployment effect refers to the impact of unemployment on the financial, emotional and psychological well-being of the individual

seach of Ireland Leo Varadkar attempting to expose 'welfare cheats'. These strategies seek to give work its moral character, introduce a disciplinary element to those in receipt of social welfare benefits while also serving as a scapegoating tactic for Governments. The Liberal Contractarian Framework places greater importance on the responsibilities of the unemployed rather than their rights, and embodies the world view that the unemployed purposefully avoid work in order to claim social welfare entitlements (King, 1999). Thus far, it appears that those in favour of a contractarian workfare system have been responsible for devising British and Irish social welfare policies and this has had serious impacts on levels of wellbeing amongst the unemployed.

The liberal welfare regime has the potential to bring about vast levels of misery and suffering suicide. In 2008, it was recorded that for every 1% rise in unemployment, a .79% increase in the rate of suicide was observed (Coulter and Nagle, 2015). Rising rates of suicide were particularly visible amongst young men between the ages of 16-24, reflecting the persisting patriarchal structures in society today. In the face of the economic crisis, the Irish Government relinquished themselves of all responsibility for protecting the unemployed, leaving them vulnerable to the devastating effects of austerity (Coulter and Nagle, 2015). Similarly, the negative effects of the liberal contractarian framework were highlighted in the most recent UN poverty report which outlined the 'punitive, mean spirited, and often callous' austerity policies in place in the UK (Booth, 2018). These policies reflect the desires of governments to socially re-engineer populations back into the low paid service economy for political gain (Booth, 2018). The report detailed that over a fifth of the population in the UK are currently experiencing 'great misery', with it coming as no great surprise that the UK government has recently had to create the position of 'Minister of Suicide Prevention and Civil Society' in order to examine the levels of desperation and isolation amongst people in British society (Booth, 2018). These outcomes call into question the functionality of the liberal welfare regime as a source of protection for the unemployed in society today.

The Evolution of Work

Marx viewed work as the fundamental foundation of society and the advent of the industrial revolution as a force alienating people from the means of production in exchange for profit. Although societies have shifted away from the hard industrial roots of capitalism towards a service based economy, the question as to whether this means that workers are happier now than in the past is highly questionable. Large, multinational corporations are a major employer in society today, offering highly esteemed graduate programmes and managerial positions to job seekers. These corporate positions are repetitive in nature and offer little opportunity for workers to differentiate themselves through their work, in a way, alienating the worker from the means of production. Although we no longer live in an industrial economy, exploitation of the worker still occurs and can be observed when we examine the service industry where work is precarious and low paid (Hochschild, 2003). This type of work has a polarising effect on employees where emotional labour degrades the individual and places them in a position of powerlessness (Gallie, 2007). The future of work and its effects on the individual are undoubtedly ambiguous, with the rise of zero hour contracts and little employee protection, the working environment is becoming more and more uncertain (Beck, 2000). It cannot be denied however, that work still forms a major role in shaping identity and notions of self-worth and is closely aligned to our sense of our own humanity.

Conclusion

To conclude, this essay has presented a brief analysis of the dynamic way in which work affects the lives of individuals in society, highlighting both the social and economic implications of unemployment. I argue that unemployment inflicts not only economic misery on individuals but also has significant psychosocial effects which impact psychological wellbeing and health outcomes. State intervention has the potential to ameliorate some of the negative impacts of unemployment, however we see the liberal welfare regime in Ireland and the UK inflicting great levels of misery on the unemployed and effectively failing the people who need them the most. Despite huge changes in the nature of the economy and the rise of more precarious, uncertain working conditions, it is clear that work still occupies a place of significance in the lives of individuals today. Work remains an essential human activity providing not only a means of survival but also a means of achieving self-fulfilment.

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Rethinking Economic Modelling: the Case for Behavioural Economics

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The concept of Economic Man has been at the heart of economics since its early days. In this essay, Pierre Louis Boczmak assesses two models based on this precept; Expected Utility and Discounted Utility using Stigler's three criteria for a sound economic model: empirical accuracy, generality, and tractability. This essay also presents two alternative models offered by behavioural economist who deviate from the assumption of Homo Economicus. This essay then concludes that the behavioural models, Prospect Theory and Hyperbolic discounting take into account the limitations of Economic Man and improve the empirical accuracy of economic models without significantly impacting the other two criteria. However, much work is still needed in modeling the insights of behavioural economics before the discipline can move away from the concept of Economic Man.

Introduction

A large body of research has identified the relations between countries as well as internal social and political order as being strongly determined by economic prosperity, itself overwhelmingly associated with market economy. Thus, bettering our understanding of today's market economy could yield a wide range of benefits in the future. This essay shall therefore be concerned with the usefulness of the concept of Economic Man for theorising and modelling today's economy, and, by extension, the assessment of those models which make use of the concept. For this purpose, this paper will not be investigating the concept's usefulness from a philosophical and sociological standpoint, and recognises that real people's actions are much more complex than what the Economic Man concept allows for. Instead, this paper seeks to assess the concept of Economic Man in relative terms. To do so, I use Stigler's (1965) three criteria for a good economic model: empirical accuracy, generality, and tractability.

I assess the widely-used models of Expected Utility for decision under uncertainty and Discounted Utility for intertemporal decisions. For each, I outline the neoclassical model's predictions, identify systematic deviations, or anomalies, and present the theoretical improvements made by behavioural economists to account for those anomalies. I then apply those findings to real-life situations in the fields of portfolio and savings theory, respectively. I argue that the neoclassical Expected Utility and Discounted Utility models built upon the Economic Man concept have become outdated with the emergence of behavioural economics. Indeed, behavioural economists have managed to formally and mathematically integrate the limitations of Economic Man into those models with the Prospect Theory and Quasi-hyperbolic Discounting.

EXPECTED UTILITY MODEL AND PORTFOLIO THEORY

Decision-making under uncertainty, or risk, is part of people's everyday lives and neoclassical economists use the Expected Utility model to predict their choice under such circumstances. According to this model, Homo Economicus will attribute a utility value to each possible outcome consistent with his atomic preferences, attribute a probability to each of those outcomes using his complete knowledge and unbounded calculation abilities, and select the course of action yielding the highest probability-weighted utility, or expected utility. In this situation, the assumption that Homo Economicus is the decision-maker allows economists to derive unambiguous and consistent predictions about his choices under risk (Samuelson, 1937), and the Expected Utility model thus easily passes two of Stigler's (1965) three criteria for a good economic model, namely, those of generality and tractability.

However, the model has some serious shortcomings regarding Stigler's first, and arguably most important, criterion: empirical accuracy. Many economists have exposed the variety of anomalies, defined as consistent deviations from the model's predictions (Smith, 2005), found at the empirical level when surveying people's decisions under uncertainty. Allais (1953) was one early critique of this neoclassical Expected Utility model and highlighted people's bounded rationality, seen in their inability to perfectly judge the utility and probability of outcomes, as the cause of such deviations. Simon (1955) too recognised the fact that people are boundedly rational and not perfect utility maximisers, even more so under uncertainty, but, in line with Allais, argued that people are coherent and consistent within their cognitive and computational limits. Moreover, Simon (1955) contended that since acquiring information was costly in time and resources, the use of heuristics to reduce the need for complete information can be rational. In this regard, early critiques of the concept of Homo Economicus did not fundamentally challenge the neoclassical theoretical framework and merely sought to point out the causes of its inconsistent empirical accuracy. Following on this, Kahneman and Tversky (1974) first focused on the heuristics employed by people to judge probabilities of outcomes and assess the value of such outcomes, and highlighted people's many unconscious biases.

In later studies, Kahneman and Tversky went on to show the deeper flaws of the neoclassical Expected Utility model and the preference reversals of the Homo Economicus, violating both the axioms of atomism and subjective rationality (Screpanti, Zamagni and Field, 2005). They did so by experimenting with simple situations in which information required to take a rational decision was inexpensive and fully available. Kahneman and Tversky (1979) observed that people were subject to a 'certainty effect', or the tendency to overweight certain events against uncertain ones when computing their respecting expected utility, reflecting an aversion to risk involving sure gains and the opposite in situations involving sure losses. More importantly, Kahneman and Tversky (1979) found that people's risk-aversion, assumed to be coherent and consistent by Allais (1953), was influenced by both the point of reference from which the decision was made, in terms of losses or gains, and from the magnitude of the losses and gains at stake. They found people to be more sensitive to losses than gains, and that sensitivity to both losses and gains decreased as the distance from the reference point increased. These deviations were proven to be recurrent and consistent anomalies and as such, predictable. This provided a rationale for integrating those findings into mainstream economic models of choice under uncertainty to improve their empirical accuracy. Kahneman and Tversky (1979) did so forcefully with their alternative Prospect Theory and without neglecting Stigler's tractability and generality criteria. In their model, gains and losses matter more than overall wealth, and real probabilities of events are replaced by subjective weights to account for people's biased judgements and irrational choices. They eventually arrived at an 's-shaped' value function, convex in the loss zone and concave in the gain one, steeper in the loss one that in the gain one, reflecting their findings aforementioned.

We are concerned in this essay with the usefulness of the concept of Homo Economicus for modelling economy and making predictions about economic behaviour. For this purpose, I now outline how Kahneman and Tversky's findings regarding decisions under uncertainty can be applied to theories about financial markets, a field still largely dominated by neoclassical models. Markowitz (1952) formulated a theory for building portfolios in which the expected return on assets for a predetermined risk level is maximised, with an emphasis on diversification and aggregate risk level. Together with the Capital Asset Pricing Model developed by Sharpe (1964) and used to estimate an asset's rate of return in the long run, these theories form the bulk of Modern Portfolio Theories. This body of theory rests upon the assumption of rationality of investors, and a perfect functioning of the financial market as understood by the neoclassical orthodoxy, and thus rejects the need for psychological and emotional considerations (Fromlet, 2001). While these theories have the merit to be generalised and tractable, their predictions are often not validated empirically. Behavioural economists argue that these deviations follow from the underlying, unrealistic model of Expected Utility, itself based on the Homo Economicus concept, as investors assembling a portfolio find themselves in a situation of decision under uncertainty (Weber, 1999).

In particular, Benartzi and Thaler (1995) have highlighted the fact that stocks have outperformed security bonds over time with a remarkably large margin and wonder why people do not invest more in stocks. The differential is too large to be accounted for by modern portfolio theories simply by invoking the mechanism of risk premium compensating for the higher volatility of stocks. They contend that, drawing on Kahneman and Tversky's findings, people are relatively more averse to losses than gains and far more short-sighted than the Homo Economicus concept allows for. As a result, investors re-evaluate their portfolios too frequently and privilege safe security bonds over volatile and relatively risky stocks in the short-run. Because of investors' irrational perception of risk, stocks become undervalued and further outperform security bonds (Camerer, 2002). To make their point, Benartzi and Thaler provide the example of pension funds which should naturally have a long-term investment strategy, allowing them to mitigate the short-term volatility of stocks, and should thus be expected to hold a larger share of stocks in their portfolios than private investors. However, the empirical evidence shows that pension funds have historically held only half of their total assets in stocks. This irrational investment strategy, they argue, is due to a form of principal-agent problem between the funds and their managing directors: their irrational loss-aversion and short-sightedness compel them to hold security bonds.

De Bondt and Thaler (1985) devote their attention to the volatility of stocks, which has been found to be consistently higher than the efficient market hypothesis can account for, assuming the rationality of investors. They find that investors irrationally overreact to news instead of correctly adjusting the expected value of stocks and make use of the representativeness heuristic (Kahneman and Tversky, 1974). This leads them to give too much importance to short-term fluctuations and overlook the real value of stocks based on fundamentals. Their hypothesis seems corroborated by the fact that portfolios holding stocks with low price-to-earnings ratio tend to outperform over three years those with 'better' stocks at the same time-reference point by more than 25% (De Bondt and Thaler, 1985)— evidence of a gradual correction of investors' pessimistic overreaction as stocks with low price-to-earnings ratio became momentarily undervalued.

Discounted Utility Model and Theory of Savings

I now address the failures of a second model widely used in neoclassical economics, the Discounted Utility model for intertemporal decision making, and the ways in which behavioural economists have sought to improve it by questioning the concept of Homo Economicus upon which it rests. As formalised by Samuelson (1937), one important early contributor to utility theory, the traditional model assumes that Homo Economicus discounts utility over time at a constant rate, and expresses it with an exponential discounted utility function. Concretely, this means that Homo Economicus is assumed to prefer consuming today rather than tomorrow, and is also indifferent between consuming today or tomorrow and in one year or one year and one day. Though modelling time discounting in this way is analytically convenient for modelling economic behaviour and making unambiguous inferences (Samuelson, 1937), it has nonetheless been proven to be empirically inaccurate by many economists (Camerer, 2002; Laibson 1997; Prelec and Loewenstein 1993; Shefrin and Thaler, 1992).

Behavioural economists indeed argue that people actually discount utility over time in a quasi-hyperbolic fashion (Prelec and Loewenstein 1991), that is, their discount rate is not constant over time. In simple terms, they found by the means of experiments in simple intertemporal decision setting that people would much prefer consuming today than tomorrow, but would be rather indifferent between consuming in one year or in one year and a day. In a similar fashion to Kahneman and Tversky (1979), Prelec and Loewenstein's (1993) ability to express their insight mathematically by changing the traditional exponential utility function into a quasi-hyperbolic one allowed them to improve on the Discounted Utility model without neglecting Stigler's other two criteria of tractability and generality. By doing so, behavioural economists have shed light on the neoclassical model's inherent flaws, for it assumes an unrealistic utility function.

Moreover, as people were observed to be incoherent within their bounded rationality when choosing under uncertainty, they were also found to be incoherent within their bounded rationality when quasi-hyperbolically discounting their utility over time. Indeed, Thaler and Shefrin (1981) found that people discounted gains more than losses, and smaller amounts more than larger ones for both gains and losses. Furthermore, differences in framing elicited preference reversals in a fashion reminiscent of the cognitive biases highlighted by Kahneman and Tversky (1974). Prelec and Loewenstein (1991) remarked that anomalies were of the same types in the cases of risky and intertemporal decisions, namely, depending on ratio, sign, magnitude, and point of reference. This forcefully reinforces the contention made by behavioural economics that those anomalies, or systematic deviations from neoclassical models' prediction, are so systematic and significant that they must be integrated into economic models.

For judging the usefulness of the Homo Economicus concept, we are concerned with real-life situations in which his limitations in judgement and choice can be observed and have meaningful consequences. One such typical intertemporal choice situation is that concerning the saving decisions made by people. Friedman (1957) is the father of the Permanent Income Hypothesis, or the traditional neoclassical model for predicting saving patterns over time. This theory assumes that people rationally maximise their utility over time and wish to maintain a constant level of consumption. It predicts that, in anticipation of the loss of regular income following their retirement, or any other change of income which can be anticipated, people will smooth their consumption over time. This means that their consumption depends on both their current and future expected assets. This seems reasonable at first considering people experience diminishing marginal utility from the consumption of goods in the same period and are, thanks to their unbounded rationality, able and willing to plan ahead. As we have seen before, however, in real-life people discount their utility over time quasi-hyperbolically and not exponentially — that is, they much prefer consuming today than later.

Thaler and Shefrin (1981) thus picture people as having two selves, a short-sighted, pleasure-seeking one, and one able to see the need for savings as retirement looms over the horizon. They contend that most often it is people's irrational self that dominates their intertemporal decision-making and, as a result, often lack the willpower to smooth their consumption over time. Following from this, Mullainathan and Thaler (2001) found that people's consumption substantially decreases when they retire. Thaler and Shefrin (1981) argue that people's short-sightedness and lack of willpower can explain why they are willing to bear the cost of self-imposed rules reducing their discretion for current spending. Specifically, the neoclassical model cannot account for the existence of Christmas Funds in which people lock their savings without being compensated with a return. Indeed, it would be more rational to invest this money in stocks or security bonds to reduce the opportunity cost of saving. However, people who are aware that they lack self-control become willing to bear this opportunity cost if it enables them to save for later in life.

Furthermore, Thaler and Benartzi (2004) found evidence that in most cases people were simply not aware of their intertemporal choice irrationality. They found that employees enrolled in a compulsory saving plans aimed at reducing their discretion over current spending saved 13.6% of their income on average while those who were not saved 3.5%. Neoclassical saving theories cannot account for this either since Homo Economicus is expected to maximise his utility over time without the need for self-imposed rules. Thus, by realising the extent of people's bounded rationality when it comes to intertemporal choice, behavioural economists can design better policy to encourage savings, with concrete benefits for economic agents and society as a whole.

Conclusion

I have sought in this paper to assess the usefulness of the concept of Homo Economicus for modelling and predicting intertemporal decision and decision under uncertainty. To do so, I have used the neoclassical models of Expected Utility and Discounted Utility which both rest on the concept of Homo Economicus. I have identified their principal flaw, their lack of empirical accuracy, and outlined how behavioural economics could improve on this by acknowledging the limitations of the concept of Homo Economicus. For the Expected Utility model, Kahneman and Tversky (1979) proposed a Prospect Theory which takes into account people's imperfect judgement and decision-making abilities. Similarly, Prelec and Loewenstein (1993) suggested the use of a quasi-hyperbolic discounted utility function instead of the exponential one typically used.

The real value of these advances in behavioural economics is that they have improved the predictions of traditional models without undermining significantly their qualities of generality and tractability. Indeed, in both cases findings about man's limited judgement and decision-making abilities were quantified and formally integrated into the models, allowing for unambiguous and much more realistic predictions than under the Homo Economicus assumption. Nonetheless, more work needs to be done to exploit the full potential of these two models. In this respect, integrating them in the broader theoretical economic framework by rendering them compatible with microeconomic models of reference is crucial. Moreover, as pointed out by Fudenberg (2006), behavioural economics has to this day not been able to quantify and model all its insights about the limitations of Homo Economicus. Indeed, though behavioural economists have demonstrated in many instances that people have social preferences and are not solely interested in maximising their own utility, they have yet to come up with a strong model allowing them to make tractable, general, and unambiguous predictions for this field of study (Wisnewski and Brzezicka, 2013).

In short, though I have shown that the concept of Homo Economicus appears outdated for models of decision under uncertainty and intertemporal choice, more work needs to be done before we can fully move away from this unrealistic, yet still necessary, concept of Economic Man.

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Voiceless: The Economic Consequences of a Stammering Population

Jeff Dwan O'Reilly, Senior Sophister

In this paper Jeff Dwan O'Reilly looks at the effects of speech impediments on an individual's career progression. The paper serves to highlight the complexity of attempting to perform any sort of regression involving income; though a statistically significant effect is found, in that speech impediments reduce income, the paper highlights the need for further research. Some extensions that are required are indeed noted in due course, but the paper serves as an excellent explainer of the issues these people may face.

Introduction

Speech disorders in individuals are not an unusual occurrence in our society, yet still the scope of their consequential effects on individual's well-being, society and the economy, remain largely under analysed from an econometric perspective. This study thus attempts to add to the existing literature on the subject by primarily examining the effects of having a speech disorder on an individual's potential earnings. This question is important not only for the well-being of people with speech disorders - hereafter PWSD's - but potentially society as a whole. Thus, evidence of lower incomes for PWSD's may compel governments to consider providing state funded therapy or treatment supports to help boost their individual productivity, benefiting the entire economy.

Logic and Literature Review

According to The National Institute on Deafness and Other Communication Disorders (NIDCD, 2016) over three million people in the U.S alone stutter, an estimated 1% of the adult population (Blumgart et al., 2010) making it by far the most prevalent speech disorder. Craig et al. (2009) succinctly describe a stammers physical manifestation as follows;

> involuntary disruptions to the fluency of speech, consisting largely of syllable repetitions, prolongations, blocking of sounds, substitutions and avoidance of words and situations. (p.61).

Considering the description above it is of little surprise that PWSD are much more likely to experience Social Phobia (SP) – an extreme form of anticipatory anxiety which can ultimately lead an individual to a poorer quality of life as they refrain from engaging in possible interactions, where they may be required to communicate with others (Blumgart et al., 2010). This anxiety is a direct result of a chronic fear of embarrassment and being perceived as foolish or incompetent. Often these anxiety effects endure even if the stammer is controlled later in life (Blumgart et al., 2010). This strategy of social avoidance eventually pervades into an individual's employment reasoning and career decisions, as noted by McAllister et al. (2012). They noted that although contrary to previous literature (O'Brien et al. 2011) having a stammer did not significantly impact on an individual's level of educational attainment but rather, stammerers were more likely to be in a lower-socio-economic class than those of the same age without a stammer because of their chosen occupation. Occupations of a high socio-economic status such as professional or managerial posts which command, on average, higher wages often require excellent verbal communication skills especially in a service-based economy. As a result, PWSD's tend to avoid these sorts of jobs, fearing employer rejection or that their speech dysfluency will prevent them from fulfilling the role effectively. Consequently, many PWSD's are underemployed in skilled manual jobs given their potential because of a lack of confidence in their communicative abilities (Craig and Calver, 1991). This conclusion is not without academic support. Klein and Hood (2004), following interviews with PWSD's finding that they tend to, "perceive their stuttering as a major handicap in the pursuit of their true vocation" (p.266). They also found that 70% stammerers believed that their speech disorder decreased their chances of promotion or being hired. 20% even rejected job offers because of their own perceived lack of personal communication competency. Severity of the stammer also played a significant role in individual's employability perceptions with those with severe stammers reporting the most difficultly. However, unsurprisingly, this was not statistically different from mild stammerers, given the severe negative psychological effects of the condition (Klein and Hood, 2004). These negative self-perceptions about employability are not unfounded with Hurst and Coopers (1983) extensive U.S employer interview surveys revealing that 85% of employers agree that stammering reduced an individual's employability to some degree. They also find that only 9% of employers would choose a stammerer over a non-stammerer for a promotion all else being equal between the candidates. According to Ruben (2000), society has dramatically changed in the last century from a manual labour driven industry to a communication dependent one, where the "fittest" person will be defined by their communication ability. This change may not only reduce PWSD's mean income because of reduced job opportunities but also render many unemployable.

HYPOTHESES AND DESCRIPTION OF THE DATA SET[1]

The primary objective of this study is to determine and interpret, using econometric cross-sectional analysis, the effects of ever having a speech disorder on an individual's reported income. Given the sensitivity of the topic combined with its relative infrequency among the population, sources of appropriate data are notoriously difficult to attain (Palasik et al., 2010). However, for this study individual data was available from the Integrated Public Use Microdata Series website (IPUMS) which contained data relating to the U.S National Health Interview Survey (NHIS). This was an online survey collecting information on the health, health care access, and health behaviours of the civilian population of the U.S.A. Each respondent in the NHIS was automatically assigned a unique identification number which IPUMS uses to match responses to individuals. As a result, those who failed to answer speech related questions, or others regarding their demographics or earnings, could easily be omitted from the analysis without risk of compromising the data ordering.

TEST HYPOTHESIS

H_0:Having ever had a speech disorder does not have any impact on level of current earnings.

H_A:Having ever had a speech disorder does have an impact on level of current earnings.

The overall sample size of the data set was 108,000 but due to missing data entries likely due to oversight or perceived irrelevance on behalf of some respondents in relation to certain key variables to do with speech disorders, the sample size was generally much lower, n=13,618. The sample consisted solely of adults.

The dependent variable of the examination was reported 'Earnings' from the previous calendar year provided they were currently in employment.

1 For summary statistics of data see Appendix table 3.

Earnings ranged from $1 to $75,000+ and were organised in bands of $5000 intervals up to $25000 and bands of $10,000 up to $75,000 with values 1 through 11. For the sake interpretation, these bands were revalued as the means of their respective bands to make earnings a continuous variable, 'Earnings2'. Earnings were further transformed into the log of earnings to estimate percentage changes in earnings.

The independent variables represent a range of explanatory individual characterises with relation to earnings. Native citizen, age, sex, region of residence, were readily available in the data set as were the number of years employed at a job and the number of hours worked per day to a large extent. The variable type for current occupation was extremely broad with over 80 groups. These were reclassified under nine subgroups in line with the Major Occupation Groupings (MOG's) of the U.S National Bureau for Labour Statistics (2001); further detailed below.

With regards the key independent variables of interest used to test Hypothesis 1 of this study it was decided that, given the sample sizes restraints of some variables, a new encompassing dummy variable be generated to maximise the sample size. Thus, the binary variable, ever-had-a-speech-problem (evspeechprobl) was created. [2]

TABLE1: VARIABLE DESCRIPTIONS

Name	Description
evspeechprobl	Has ever suffered from a speech disorder
earnings	Earnings from previous calendar year
log_earnings2	Log of earnings previous calendar year
educ	Educational attainment to the highest level
age	Current age
sex	Male or Female
citizen	Born in the U.S or not.
region	Region of residence in the U.S
yearsonjob	Years on main or longest
hourswrk	Total hours worked last week or usually
secondjob	Have more than one job or business
mog_a	Professional and Technical Occupations
mog_b	Executive, Administrative, And Managerial Occupations
mog_c	Sales Occupations
mog_d	Administrative Support Occupations (Including Clerical)
mog_e	Precision Production, Craft, And Repair Occupations
mog_f	Machine Operators, Assemblers, And Inspectors
mog_g	Transportation and Material Moving Occupations
mog_h	Handlers, Equipment Cleaners, Helpers, And Labourers
mog_k	Service Occupations, Except Private Households

2 EVSPEECHPROBL WAS CREATED FROM OBSERVATIONS FROM A RANGE OF OTHER SPEECH DISORDER RELATED QUESTIONS WHERE IT COULD BE RELIABLY INFERRED THAT, IF ANSWERED IN THE AFFIRMATIVE, THE RESPONDENT HAD, OR STILL CURRENTLY HAS, A SPEECH DISORDER WHICH THEY HAD EITHER BEEN MEDICALLY DIAGNOSED WITH OR SELF-REPORTED..

EMPIRICAL APPROACH

To answer this question we firstly, run a fully specified OLS multiple linear regression model to determine the effect of ever having had a speech disorder on earnings (eq.1). This broad model attempts to control for a variety of other explanatory variables and capture the net effects of each of these independent variables, on log of earnings, thereby reducing the likelihood of omitted variable bias (OVB). From this we will assess the overall explanatory power of the model.

Following this, we conduct and briefly outline the results of a variety of diagnostic, statistical and robustness tests on the model before discussing the results.

Our prior expectation regarding our key explanatory variable, evspeechprobl was that considering the negative physical and enduring psychological effects caused by speech disorders as described in the literature review, we expect that having ever had a speech disorder would likely have a significant negative impact on an individual's current earnings.

Empirical Analysis

We begin our empirical analysis with our final OLS multiple linear regression model with robust errors to describing the relationship between the log of individual earnings and a multitude of independent variables (equation 1).

EQUATION 1

1. $log\_earnings2 = \beta_0 + \beta_1 evspeechprobl + \beta_2 sex + \beta_3(evspeechprobl * sex) + \beta_4 educ + \beta_5 age + \beta_6 region + \beta_7 citizen + \beta_8 yearsonjob + \beta_9 secondjob + \beta_{10} hourswrk + \beta_{11} occupation + u.$

TABLE 2: PRIMARY REGRESSION OF INDEPENDENT VARIABLES ON LOG_EARNINGS2 WITH ROBUST STANDARD ERRORS

Dependent Variable	***log_earnings2*** **Coefficient**
Ever had a Speech Disorder =1	-0.169***
	(0.0498)
Sex =1, Female	-0.218***
	(0.0119)
(Evspeechprobl=1 * Sex=1, Female)	0.0293
	(0.0755)
Highest level of Educational Attainment	
Grade 1	-0.331 (0.218)
Grade 2	-0.425** (0.173)
From Grade 3 until leaving college without degree	
yielded insignificant results.	
AA degree: technical/vocational/occupational	0.256*** (0.0893)
Bachelor's degree (BA, AB, BS, BBA)	0.422*** (0.0883)
Master's degree (MA, MS, Meng, Med, MBA)	0.538*** (0.0891)
[illegible]	[illegible]

Doctoral degree (PhD, EdD)	0.630*** (0.0942)
U.S. citizenship =1, Yes, U.S. citizen	0.145*** (0.0204)
Age	0.000192 (0.000535)
Years on main or longest or last job	0.0158*** (0.000744)
Region of residence	
North Central/Midwest	-0.117*** (0.0168)
South	-0.0700*** (0.0149)
West	-0.0322** (0.0163)
Total weekly hours usually worked	0.0221*** (0.000607)
Have more than one job or business =1, Yes	-0.137*** (0.0187)
Occupation	
MOG_A (Professionals)	0.360*** (0.0220)
MOG_B (Managers)	0.338*** (0.0237)
MOG_C (Sales)	0.132*** (0.0302)
MOG_D (Administration)	0.284*** (0.0234)
MOG_E (Precision Production/Craft)	0.215*** (0.0299)
MOG_F (Machine Operators)	0.289*** (0.0262)
MOG_G (Transportation)	0.188*** (0.0294)
MOG_H (Cleaners and Labourers)	-0.0760** (0.0314)
Constant	8.903*** (0.0950)
Observations	13,618
R-squared	0.397
Adjusted R-squared (non-robust standard errors)	0.395

Robust standard errors in parentheses
***p<0.01, **p<0.05, *p<0.1

Discussion of Coefficients

Our primary variable of interest, ever-having-a-speech-disorder, is proven to be significant at the 1% level and with a negative coefficient of -0.169. This is both in line with the literature prediction and our test hypothesis, H_A. Thus, we can reject H_0 – and confidently conclude that having, or to have ever had a speech disorder does have a negative impact on an individual's earnings. These results are most likely due to decreased employability in today's communication driven society and individual's specific career avoidance (McAllister et al., 2012). The coefficients predict that controlling for the effects of other variables in the model, those who have or have ever had a speech disorder earn approximately 17% less (-.169) than those who have not.

Both sex and citizen yielded results consistent with our predictions and both at the 1% level of significance. Women earned approx. 22% less than their male counterparts all else being equal and native U.S citizens earned 14.5% more relative to non-native-citizens, who are more likely to suffer from employer discrimination. Although not the focus of this paper, the disparity in earnings between men and women in particular, in this relatively large sample, is socially a troubling result although consistent with the literature (Blau and Kahn, 2017).

Interestingly the interaction variable between evspeechprobl and sex (female) yielded an insignificant result indicating that having a speech disorder did not adversely affect the earning potential of women compared to similarly speech-affected male counterparts. In other words, it seems from the model, that having a speech disorder affects the earning potential of both men and women to the same degree.

As regards education, although statistical significance is lacking for the middle levels of education range it is clear that, higher levels of education yield higher earnings with the top levels such as PhD and master's degrees yielding economically significant positive coefficients statistically significant at the 1% level. Holding all else constant those with doctoral degree's are likely to have earning 63% above average (0.630).

Against initial intuition, age yields an insignificant result. However, given that it surveys only adults this could be due to the rise of educational attainment of younger generations which allows them to earn as high salaries as older generations but at a younger age.

Having more than one job, according to the table, seems to indicate a lower level of earnings which may seem counterintuitive. However, this statistically significant result could be born out of a necessity to work more than desire, as individuals struggle to provide for themselves and others by working multiple low-paying jobs.

Occupation categories also yield some interesting results. As expected, those who occupy professional or managerial executive roles are significantly more likely to earn higher wages than others, given the competency and intelligence they require to perform; 36% and 34% respectively. Although only significant at the 5% level cleaners and labourers were shown to earn less on average.

Region also seems to be a relatively important factor in determining income in the U.S., most obviously those in middle and northern regions where incomes are estimated to be almost 12% lower all else being held equal (0.117).

This could be the hypothetically be explained poorer given its declining economy due to lack of industry and predominantly rural economy.

Discussion of R-squared and Further Tests

An acceptable adjusted R^2 value of 0.395 was obtained in the model indicating that 39.5% of the variation in log of earnings can be explained by the model. Although not high enough to definitively prove a strong relationship it is still a reasonable result. A test for OVB was conducted and did find that despite the multitude of variables contained in fully specified model, it continued to suffer from this effect indicating that some explanatory variables are missing from the model. This is unsurprising however given the size of our models R^2. Earnings are a notoriously difficult variable to explain given the variety of factors that can affect it. Thus, it is important to note the dataset used in this study was originally collected by researchers with the purpose of conducting medical research. Therefore, the number of variables available that were perceived to be relevant in explaining individual's earnings were significantly limited. The inclusion of variables regarding race, level of parental educational attainment, proficiency in the English language and number of children for example, as well as more interactions between variables could well significantly add to the explanatory power of the model. Furthermore, there are some variables that would indeed be extremely useful to include to add to the explanatory power of the model, such as innate talent or intelligence as well as work ethic, but are extremely difficult to control for or find appropriate instruments.

To test for multicollinearity a pairwise correlation table was constructed . With respect to our variable of interest evspeechprobl there was little evidence of multicollinearity with other variables, suggesting as we would expect, that its occurrence and variance is independent of other external factors. The presence of Heteroskedasticity was confirmed using the Breusch-Pagan test – recommend by Baum (2006) and was subsequently corrected to mitigate its effects before presenting the results in the table 2 above.

Policy Implications and Further Research.

Considering the significant results of the regression above we would conclude that there is surely an impetus to provide social and employment support to those who stammer and suffer from social phobia (Blumgart, 2010). Such an existence is not beneficial to society as those individuals with severe speech disabilities are more likely to be unemployed or of a lower socio-economic class than people unafflicted. According to Ruben (2000), communication disorders may cost the United States between \$150 and \$186 billion per annum in unfulfilled potential and welfare costs. Furthermore, given the research of Hurst and Cooper (1983) uncovering latent employer attitude towards those with disabilities, there must be more equal and transparent employment policies implemented in the workplace so those with speech disorders, as well as other disabilities, are not discriminated against when it comes to employment and promotion. Allowing those with speech disorders to fulfil their career potential and thereby allowing them to earn higher wages benefits the entire economy as they become more engaged both socially and economically.

Unfortunately, however, the analysis of this study has only made a minor excavation into what is a much larger issue. Given the relatively poor quality of the data in this survey (lack of data on other explanatory variables), as well as well as the preliminary level of analysis, a much more rigorous study should be performed including a broader range of interaction between the explanatory variables before any definitive conclusions are drawn. A more detailed set of quantitative microdata should be collected containing more descriptive details of the stammer itself including its severity as well as the economic habits of stammerers, so as to make a more informed case for future policy action. Quantitative research regarding the evaluation of the most effective form of treatment is also crucial if government of businesses are to be persuaded to provide partially-funded therapy or other support to help maximise the potential of their people. Furthermore, a time-series analysis would also be extremely enlightening as to how the effects of a stammer vary in relation to employment and income over time and whether its effects persist even after treatment.

Conclusion

The primary goal of this paper has been to establish whether a significant relationship existed between ever having had a speech disorder on an individual's earnings. It is the hope of the author that this claim has indeed been appropriately vindicated through appropriate econometric methods and analysis despite issues with regard OVB, and heteroskedasticity. The nature of the affliction makes it difficult to accurately quantify, yet even following a series of robustness checks and controlling for a range of variables it remained stubbornly persistent in both its statistical significance and direction of effect. Thus, this paper has emphasized and explained why there is a need for policy-makers to address, not only this issue regarding speech-disorders, but also other disabilities and conditions that result in unfulfilled potential. As demonstrated by Ruben (2000), less than optimal fulfilment of potential can have damaging economic consequences, not only for those afflicted, but also for the entire economy.

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APPENDIX

Table 3: Variable Summary Statistics

Variable	*Obs*	*Mean*	*Std.Dev.*	*Min*	*Max*
earnings	40405	6.147	3.063	1	11
earnings2	40405	35755.11	23508.64	2500	75000
evspeechpr~1	34483	.04	.197	0	1
hourswrk	47843	39.35	13.195	1	95
educ	99015	13.527	5.227	1	22
yearsonjob	27080	11.625	10.111	1	35
citizen	108000	1.912	.283	0	1
secondjob	19994	1.092	.289	0	1
earnings	40405	6.147	3.063	1	11
age	108000	36.568	22.634	0	85
sex	108000	1.52	.5	0	1
region	108000	2.759	1.038	1	4
MOG_A	32005	.275	.447	0	1
MOG_B	32005	.129	.335	0	1
MOG_C	32005	.075	.263	0	1
MOG_D	32005	.135	.342	0	1
MOG_E	32005	.076	.265	0	1
MOG_F	32005	.087	.281	0	1
MOG_G	32005	.06	.237	0	1
MOG_H	32005	.057	.232	0	1
MOG_K	32005	.106	.308	0	1

Table:4 – Ever had a Speech Disorder – Frequency.

Evspeechprob	Freq.	Percent	Cum.
0 - No	33,094	95.97	95.97
1 - Yes	1,389	4.03	100.00
Total	34,483	100.00	

Table 5: Pairwise Correlations between variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) log_earnings2	1.000									
(2) evspeechprobl		-0.062*	1.000							
		0.000								
(3) hourswrk	0.460*	-0.022*	1.000							
	0.000	0.002								
(4) educ	0.304*	-0.058*	0.092*	1.000						
	0.000	0.000	0.000							
(5) yearsonjob	0.188*	-0.015*	0.056*	-0.004	1.000					
	0.000	0.016	0.000	0.509						
(6) citizen	0.116*	0.039*	0.028*	0.082*	0.150*	1.000				
	0.000	0.000	0.000	0.000	0.000					
(7) secondjob	-0.009	0.007	0.075*	0.072*	-0.014	0.038*	1.000			
	0.271	0.310	0.000	0.000	0.081	0.000				
(8) sex	-0.168*	-0.015*	-0.199*	0.028*	-0.098*	0.008*	0.009	1.000		
	0.000	0.006	0.000	0.000	0.000	0.013	0.221			
(9) MOG_B	0.156*	-0.013*	0.148*	0.093*	0.098*	0.056*	-0.006	-0.074*	1.000	
	0.000	0.018	0.000	0.000	0.000	0.000	0.362	0.000		
(10) MOG_H	-0.150*	0.004	-0.072*	-0.251*	-0.036*	-0.168*	-0.011	-0.020*	0.095*	1.000
	0.000	0.466	0.000	0.000	0.000	0.000	0.131	0.000	0.000	

* shows significance at the .05 level

The Effect of News on Intra-Day Stock Prices & their Volatility

Luc Bellintani, Junior Sophistor

The exact effect of news on stock prices is something that is of great interest to many people in the business world. This paper, by Luc Bellintani, looks at the effect of news on both stock prices and volatility, using almost 7.5 million total rows of data to draw its conclusions. First, much of the existing research and its limitations are discussed, which is followed by his own analysis. In particular, he builds several variables to try to "adjust" news sentiment and news relevance prior to his analysis. The paper quantifies the effect of news on stock prices, finding negative news had a negative effect, while positive and neutral news had a positive effect, with the previous close having a large effect.

Introduction

The most visible piece of financial information about a company is arguably its stock price. Its growth or decline represents not only how the company is faring, but the perception of its present-day performance, as well as its future viability. The recent cryptocurrency bubble has illustrated how important market sentiment is to the price of a stock or commodity. Bitcoin, an electronic currency with little in terms of use, rose and fell sporadically on a daily basis. The crests and troughs of its existence seemed to follow in the footsteps of its mentions in the mainstream news and Twitter (Galeshchuk, Vasylchyshyn & Krysovatyy, 2018).

News is a vital contributor to market sentiment. A string of bad news could affect the way an investor perceives the position of a company. A positive market sentiment regarding a company can see its stock price rise, whereas a negative sentiment could see the company's worth be wiped in a day. Whether or not the sentiments are well founded in information and logic or a simple guess, they can decide the fate of a company.

Articles give a summary of what has happened in relation to the company and speculate on the potential effects that said happening will have on the company as a result. Figuring out a potential method to the apparent madness of a stock market could be the key to more guaranteed and sustainable returns for investors, effectively helping to remove the gambling aspect the markets are so widely likened to.

The question this essay aims to answer is simply how news affects the price of a stock. The topic has been theorised by many in mainstream media, coupled with those advertising the "Buy low, sell high" method of investing. It has been looked at academically using newspaper articles, finding GDP and unemployment mentions in newspapers tended to affect the stock market (Birz & Lott Jr., 2011).

It was found that news articles that are marked as either positive, negative or neutral in terms of the way a company is mentioned in said article had little effect on the day's close price of the stock versus its opening price. The results are not only significant for investors, but also for economic theory; William Sharpe writes that a change in investor preferences (in this case, as a result of news) could mean that numerous parts of models need to alter, to accommodate the preference changes (Sharpe, Risk-Aversion In The Stock Market: Some Empirical Evidence, 1965).

Background

Previous literature has seen researchers look at newspapers for example; it was also found that conditional volatility of stocks was lower on days that preceded scheduled policy announcements from 1994 (Birz & Lott Jr., 2011). Other research has seen Twitter sentiments look at stock prices correlation to tweets. Researchers found they could predict the polarity of the change in stock prices with high accuracy based on that day's tweets (Bollen, Mao, & Zeng, 2011).

A group from Kuwait looked at the effect of news on 7 Kuwaiti oil and gas companies over 93 days in 2012 and found that positive and negative sentiment news did, in fact, affect the stock prices of these companies (Al-Augby, Majewski, & Nermend, 2013). In response to this, I raise the following argument; oil and gas companies are paramount to the success of the Kuwaiti economy. As such, the public will likely place more importance on these companies because of their juggernaut status in the local economy. Also, the sample size in question is minute and potentially may fail to capture other reasons the stocks may have been fluctuating in price during that time period. As such, the data may fail to capture other sources of change and variance within the model.

A 2001 study from the Financial Analysts journal found that there was no correlation between the postings of stocks on a message board for the 10 months starting April 1999, and any change in their stock prices (Whitelaw, 2001). However findings in 2013 also show that it is likely that movements in financial markets and movements in financial news are intrinsically interlinked (Merve Alanyali, 2013). Research was done on the effect of earnings news on the price of stocks. A group from Queen's University, Ontario looked at a set of pharmaceutical stocks for a 6 month period when mentioned in the news at a 30 minute interval. They found they could predict the direction the stock price would move to a high degree of accuracy (Dev Shah, 2018).

The goal of the analysis performed for this essay is to provide a much broader analysis and examination as to what effect news articles mentioning a company have on the price of the stock from the beginning of the day until it closes. The above-mentioned research tackles facets of the question at hand, while all of them fail to illustrate a true picture of the situation. This essay aims to provide said picture and can be used as a springboard for other research to be carried out as well.

Analytical Approach

As this research aims to find the link between the price of a stock and the news that may affect it, I have chosen a multi-regression model with eleven independent variables and one dependent variable. This was chosen over other models such as a clustering analysis as there is little in terms of predictive power for a cluster analysis. A principal components analysis would have only analysed the variance of the whole model, and not predict the potential changes in the daily stock price from the other data provided.

The independent variables aim to show what can affect the price of the stock. These will be the following; Previous market adjusted returns, sentiment class of the article (1 = Positive, -1 = Negative, 0 = Neutral) & the positive, negative and neutral sentiment scores of the article.

I have added variables that should not affect the analysis to act as control variables, which include the articles word count and the number of companies mentioned in the article.

The regression equation is listed below:

$$
\begin{aligned}
Y_{Delta_i} = {} & X_{Lagged\ Variable_i}\beta_{Lagged\ Variable_i} + X_{1\ Day\ Market\ Return_i}\beta_{1\ Day\ Market\ Return_i} \\
& + X_{1\ Day\ Market\ Close_i}\beta_{1\ Day\ Market\ Close_i} + X_{Article\ Length_i}\beta_{Article\ Length_i} \\
& + X_{Article\ Urgency_i}\beta_{Article\ Urgency_i} \\
& + X_{Number\ of\ Companies\ Mentioned_i}\beta_{Number\ of\ Companies\ Mentioned_i} \\
& + X_{Article\ Relevance_i}\beta_{Article\ Relevance_i} + X_{Sentiment\ Class_i}\beta_{Sentiment\ Class_i} \\
& + u_i
\end{aligned}
$$

Intuition would tell us that as the positivity of a news article increased, it would have a positive effect on the outlook for the company mentioned, and would cause the stock to increase in price. On the other hand, a negative article should decrease the confidence investors and the public have in a company, therefore decreasing the price of the stock.

DESCRIPTION OF THE DATASET

The data comes in two portions. The market data from Intrinio and the news data from Thomson Reuters accessed through a Python kernel on Kaggle.

Looking first at the market data; it runs from February 2007 until December 2016 for a group of roughly 1700 stock tickers per day for 2277 trading days. Basic information such as open & close prices along with volume counts was included. Following from that were more advanced tools such as both raw and market-adjusted returns for that stock for the previous 1 & 10-day horizons along with the next 1 & 10 days. The dataset numbers roughly 4,000,000 rows, which is more than enough market data to be relevant.

The news data is the key to this analysis. It consists of roughly 3.5 million rows of data. Each row consists of the headline, date, body size and stock ticker mentioned. Each news article was analysed by roughly seventy readers and given a sentiment score, days with multiple articles and sources were aggregated into one singular article. Python was used to clean the data, merge news articles and merge the news data with the stock price data.

Graphing the data, Figure 1 (located in the Appendix) suggests that the stock deltas are normally distributed with mean value μ=0.0055 and a standard deviation of σ= 0.941. This shows us that from 2007 to 2016, stocks tended to increase in price by \$0.0055 per day with a variance of \$0.94 per day. One can also surmise from the graph that it has an extremely high kurtosis, implying that the point on the graph is sharp and its tails are extremely tight to the mean. This is highlighting the fact that intra-day prices tended to centre themselves close to the mean (and 0, given how close μ is to 0).

EMPIRICAL RESULTS

Multiple regression analyses were performed using Ordinary Least Squares (OLS) at a 5% level of significance. The dependent values tested using two separate regressions; first the stocks daily delta, with and without news in a day. Second the returns in the 10 days after a piece of news (market adjusted). The sentiment parameters used are the relevance adjusted figures.

Looking firstly at Figure 2, where the stocks deltas were regressed against numerous independent values, one notices a few interesting points; The adjusted negative sentiment did indeed have a negative effect on the size of the delta of stocks with a $\beta_{\text{Adjusted Negative}}$=-0.082. The logic behind the positive sentiment stayed true to theory, where the model produced $\beta_{\text{Adjusted Positive}}$=0.017. Adjusted Neutral sentiment had a positive effect on the price of a stock with $\beta_{\text{Adjusted Neutral}}$=0.011. Neutral news had a slightly positive effect on the company as investors potentially thought "No real news is good news". All of the above figures had $P<0.01$ values which mean they are all statistically significant to the model.

The main constituent to the predictive power from the model came from the previous day's non-market adjusted return, which is the Lagged Variable in the study. With $\beta_{\text{Lagged Variable}}$=17.8. This means that as the close price of the previous day increased, the close price of the next day tended to increase too.

Looking at the model as a whole we see that we have R^2=R_adj^2=0.22 which says the model accounts for 22% of the total variation in the data. With something as intricate and complicated as the stock market, this number is totally expected and acceptable. The F-test had a P=0, which means the model is statistically significant, the likelihood of the β coefficients being equal to zero, is zero.

The Durbin-Watson statistic measures the degree of autocorrelation in the model. Autocorrelation is the measure of the correlation of a variable with past values of the variable (i.e. the correlation between yesterday's stock price with today's stock price). The model produced had a d=1.83, which indicates a near complete absence of autocorrelation within the model, adding to its validity.

A Dickey-Fuller test was performed with the following Hypotheses; H_0:There is a unit route for the series and H_1:There is no unit route for the series,therefore stationary. The value obtained had a P-value of P=0. This indicates the model displays no variance with time.

The Jarque-Bera test establishes whether or not the distribution of the data is normal (one of the assumptions of the regression model). The model produced a JB=$1.2*10^{13}$ and prob(JB)=0 which indicates from the test that there is no normality in the sample. However, this test can be inaccurate for any sort of outlier. As sample size as this dataset is ~3.75 million rows, there are numerous outliers (in comparison to the rest of the data) that can nullify the test (Brys, Hubert, & Struyf, 2004). Another argument against the accuracy of the Jarque-Bera test is the Central Limit Theorem (CLT). The CLT states that the sampling distribution of the sample means tends to a normal distribution as the sample size increases — regardless of the shape of the population distribution. This tells us that with a sample as large as the one being used in the model, it is more than likely normally distributed.

The model presented was chosen over other models, seen in Figure 3. For example, the non-adjusted sentiment ratings (Negative Sentiment, Neutral Sentiment and Positive Sentiment) mostly had $P>0.05$ so were statistically insignificant. This is seen in Figure 3. The purpose of adjusting the variables was to see how much the relevance of the news article affected the change in stock price. This adjustment standardises the effect a piece of news had on a stock. The R^2 values remained the same between the models.

Figure 4 looks at how news would affect the volatility of a stock as a result of a piece of news. The logic behind this is that the 10 Day Market Return is a measure of the market adjusted returns of the stock 10 days after the news is published. We can see from Figure 4 that the model $R^2=0.004$ which is admittedly low, but that the adjusted returns depend on multiple extraneous market variables that are completely unaffected by one company as a whole. Many of these variables simply cannot be included in a model such as the one presented, this is due to the amount of unknown variables that could affect a stock each day compounds to a point where a model simply can't reasonably account for them all. Knowing this, we see that news has a negligible effect on the volatility of the stock over the next 10 days of trading.

POSSIBLE EXTENSIONS

In an attempt to add more predictive power to the model, some market variables could be investigated as to whether or not they have an effect on the movement of a stock price. This could include; general sentiment towards the world and local markets and general sentiment towards a company and sector.

This could give an idea of how much an investor is likely to pay attention to a particular article in relation to a company.

Copious extra regressions could be performed to establish a company index on the effects of news on the stock price of a company. A cluster analysis could be performed on this to establish if there are any clusters of companies (for example, companies in the oil sector) that are all affected by news in a similar way. This could show allow for more intelligent trading into the future.

Conclusions

The goal of the analysis performed was to investigate the effect of news pieces on stock prices. The model provided has given the following results; positive, negative or neutral news has a negligible, but statistically significant, effect on the price of a stock at an intra-day level. Positive, negative or neutral news has almost nil effect on the volatility of the stock in the 10 days following publishing.

The stock market is very much elastic in its response to news shocks as the vast majority of price changes due to news seem to return to normal by the end of the day. However, this could have ramifications for the Capital Market equilibrium as described by William Sharpe. As the tastes of investors change, the market equilibrium price could change too (Sharpe, 1964),

Knowing the way investor preferences change in reaction to news could allow for the development of more intelligent trading and investment strategies. It has been found that investors and financial professionals do not always make rational decisions (Chandra, 2009). The potential to take the human randomness out of stock trading could potentially revolutionise the face of algorithmic stock trading into the future.

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Appendix

Figure 1(Distribution of Stock's Intra-day prices)

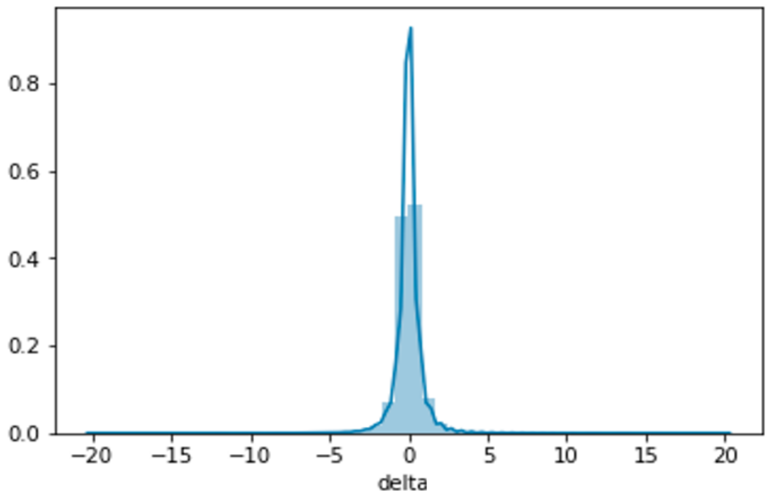


Figure 2

OLS Regression Results

Dep. Variable:	Delta	R-squared:	0.221
Model:	OLS	Adj. R-squared:	0.220
Method:	Least Squares	F-statistic:	8.124e+04
Date:	Sat, 02 Feb 2019	Prob (F-statistic):	0.00
Time:	13:02:47	Log-Likelihood:	-4.8837e+06
No. Observations:	3733316	AIC:	9.767e+06
Df Residuals:	3733303	BIC:	9.768e+06
Df Model:	13		
Covariance Type:	nonrobust		

	coef	std err	t	P>ltl	[0.025	0.975]
Lagged Variable	17.8335	0.027	672.649	0.000	17.782	17.885
1 Day Market Return	-7.1779	0.031	-233.168	0.000	-7.238	-7.118
1 Day Market Close	-0.0003	0.000	-1.762	0.078	-0.001	3.89e-05
Article Urgency	0.0014	0.001	1.769	0.077	-0.000	0.003
Article Length	-6.897e-07	2.4e-07	-2.868	0.004	-1.16e-06	-2.18e-07
Number of Companies Mentioned	6.192e-06	0.000	0.043	0.965	-0.000	0.000

Sentiment Class	-0.0003	0.002	-0.123	0.902	-0.005	0.004
Adjusted Negative	-0.0818	0.007	-12.496	0.000	-0.095	-0.069
Adjusted Neutral	0.0111	0.004	2.646	0.008	0.003	0.019
Adjusted Positive	0.0173	0.005	3.256	0.001	0.007	0.028

Omnibus:	9024802.074	Durbin-Watson:	1.833
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12072648679852.670
Skew:	-23.356	Prob(JB):	0.00
Kurtosis:	8812.544	Cond. No.	2.60e+05

FIGURE 3

OLS Regression Results

Dep. Variable:	Delta	R-squared:	0.220
Model:	OLS	Adj. R-squared:	0.220
Method:	Least Squares	F-statistic:	8.799e+04
Date:	Fri, 08 Feb 2019	Prob (F-statistic):	0.00
Time:	15:15:22	Log-Likelihood:	-4.8838e+06
No. Observations:	3733316	AIC:	9.768e+06
Df Residuals:	3733304	BIC:	9.768e+06
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Lagged Variable	17.8347	0.027	672.740	0.000	17.783	17.887
1 Day Market Return	-0.0006	0.000	-3.078	0.002	-0.001	-0.000
1 Day Market Close	-7.2063	0.030	-240.376	0.000	-7.265	-7.148
10 Day Market Return	0.0011	0.000	5.894	0.000	0.001	0.001
Article Urgency	0.0030	0.002	1.745	0.081	-0.000	0.006
Article Length	-6.208e-07	2.43e-07	-2.554	0.011	-1.1e-06	-1.44e-07
Number of Companies Mentioned	1.865e-05	0.000	0.118	0.906	-0.000	0.000
Article Relevance	-0.0087	0.003	-2.591	0.010	-0.015	-0.002
Sentiment Class	0.0032	0.003	0.959	0.338	-0.003	0.010
Negative Sentiment	-0.0401	0.009	-4.715	0.000	-0.057	-0.023
Neutral Sentiment	0.0054	0.006	0.832	0.406	-0.007	0.018
Positive Sentiment	0.0098	0.009	1.134	0.257	-0.007	0.027

Omnibus:	9026934.298	Durbin-Watson:	1.833
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12092532544465.189
Skew:	-23.370	Prob(JB):	0.00
Kurtosis:	8819.796	Cond. No.	2.57e+05

FIGURE 4

OLS Regression Results

Dep. Variable:	10 Day Market Return	R-squared:	0.004
Model:	OLS	Adj. R-squared:	0.004
Method:	Least Squares	F-statistic:	1358.
Date:	Fri, 08 Feb 2019	Prob (F-statistic):	0.00
Time:	13:46:38	Log-Likelihood:	-8.7345e+06
No. Observations:	3733316	AIC:	1.747e+07
Df Residuals:	3733304	BIC:	1.747e+07
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Lagged Variable	-0.1324	0.079	-1.682	0.093	-0.287	0.022
1 Day Market Return	0.0678	0.001	127.467	0.000	0.067	0.069
1 Day Market Close	-0.0052	0.085	-0.062	0.951	-0.171	0.161
Article Urgency	0.0062	0.002	2.699	0.007	0.002	0.011
Article Length	-5.966e-07	6.74e-07	-0.885	0.376	-1.92e-06	7.25e-07
Number of Companies Mentioned	-0.0003	0.000	-0.871	0.384	-0.001	0.000
Article Relevance	-3018.1934	8791.640	-0.343	0.731	-2.02e+04	1.42e+04
Sentiment Class	0.0022	0.006	0.355	0.723	-0.010	0.014
Adjusted Positive	3018.1768	8791.640	0.343	0.731	-1.42e+04	2.02e+04
Adjusted Negative	3018.1816	8791.640	0.343	0.731	-1.42e+04	2.02e+04
Adjusted Neutral	3018.1870	8791.640	0.343	0.731	-1.42e+04	2.02e+04
Delta	0.0086	0.001	5.899	0.000	0.006	0.011

Omnibus:	26297150.539	Durbin-Watson:	2.000
Prob(Omnibus):	0.000	Jarque-Bera (JB):	978527003927560 32.000
Skew:	803.835	Prob(JB):	0.00
Kurtosis:	793131.873	Cond. No.	4.15e+10

A Game Theory Analysis of the Suspension of the INF Treaty

Daire de Hora, Senior Sophister

On February 1st, Donald Trump confirmed that the U.S was suspending its obligations under the Intermediate-Range Nuclear Forces (INF) Treaty amidst allegations of repeated Russian breaches. Despite this, the U.S will not fully withdraw until August, giving Russia the opportunity to respond and attempt to salvage the treaty. Daire de Hora analyses this U.S-Russian interaction as an extensive form game with incomplete information, in an attempt to identify the possible equilibrium outcomes. In doing so, she provides an interesting analysis of the potential motivations of the two players concluding that Russian beliefs about American intentions could ultimately be the deciding factor for the future of the treaty.

Introduction

The INF treaty, signed in 1987 by the USSR and the US, required the elimination of all ground-launched missiles with a range between 500 and 5,500 km and prohibited future development of such missiles (nti.org, 2018). In October 2018, President Trump announced that the US planned to withdraw from the INF treaty, citing Russia's non-compliance with the treaty's provisions as the main reason (nti.org, 2018). In February 2019, it was announced that the US was suspending its compliance with the treaty and planned to withdraw in August (nti.org, 2018). The allegations have been denied by President Putin and he has stated that Russia is not in favour of the destruction of the treaty (rferl.org, 2018).

Outline

This paper will model the situation between Russia and the US as an extensive form game with incomplete information. The US has two types: an independent type and a cooperative type. The independent type values its independence and receives a higher payoff from withdrawing from the treaty. The cooperative type values the security provided by the treaty, and receives the highest payoff when it remains in the treaty and Russia complies.

In order to solve the game, it is modelled as a game of imperfect information. Nature moves first and determines the US' type. The probability that the US is the independent type is denoted by α and the probability that the US is the cooperative type is denoted by 1-α and these probabilities are known to both players. After Nature moves, the US knows its type, but Russia does not.

The US moves after Nature and decides whether to announce that it plans to withdraw from the treaty or not. If the US does not announce that it will withdraw, the game ends and both players remain in the treaty. If the US announces its withdrawal, Russia can move. Russia observes the US' action and, if the US played announce, can then decide whether to stand firm and continue to claim that it is not in violation of the treaty, or to cave and admit to the alleged violation of the treaty and agree to stop. The US can then move again and either withdraws from the treaty or changes its mind and does not withdraw.

The payoffs to each outcome are given at each terminal node and the US' payoffs are always listed first. The payoffs to the different potential outcomes are ranked in the following way (where the outcome is the result of the players following the actions in parentheses):

Independent type of the US:

U(Announce, Cave, Withdraw)>U(Announce, Stand firm, Withdraw)>U(Announce, Cave, Change mind)>U(Don't announce)>(Announce, Stand firm, Change mind)

The independent type obtains the highest payoff when it withdraws from the treaty, since it values its independence, and the payoff is higher when Russia admits it has breached the treaty than when Russia plays stand firm. The independent type prefers to remain in the treaty when Russia admits to breaching the treaty than it does to not announce its plans to withdraw at all. Lastly, the worst option for the independent U.S type is to announce its withdrawal and then change its mind when Russia has played stand firm.

Cooperative type of the US:

U(Announce, Cave, Change mind)>U(Don't announce)>U(Announce, Cave, Withdraw)> U(Announce, Stand firm, Withdraw)>(Announce, Stand firm, Change mind)

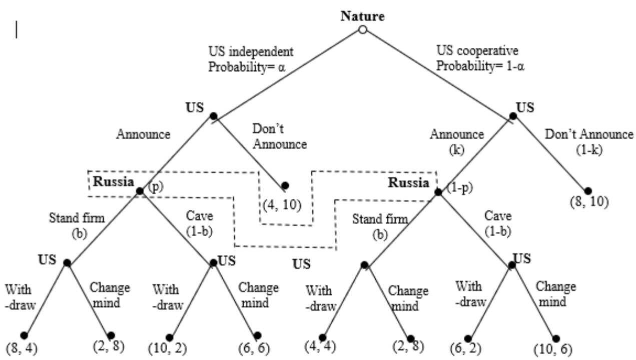
The cooperative type receives the highest payoff when it remains part of the treaty and Russia agrees to comply with the treaty. The cooperative type prefers not to announce its plans to withdraw from the treaty than to withdraw from the treaty. The lowest payoff to the cooperative type of the US is the same as that of the independent type, which is when it threatens to leave the treaty but changes its mind after Russia plays Stand firm.

Russia:

U(Don't announce)>U(Announce, Stand firm, Change mind)>U(Announce, Cave, Change mind)> U(Announce, Stand firm, Withdraw)>(Announce, Cave, Withdraw)

Russia's payoffs do not depend on the type of the US, only on the actions taken by the players. Russia's most preferred outcome is for the US not to announce its withdrawal from the treaty. Russia prefers to stay in the treaty, so if the US does announce its withdrawal, Russia receives a higher payoff when the US changes its mind than when it follows through with the withdrawal. Russia also receives a higher payoff from playing Stand firm than Cave, for a given action of the US at its second decision node.

Model



Assumptions

In order to formulate the payoffs, assumptions had to be made about how the players would rank the outcomes and also the values they might attach to them. The assumptions about the ranking of the preferences seem reasonable given the behaviour of the players in reality. For example, as mentioned in the introduction, President Putin has made it clear that Russia would prefer to remain part of the treaty, so it makes sense for Russia to receive a higher payoff when the treaty is not terminated.

There is no way to discern the exact payoffs the players would assign to each outcome, so for simplicity it has been assumed each player's most preferred outcome gives them a payoff of 10, and that each less preferred outcome gives a payoff that is lower by 2. Changing the value of the payoffs could change the equilibria of the game, but any values would be arbitrary, so it is assumed that these values are correct.

It is also assumed that Russia does not know the US' true preferences when the US announces its plans to withdraw from the treaty. This is modelled in the game as the US having two types and Russia not knowing which type it is playing against (shown by the information set in the decision tree).

To solve the game α must be given a value, so it will first be assumed that α is equal to 0.6. It seems probable that the US is more likely to be the independent type, because there has been speculation that the US is concerned about the build-up of the nuclear arms of other countries, China in particular (rferl.org, 2018). The US might thus prefer to withdraw from the treaty, regardless of whether Russia agrees to comply. This assumption will then be relaxed, to examine how changing this probability will change the predictions of the game.

Equilibria

When $\alpha=0.6$, the game yields one perfect Bayesian equilibrium (PBE):

Separating equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent | Announce)= 1

This is a separating equilibrium because the two types of the US play different actions at their first decision nodes. This allows Russia to update its beliefs after observing the US' first move.

The assumption that α=0.6 will now be relaxed to examine how the predictions of the game change as the value of α changes.

Increasing the value of α does not change the equilibria of the game. Any value of α greater than 0.6 yields only the separating equilibrium.

When α=0.5, the game yields two PBE:

Separating equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent | Announce)= 1

Pooling equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce; Withdraw; Change mind

Russia's strategy: Stand firm with probability<1/3; Cave with probability≥2/3

Russia's beliefs: Prob(Independent | Announce)= 1/2

There is now also a pooling equilibrium, in which no information is revealed to Russia when the US moves because both types play Announce.

When α<0.5, the game yields three PBE:

Separating equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent | Announce)= 1

Pooling equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce; Withdraw; Change mind

Russia's strategy: Cave

Russia's beliefs: Prob(Independent|Announce)= α

Semi-separating equilibrium:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce with probability k; Don't announce with probability 1-k; Withdraw; Change mind (where $1/9 \leq k \leq 2/3$, depending on the value of α)

Russia's strategy: Stand firm with probability 1/3; Cave with probability 2/3

Russia's beliefs: Prob(Independent|Announce)= 1/2

There is now a semi-separating equilibrium, in which both Russia and the cooperative type of the US are using mixed strategies.

Analysis

This game highlights that there might be a situation in which the INF treaty remains in effect, even though the US has already announced its plans to withdraw from it. So far, Russia has denied the allegations of its non-compliance with the treaty's provisions. The pooling equilibrium shows that Russia will admit that it has violated the treaty, if it believes that the US is less likely to be the independent type than the cooperative type given that it played announce ($p \leq 1/2$). Whether Russia would admit to breaching the treaty in reality has yet to be seen. This result implies, however, that, if the assumption that Russia wants to stay in the treaty is correct and if Russia believes that the probability that the US has the preferences of the cooperative type in reality is sufficiently high, it might be willing to admit that it has breached the treaty in order to prevent its demise.

It is also interesting to consider the impact that the incomplete information has on the outcomes for the two players, especially when the US is the cooperative type. The separating equilibrium, which exists for all values of α, results in a payoff of 10 to Russia and a payoff of 8 to the US if Nature determines that the

US is the cooperative type. If Russia were playing against the cooperative type and there was complete information, the only subgame perfect equilibrium would be for the US' strategy to be announced, withdraw, change mind and for Russia's to be cave. Russia and the US would therefore obtain payoffs of 6 and 10, respectively. In this case, complete information would make Russia worse off and the US better off. It is as if Russia's lack of information gives credibility to its threat of playing stand firm. With perfect information, it would not be optimal for Russia to play stand firm, because it would receive a higher payoff from playing cave. When Russia does not know the US' type, however, it can credibly claim that it will play stand firm and the cooperative type optimally responds by playing don't announce.

EXTENSIONS

President Putin has claimed the Russia will retaliate and develop weapons that were prohibited under the treaty should the US withdraw(Johnson, 2018). A possible extension to this game would be to incorporate this development by allowing Russia to have an additional move at the end of the game, where it can decide to retaliate or not. Alternatively, an option to threaten retaliation could be included at Russia's first decision node. It would be interesting to examine whether expanding Russia's set of available actions would change the equilibria of the game.

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Appendix

Solving for the PBE:

Starting at the bottom of the game, at the independent type of the US' second decision node, the independent type should choose Withdraw when Russia chooses Stand firm and when Russia chooses Cave. At the independent type's first decision node, it will choose Announce, because it strictly dominates Don't announce.

At the second decision node of the cooperative type of the US, when Russia plays Stand firm, the cooperative type should play Withdraw. When Russia plays Cave, the cooperative type should play Change mind. At its first decision node, the cooperative type should play Don't announce when Russia plays Stand firm and it should play Announce when Russia plays Cave.

Russia's optimal move, given its belief, p:

$EU_R(SF|p)= (p)4+(1-p)4= 4$

$EU_R(C|p)= (p)2+(1-p)6= 6-4p$

Russia prefers to play Stand firm when $EU_R(SF|p)> EU_R(C|p) = 4>$

$6-4p = p>1/2$

When $p>1/2$, Russia will play Stand firm

When $p<1/2$, Russia will play Cave

When $p=1/2$, Russia is indifferent between playing Stand firm and Cave

P=Prob(Independent|Announce)= (prob(Announce|Independent).prob(Independent))/(prob(Independent).prob(Indepedent)+ prob(Cooperative).prob(Cooperative))

$= (1(\alpha))/(1(\alpha)+ k(1-\alpha))$

We know that the independent type will always choose Announce, so the probability that the US will choose Announce when it is the independent type is 1.

Let k denote the probability that the US will choose Announce when it is the cooperative type.

The value of p thus depends on the value of α and the value of k.

What value of k leads to p being less than, greater than, and equal to 1/2?

p<1/2 when $(1(\alpha))/(1(\alpha)+ k(1-\alpha)) < 1/2 = 2\alpha < \alpha+ k(1-\alpha) =$

$k > \alpha/((1-\alpha))$

p>1/2 when $k < \alpha/((1-\alpha))$

p=1/2 when $k = \alpha((1-\alpha))$

$\alpha=0.1$: $\alpha/((1-\alpha)) = 0.1/((1-0.1)) = 1/9$

$\alpha=0.2$: $\alpha/((1-\alpha)) = 0.2/((1-0.2)) = 1/4$

$\alpha=0.3$: $\alpha/((1-\alpha)) = 0.3/((1-0.3)) = 3/7$

$\alpha=0.4$: $\alpha/((1-\alpha)) = 0.4/((1-0.4)) = 2/3$

All of these values of k lie between 0 and 1 (which is required since k is a probability).

$0.1 \leq \alpha \leq 0.4$

Case 1: p<1/2

If p<1/2, Russia prefers to play Cave.

If Russia plays Cave, the cooperative type of the US will play Announce at the first decision node, so k=1.

To have p<1/2, we must have k>1/9 for $\alpha=0.1$; k>1/4 for $\alpha=0.2$; k>3/7 for $\alpha=0.3$ and k>2/3 for $\alpha=0.4$.

A value of k=1 is thus consistent with p<1/2 for all values of α between 0.1 and 0.4, so beliefs are consistent.

The independent type of the US will always play Announce at the first decision node and Withdraw at both of its following decision nodes.

Since both types of the US are playing Announce at the first decision node, no information is revealed through this action, so Russia's posterior beliefs are equal to its prior beliefs.

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce; Withdraw; Change mind

Russia's strategy: Cave

Russia's beliefs: Prob(Independent|Announce)= α

Case 2: p>1/2

If p>1/2, Russia prefers to play Stand firm.

If Russia plays Stand firm, the cooperative type of the US will play Don't announce at the first decision node, so k=0.

To have p>1/2, we must have k<1/9 for α=0.1; k<1/4 for α=0.2; k<3/7 for α=0.3 and k<2/3 for α=0.4.

A value of k=0 is thus consistent with p>1/2 for all values of α between 0.1 and 0.4, so beliefs are consistent.

The independent type will always play Announce at the first decision node and Withdraw at both of its following decision nodes.

Since each type of the US is playing different actions at the first decision node, Russia can update its beliefs using Bayes' rule after observing the US' action.

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent|Announce)= 1

Case 3: p=1/2

If p=1/2, Russia is indifferent between playing Stand firm and Cave.

If p=1/2, k is equal to a particular value less than 1 when α takes these values, so the cooperative type is mixing between Announce and Don't announce.

In order for the cooperative type to be willing to mix, it must be indifferent between paying Announce and Don't announce. This is only possible if Russia is also mixing.

The cooperative type of the US is indifferent between Announce and Don't announce when EUUSC(Announce|b)= EUUSC(Don't announce|b) =

(b)4+(1-b)10 = 8 =

b=1/3

where b denotes the probability with which Russia will play Stand firm.

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce with probability k; Don't announce with probability 1-k; Withdraw; Change mind

Russia's strategy: Stand firm with probability 1/3; Cave with probability 2/3

Russia's beliefs: Prob(Independent|Announce)= 1/2

where k=1/9 when α=0.1; k=1/4 when α=0.2; k=3/7 when α=0.3 and k=2/3 when α=0.4

α=0.5

$\alpha/((1-\alpha)) = 0.5/((1-0.5)) = 1$

For p to take a value less than 1/2 would require k to be greater than 1. This is not possible, since k is a probability and must lie between 0 and 1, so there cannot exist an equilibrium in which p<1/2.

Case 1: p>1/2

If p>1/2, Russia prefers to play Stand firm.

If Russia plays Stand firm, the cooperative type of the US will play Don't announce at the first decision node, so k=0.

To have p>1/2, we must have k<1. A value of k=0 is thus consistent with p<1/2, so beliefs are consistent.

The independent type of the US will always play Announce at the first decision node and Withdraw at both of its following decision nodes.

Since each type of the US is playing different actions at the first decision node, Russia can update its beliefs using Bayes' rule after observing the US' action.

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent|Announce)= 1

Case 2: p=1/2

If p=1/2, Russia is indifferent between playing Stand firm and Cave.

If p=1/2, k=1 when α=0.5

The cooperative type of the US is willing to play Announce with probability 1 (k=1) when EUUSC(Announce|b)>EUUSC(Don't announce|b)=

$(b)4+(1-b)10 > 8 =$

$b<1/3$

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Announce; Withdraw; Change mind

Russia's strategy: Stand firm with probability<1/3; Cave with probability≥2/3

Russia's beliefs: Prob(Independent|Announce)= 1/2

$0.5 < \alpha \leq 1$

$\alpha=0.6$: $\alpha/((1-\alpha)) = 0.6/((1-0.6)) = 3/2$

$\alpha=0.7$: $\alpha/((1-\alpha)) = 0.7/((1-0.7)) = 7/3$

$\alpha=0.8$: $\alpha/((1-\alpha)) = 0.8/((1-0.8)) = 4$

$\alpha=0.9$: $\alpha/((1-\alpha)) = 0.9/((1-0.9)) = 9$

For all of these values of α, there only can exist an equilibrium in which $p>1/2$. For p to be equal to or less than 1/2 would require k to be greater than 1, which is not possible since k is a probability.

Case 1: $p>1/2$

If $p>1/2$, Russia prefers to play Stand firm.

If Russia plays Stand firm, the cooperative type will play Don't announce at the first decision node, so $k=0$.

To have $p>1/2$, we must have $k<3/2$ for $\alpha=0.6$; $k<7/3$ for $\alpha=0.7$; $k<4$ for $\alpha=0.8$ and $k<9$ for $\alpha=0.9$

A value of $k=0$ is thus consistent with $p>1/2$ for all values of α between 0.6 and 0.9, so beliefs are consistent.

The independent type of the US will always play Announce at the first de cision node and Withdraw at both of its following decision nodes.

Since each type of the US is playing different actions at the first decision node, Russia can update its beliefs using Bayes' rule after observing the US' action.

PBE:

Independent type's strategy: Announce; Withdraw; Withdraw

Cooperative type's strategy: Don't announce; Withdraw; Change mind

Russia's strategy: Stand firm

Russia's beliefs: Prob(Independent|Announce)= 1

The Geopolitical Dilema: a Game Theory Analysis of OPEC

Laura Finnerty, Senior Sophister

In this paper, Laura Finnerty applies classic game theory analysis to OPEC+'s oil supply decisions in the face of threats of US sanctions. She highlights the complexity of the issue as she outlines the optimal strategy for each player given their motivations. This relationship has taken on an interesting dynamic recently as Saudi Arabia is keen to maintain a positive relationship with the U.S following the controversial murder of Jamal Khashoggi, but is unable to withstand current low oil prices. The paper concludes that OPEC+'s supply decisions are much less effective without cooperation with the U.S

INTRODUCTION

Oil prices fell by over 30% in the period from October to December 2018, due to increased global supply (Sheppard and Crooks, 2018). The political dynamics are increasingly complex ahead of OPEC's April meeting, where the cartel will decide whether to further cut oil supplies in a bid to increase global oil prices. President Trump welcomed falling oil prices, hailing them as a "tax cut" for the world (Sheppard, 2018), hence it is assumed that the US' preference for no supply cut is known. Meanwhile, Saudi Arabia, as the world's largest oil exporter requires sustained oil prices to maintain economic growth. Saudi Arabia, OPEC's de facto leader, faces a trade-off between economic and political gains. The murder of Saudi Arabian journalist Jamal Khashoggi, caused fractures in their relationship with the United States, a key Western ally.

Since 2016, Russia along with other non-OPEC oil producers have cooperated with OPEC's supply decisions forming the OPEC+ group. Russia, alongside Saudi Arabia were the biggest benefactors from increasing supply in response to US sanctions on Iranian oil exports. Simultaneously, a boom in US shale production has led to further supply in the market, surpassing the decrease in output from Iran and Venezuela. According to the law of supply, as quantity supplied increases the price of a good will decrease, assuming demand is held constant, resulting in falling oil prices. OPEC+ faces a strategic decision; to stabilise global oil prices through a supply cut or give in to political pressure from the US and maintain current output levels. In this paper, game theory is used to model strategic interactions between the US and OPEC+, analysing the optimal strategy for each.

Outline

The model represents an Extensive form Bayesian game with imperfect information. There are two players who move sequentially; OPEC+ and the US. The US only has one type, OPEC+ can be one of two types; Political or Economic. In order to model this random variable Nature moves first and determines OPEC+'s type. After Nature's signal, only OPEC+ is aware of its type and the US never has complete information. OPEC+ must decide between imposing a supply cut or leaving supply at current levels. If OPEC+ does not reduce supply then the game ends and downward pressure on oil prices remain. If OPEC+, decides to impose a supply cut, the US must choose whether or not to retaliate. If the US chooses not to retaliate then the game ends and the supply cut remains in place, increasing global oil prices.

In response to a possible supply cut, the US has several possible forms of retaliation; increased shale production or to reduce Iranian sanctions - both increasing oil supply. Politically, the US could impose sanctions on Saudi Arabia over Jamal Khashoggi's murder. If the US retaliates, OPEC+ may choose to keep the supply cut or to drop it.

Assumptions

The first assumption underlying the model is that all OPEC+ members will move together, which requires the cooperation of non-OPEC members, including Russia. Excluding the potential of divergence among OPEC+ members is a simplification of the game. Although it is likely not too restrictive as the Russian Energy minister has confirmed intent for continued cooperation (Devitt, 2018).

Secondly, the model assumes that the United States has the ability to retaliate. A lack of pipeline infrastructure in the Permian basin has limited output, however, three major projects will open next year (Crowley, 2018) creating capacity to increase supply in excess of any OPEC+ cut. In November, the United States gave six-month waivers to eight countries to allow them to continue to buy

Iranian crude oil (Manson, Peel and Bozorgmehr, 2018). The US could retaliate to a supply cut by extending waivers duration or by increasing the number of countries granted exemption.

Finally, there are assumptions over the preferences of the US and OPEC+. Breakeven costs for US shale producers have fallen dramatically (see Figure 4) and hence it is assumed that while US shale producers would benefit from higher oil prices, they can withstand current levels. President Trump, a proponent of fossil fuels, has welcomed falling oil prices as a "tax cut" passed on to regular Americans at gasoline pumps. With an election in 2020, it is in the US President's political interest to suppress crude prices. The US is now the largest oil producer in the world (see Figure 2), and although damaging international relations through retaliation is undesirable, they have strong political leverage over the group's de facto leader.

Although Middle Eastern producers have lower breakeven costs (see Figure 5), according to the IMF, countries such as Saudi Arabia need oil prices sustained in the \$85-\$87 range to finance state spending (Hiller, 2018). A supply cut is in the economic interest of OPEC+, however, the question remains whether Saudi Arabia can withstand US retaliation. Saudi Crown Prince Mohammed bin Salman wants to avoid conflict with the US President after he stood by him following the murder of Jamal Khashoggi, ignoring calls from Washington to impose sanctions for the killing. Saudi Arabia cannot afford to lose the US as a Western ally but simultaneously cannot withstand \$50 a barrel oil prices without serious economic ramifications.

The outcomes for the US are ranked as follows:

U(No Cut)>U(Cut, Retaliate, Drop)>U(Cut, Not Retaliate)>U(Cut, Retaliate, Keep)

For the United States the best outcome is that no supply cut is imposed and oil prices remain low. In response to a supply cut, the US would rather retaliate if they believe OPEC+ will drop the cut than not retaliate at all. However, the worst outcome is if the US retaliates and the supply cut is maintained, damaging international relations and suffering higher oil prices.

If OPEC+'s type is economic:

U(Cut, Not Retaliate)>U(Cut, Retaliate, Keep)> U(No Cut)>U(Cut, Retaliate, Drop)

If OPEC+'s type is economic it is assumed that the benefits from higher oil prices outweigh some damages to international relations. The best outcome is that OPEC+ impose a supply cut and the US does not retaliate resulting in higher oil prices but limited tension between the groups. However, OPEC+ acting in its economic interest, would prefer to cut supply and maintain the cut in response to US retaliation rather than not cutting supply at all. The worst outcome is to cut supply and then back down to US retaliation resulting in damaged international relations and no economic benefit from a supply cut.

If OPEC+'s type is political:

U(Cut, Not Retaliate)>U(No Cut)>U(Cut, Retaliate, Drop)>U(Cut, Retaliate, Keep)

If OPEC+'s type is political it is assumed that while the economic gains from a supply cut is beneficial, avoiding further strain to international relations is more important. The best outcome is that OPEC+ cuts supply and the US chooses not to retaliate. However, if the political OPEC+ believes the US will retaliate to a supply cut then they would rather not cut supply. The worst outcome for the political OPEC+ is the same as the US where following retaliation, the supply cut remains in place and international relations are severely damaged.

EQUILIBRIA

Starting at the end of the game it is clear that the Economic type of OPEC+ will choose to Keep a supply cut and the Political type will choose to Drop a supply cut, hence those are the relevant payoffs to consider. The Economic type has a pure strategy. An Economic OPEC+ will always prefer to play Cut regardless what the US chooses later in the game. A Political OPEC+ will randomise at its first information set where it will choose between Cut and No Cut.

- α: Pr(OPEC+ is Economic)
- k: Pr(Cut | OPEC+ is Political)
- b: Pr(US chooses to Retaliate)
- p: Pr(OPEC+ is Economic | Cut)

Model 1: $\alpha = 2/3$

The first model we look at assumes that OPEC+ is Economic with probability 2/3 and Political with probability 1/3, hence it is twice as likely that OPEC+ is Economic than it is to be Political. The model results in a unique pooling equilibrium.

Pooling PBE (Perfect Bayesian Equilibrium):

- OPEC+ strategy:

    o Economic OPEC+: (Cut, Keep)

    o Political OPEC+: (Cut, Drop)

US strategy: (Not to Retaliate)

- US beliefs:

    o OPEC+ is Economic with probability 2/3 and Political with probability 1/3. The US' beliefs are consistent. Their posterior beliefs are equal to their prior beliefs as the actions of OPEC+ do not reveal any information about their type. The US' strategy is optimal because the expected utility from not retaliating is higher when $p > 1/3$, and in this case $p= 2/3$. OPEC+ strategy is also optimal. Since the US will always choose Not to Retaliate, both the Economic and Political types of OPEC+ will choose to cut earning their highest payoffs of 10.

Model 2: $\alpha= 1/4$

In the second model, we consider new underlying probabilities for OPEC+'s type. This focuses on the political pressure from the United States where international relations between the key nations are already fractured and the group is three times as likely to be a Political type. We assume $\alpha = 1/4$. This yields a unique semi-separating equilibrium whereby the Political OPEC+ is mixing between Cut and No Cut and the US is mixing between Retaliate and Not to Retaliate.

Semi-separating PBE:

- OPEC+ strategy:

    o Economic OPEC+: (Cut, Keep)

    o Political OPEC+: (Cut with probability 2/3, No Cut with probability 1/3, Drop)

- US strategy: (Retaliate with probability 2/3, Not to Retaliate with probability 1/3)

- US beliefs:

    om OPEC+ is Economic with probability 1/4 and Political with probability 3/4. Using Baye's Rule Pr(OPEC+ is Economic | Cut) = 1/3. OPEC+ Political must play Cut with probability 2/3 for the US to be willing to mix between Retaliate and Not to Retaliate. For this to be optimal for OPEC+

Political, the US must play Retaliate with probability 2/3. If the US observes a supply cut, then it believes OPEC+ is Economic with probability 1/3.

Analysis

By comparing equilibria with different underlying discrete probabilities we see the importance of the probabilities assigned to each type of OPEC+. If it is more probable that OPEC+ will act in its economic interest (Model 1), then the optimal strategy for the US is not to retaliate to a supply cut. However, if it is more probable that OPEC+ is acting in its political interest (Model 2), then the optimal strategy is for the US to mix strategies.

In this paper, co-operation between OPEC+ countries is assumed as a simplification. Although not modelled in this paper, there is a further game theory decision nested within OPEC+; the strategic decision of each OPEC+ country on whether or not to obey a supply cut. This can be thought of as a complex version of the Prisoner's dilemma. The Pareto efficient outcome is for all members to co-operate in cutting supply, however, there is always a monetary incentive to deviate and produce more. In reality, this can be thought of as a repeated game as OPEC will face further supply decisions in the future. Hence, as there is the potential for punishment if members do not cooperate this should lead OPEC+ to the efficient outcome.

An interesting extension to the model would be to include cheap talk signalling, where after the sender (OPEC+) learns their type, they choose a message to send to the receiver (US). In the age of world leaders Tweeting, the addition of a costless signal of intent is realistic. It is in OPEC+'s interest to signal that its type is economic, as then the US's optimal strategy is not to retaliate resulting in the highest possible payoff for OPEC+.

Policy

OPEC is most efficient when there is cooperation between all members. Increased cooperation between oil producing nations both OPEC and non-OPEC members should lead to greater oil price stability. Hence, there is a policy incentive to create a more formal OPEC+ which would lock in non-member countries such as Russia to cooperate on future supply decisions. As the United States is now the largest oil producer in the world, in order for OPEC's supply decisions to remain effective there is a policy incentive to include the United States in a redefined OPEC group.

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APPENDIX 1

Model 1: $\alpha = Pr(OPEC^{+} is Economic) = \frac{2}{3}$

$$EU_{US}[Retaliate|p] = p(1) + (1-p)(7) = 7 - 6p$$
$$EU_{US}[NotRetaliate|p] = p(5) + (1-p)(5) = 5$$

US will prefer to Retaliate if:

$$7 - 6p > 5$$
$$-6p > -2$$
$$p < \frac{1}{3}$$

Therefore:

- If p $< \frac{1}{3}$ US will choose Retaliate.
- If p $> \frac{1}{3}$ US will choose Not to Retaliate.
- if p $= \frac{1}{3}$ US will be indifferent between Retaliate and Not to Retaliate.

US beliefs must be consistent with OPEC^{+}'s strategy and Baye's rule:

$$\begin{aligned} p &= Pr(OPEC^{+}Economic|Cut) \\ &= \frac{Pr(Cut|OPEC^{+}Economic) * Pr(OPEC^{+}Economic)}{Pr(C|OPEC^{+}Economic) * Pr(OPEC^{+}Economic) + Pr(C|OPEC^{+}Political) * Pr(OPEC^{+}Political)} \\ &= \frac{(1)(\frac{2}{3})}{(1)(\frac{2}{3}) + (k)(\frac{1}{3})} \\ &= \frac{2}{2+k} \end{aligned}$$

'Cocoa is Ghana, Ghana is Cocoa' – Should Ghana Specialise in the Production and Export of Cocoa Beans?

Dinnaga Padmaperuma, Senior Sophister

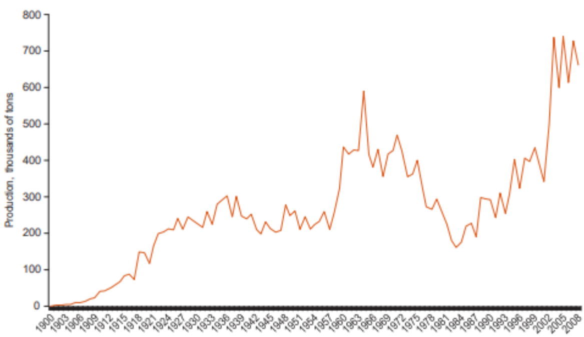
Potential of "Dutch Disease" in Ghana, the second largest producer of cocoa beans, has produced the unlikely question of whether to continue specialization toward cocoa. Based upon a balanced consideration of economic theory through the Heckscher-Ohlin Model and previously discounted flaws of this model, Dinnaga Padmaperuma recommends to not specialize further in cocoa production. He presents a series of arguments rooted in real wage dynamics, producer price developments and incentives for innovation to evaluate decisions, both theoretical and institutional, to specialize. In conclusion, he presents some possible improvements and extensions to his analysis.

Introduction

The light-hearted phrase 'Cocoa is Ghana, Ghana is Cocoa' mentioned in everything from dessert recipes to peer-reviewed academic papers, provides an insightful glance at a wider issue in the sphere of international trade economics. Traditionally, West African agriculture has played a central role in the provision of sustenance, raw materials, employment and foreign earnings to secure adequate backing for development (Yahaya, et al., 2015). This is evident in Ghana being the second largest producer of cocoa beans, with recent estimates indicating 900,000 tons in 2017/2018 second only to Côte d'Ivôire (ICCO, 2018). The magnitude of the subsector is witnessed through the 1 million households involved in cocoa production, whose output accounts for greater than one-fifth of Ghana's GDP, and 20–25% of export earnings – a primary source of foreign exchange (World Bank, 2018). However, recently Ghana has begun diverging from this trend, with economic growth being driven strongly by growth in oil production at 16% in 2016/2017 compared to 0.8% in agriculture. The World Bank (2018) specifies this consistent reduction in agricultural contribution to GDP alongside the rapid rise in extractive industry as a nascent sign of the Dutch Disease, i.e., focusing on one sector at the expense of the economic activity of another. A clear method to alleviate this expected decline in medium term oil production is development of non-natural resource sectors. Given the structural importance of the agricultural sector and the heavy reliance on cocoa beans, this essay seeks to determine if Ghana should continue to specialize in the production and export of cocoa beans in a longer term sustainability context. This paper will begin with a historical overview, then determine what trade economic theory proposes through the Heckscher-Ohlin framework. Subsequently we argue on the bases of real wages dynamics, producer prices and productivity/innovation as to why Ghana should not specialize in cocoa production, whilst drawing on any relevant theoretical predictions and or shortcomings.

Historical Background

Figure 12.1 Ghana's Cocoa Production, 1900–2008



Source: Gill & Duffus Group, various issues; Ghana Cocoa Marketing Board, various issues.

- 1888 – 1937: Cocoa introduced in mid-19th century by commercial farmers seeking different export agriculture opportunities and establishment of European companies. This was aided by expansion of the road/rail system from 1920 onwards and the association of export marketing by middlemen, allowing cocoa earnings to account for 84% of total exports by 1927 (Kolavalli & Vigneri, 2011);

- 1938 – Early 1964: Interwar periods witnessed volatility in cocoa production fueled by reduced global demand alongside transport complications. Subsequently, epidemics of pests/diseases reduced Eastern regional production in the 1940s, building cocoa cultivation in Western frontiers (Amanor, 2010). From 1947, the Cocoa Marketing Board (CMB) was established, with a monopoly over the purchase of cocoa beans. The CMB became a tool for public finance and maintained steady profitability through manipulation of government policy[1] (Brooks, et al., 2007). The 1960s saw a series of restrictive measures (i.e. increased taxation, import licensing) to combat forex reserve declines and budget deficits due to world cocoa prices falling (Kolavalli & Vigneri, 2011).
- 1967 – 1982: The global reductions in cocoa prices from 1965 ensured another downturn (Stryker, 1990); this was exacerbated by real producer prices dropping due to inflation caused by extensive money creation to counteract loss of cocoa revenue and overvaluations of the cedi. Further, aging tree stocks and repeated spread of disease reduced capital investment into cocoa. Poor confidence and low margins in the industry forced farmers to move toward food production (Amanor, 2005). Ghana's cocoa production fell to its lowest point in 1982/1983 at 159,000 tons (Kolavalli & Vigneri, 2011).
- 1983 – Present: Ghana's cocoa sector rebounded with the Economic Recovery Program of 1983. Notable policy changes include higher prices to Ghanaian farmers and devaluing the cedi. Output reached 400,000 tons by 1995/1996 whilst productivity rose from 210 – 404 kilograms per hectare (Kolavalli & Vigneri, 2011). From 1992 onward, Cocobod[2] awarded six private licensed buying companies responsibility for cocoa procurement, to reduce inefficiency and improve competitiveness. The 2000s saw production continue growing, driven by high world prices, increased farming incomes, improved

1 In real terms, total consolidated public expenditures increased approx. six-fold during the 1950s. Whilst share of expenditure in GDP grew from 7% to 18%, and the share of extraordinary/development expenditure grew from 27% to 36% (Kolavalli & Vigneri, 2011).

2 Rebranded CMB.

farming practices (e.g. mass spraying programs); subsidy packages and 'frequent applications of fertilizer' (Vigneri & Santos, 2008).

THEORETICAL INTUITION & RECOMMENDATION

The Heckscher-Ohlin Theorem (H-O model) built upon the Ricardian model of comparative advantage (Heckscher, 1919) (Ohlin, 1933). Here, comparative advantage remains when a country's 'opportunity cost of producing the good is lower than the opportunity cost of producing the good in another country' (Feenstra & Taylor, 2017). The model states that trade takes place due to differing costs of factors of production between nations. Therein, countries will export products that intensively use the factor they are abundant in, and import products that are produced by domestically scarce factors (Feenstra & Taylor, 2017) (Blaug, 1992). The model specifically maintains that 'factor endowments are immobile between nations' (Verter, 2016) alongside several assumptions. We maintain the H-O model superior to the Ricardian model as it (is): comprehensively more versatile by implementing more variables (two countries; two commodities; two factors); includes the use of money as opposed to Ricardo's 'wage good' allowing for more seamless analysis; proposes the main cause of international trade is the difference in abundance of factors as opposed to variances in the technological abilities of countries (Heckscher, 1919) (Ohlin, 1933). This latter point is crucial as the model allows for the free dissemination of knowledge between nations and that best techniques will eventually be adopted in both countries.

In constructing the model, we keep that cocoa production is labor-intensive, though seasonal (Boas & Huser, 2006), reinforced by the 1 million households involved in cocoa production (World Bank, 2018). This is in contrast to capital-intensive surface mining operations, that require less but very skilled labor for the complex operation of equipment (Amponsah-Tawiah & Dartey-Baah, 2011). Alternatively, some academics propose Ghana has a factor endowment of favorable tropical climate(s) (e.g. 6 million hectares of arable land in the Northern Savannah Ecological Zone (NSEZ) (World Bank, 2018)), which in the H-O model may be a cause for specialization in cocoa production as agriculture demands arable land. We do not consider a land endowment in the model due to Breisinger et al. (2008)'s research into average yield in relation to harvested land that indicates cocoa production is exhausting suitable land rapidly (Breisinger, et al., 2008).

Given labor abundance, we would witness Ghana choosing to export cocoa. Engaging in trade will see the relative price of cocoa rise, whilst its imports can be purchased at the lower world market price (Feenstra & Taylor, 2017). Historically, Ghana's export profile does not diverge significantly from the model (see Figure 2), indicating heavy production and export between 1961 and 2016. The subsequent diagram confirms that Ghana gradually experienced an increase in the price per ton of cocoa beans (see Figure 3). Despite similarities between the model and reality, it is important to outline the clear shortcomings of the model, namely: that econometric testing of the standard H-O model and Vanek's (1968) extension convey factor endowment has poor predictive power of international trade patterns (Vanek, 1968) (Trefler & Zhu, 2000); that the H-O model in contrast to New Trade Theory assumes firms are homogenous with identical production functions (Greenaway & Kneller, 2007); homogeneity and complete transferability of capital (Edwards, 1985)[3].

Real Wages Dynamics

Real wage remains a wide-ranging measure of the outcome of trade but further a key mechanism by which the disadvantaged may obtain wealth and reduce economic vulnerability. The theoretical intuition underlying long term changes in real variables under H-O specialization remains the Stolper-Samuelson (SS) theory; which posits an increase in the relative price of the associated labor-intensive good will generate associated increases in the relative price of labor/real wage (Stolper & Samuelson, 1941) (Feenstra & Taylor, 2017). Unfortunately, the literature corroborating such is both scarce and ambiguous in relation to cocoa – warranting evaluation. The 1990s, a period of macroeconomic liberalization replicates the theoretical movement toward greater free-trade, where Teal & Vigneri's (2004) paper estimates an econometric production function for cocoa production, drawing on two household surveys covering the period from 1991 to 1998 (Teal & Vigneri, 2004). Overall this period experienced an increase in total cocoa output of 37% (Teal, 2000) alongside improved prices – highlighting the tangible export benefits of liberalization. Nevertheless, the Ghana Living Standards Survey suggested that during this period, there is no evidence for a rise in real cedi agricultural wage, with a change from GH₵565.97 in 1990 to GH₵564.40 in 1997 (indexed to 1990 GH₵) (Teal & Vigneri, 2004). This ambiguity is deepened given the associated rise in labor productivity from GH₵141.00 in 1990 to GH₵297.00 in 1997, due to the growth of non-labor inputs through the Cocoa Rehabilitation Project in 1983 for example fertilizers, hybrid cocoa varieties and better disease management (Boahene, et al., 1999) (Teal, et al., 2006). According to the equation from Feenstra & Taylor (2017) real wages should in fact have risen:

3 Note, this model has various other shortcomings primarily rooted in the strong assumptions.

$$MPL_c = \frac{W}{P_C}$$

We attribute this to the inability to adjust for cocoa farmers varying their use of land and labor in response to the dynamism of the cocoa market. Fundamentally, real wage effects should have improved however in practice when labor costs rose significantly, cheaper forms of labor were sought primarily sharecropping arrangements or informal labor groups (Berry, 1993) (Amanor, 2010). Hence real wages never improved drastically rose for farmers as they were undercut by seasonal workers. For perspective, the World Bank (2018) claims 55% of workers in agriculture and fisheries are informal. Construction of specialization policies that disregard this large proportion of informal workers, will inherently provide unrealistic predictions on the real effect of trade.

Beyond this, pretenses to specialize may instigate internal policy that promotes unsustainable practices. This is witnessed in the 'switching' factor endowments related to the above example that saw an increase in the land-to-labor ratio (Teal & Vigneri, 2004). This occurred as farmers were promised property rights by developing and clearing uncultivated land for cocoa production (Amanor, 2010) (Berry, 2009) (Takane, 2002). This micro level rent-seeking has contributed to widespread surges in land cultivations, with no changes in land productivity. This is observed as the drop in labor per unit of land offsets the rise in non-labor inputs to land (Teal, 2000). Interestingly the final effect on the real rental on land remains variable with the price of cocoa. It is true that optimum use of arable land has previously aided the cocoa sector however the present scenario remains unsustainable as the NSEZ, the land gradually being reclaimed/cultivated, has been explicitly stated to not hold potential for cocoa but rather production of cereals, sugar cane, cotton, and livestock (World Bank, 2018).

Inefficiency of Producer Prices

Producer price of cocoa remains a different strata from real wage, as producers are paid a proportion (approx. 70%) of the 'net free-on-board (FOB) price,' a producer price generated (incl. costs, storage etc.) by Cocobod at the start of a season (World Bank, 2018). Further, the FOB price often differs from world market price but may also differ from the sale price as cocoa is primarily comprised of forward sales. This highlights the inherent pricing distortions of the cocoa trade. In relation to the SS theory Ghanaian producer prices present a mixed image, and it is difficult to decipher if specialization has improved producer prices. Figure 4 details that cocoa production has risen since the reforms of the 1990s, alongside a partially lagged increase in real producer price.

Discounting the abrupt drop in price from 2002 to mid-2006 with only minor fluctuations in output, we experience a general upward trend in the absolute amount received by farmers. However, Figure 5 crucially conveys that despite absolute increases in prices the share of has remained approximately constant if not declined moderately. This is corroborated by Barrientos and Asenso-Okyere (2008) in 1996 and 2006 who observe 'cocoa production has not improved in profitability for farmers, with net profits 7% lower in 2005 than 1996; signaling whilst real price of cocoa increase by 47% between this period, cost of inputs has increased by more (Kolavalli & Vigneri, 2011).

This pricing inefficiency has arisen as the Ghanaian government has become overly reliant upon cocoa revenue. Leading it to leverage its factor endowment in labor to serve as a fixed tool for revenue collection through both extensive implicit taxation of the producer price (World Bank, 2018), and a lesser extent the difference between the producer price and final sale price. This systemic inefficiency not only reduces the real income share of producers, but contributes to a variety of derivative inefficiencies that harm the supply chain. In Adarkwa [village], lower producer prices result in farmers being incapable of investing their incomes into their farms as they cannot afford necessities. Indirect lowering of small-scale investments leave small-producers unable to purchase required inputs worsening crop management and subsequently yields (Dormon, et al., 2004). The government has enacted measures to alleviate such problems (see Fertilizer Subsidy Program), however such programs often crowd out investment into long-term productivity in exchange for shorter term gains. Dormon et al (2004) indicate despite reforms of the cocoa industry in the 1990s, mechanization remained minimal. From 2007 onward the Ghanaian government has been subsidizing agricultural-specific machines to scale up hire services to smallholder farmers. Heavy subsidies on capital-intensive equipment distort development of the input supply chain, and bar lower-cost machines entering the market. Moreover, foreign manufacturers lack local market knowledge to cater suitable products to the region. Enhanced specialization proves distressing as the obscure endogenous relationship between the cocoa industry and the government generates a scenario, wherein the latter has no reason to improve efficiency as the flourishing cocoa industry continues to inflates the FOB price contributing to export margins approx. double that of Côte d'Ivoire (World Bank, 2018). Similar to lacking informal agents, a key factor is the role of institutions during and/or after specialization. This is understandable given that we cannot deny the literature is scattered with examples of such, however, it is difficult to model

Figure 12.5 Ghana Cocoa Production and Real Producer Price, 1990–2008

Source: Cocobod and ICCO.

Figure 12.4 Farm Gate Prices, Direct Taxation, and Exchange Rate Taxation for Ghanaian Cocoa, 1966–2008
Percent

Source: Vigneri 2005.

Primary Commodity Specialization and Innovation

A large portion of economic development cannot be explained by the allocation of capital and labor nor the real changes in terms of trade. This unexplained part, multi-factor productivity, characterizes advances in the efficiency of production. Productivity is fueled by innovation in the strictest sense, and in neoclassical terms we see productivity when new capital resources are introduced into the firm or when market competition produce a greater incentive to innovate (Arrow, 1962). With respect to Ghana, agricultural productivity concerns are masked by overarching success of the sector growing 10% (Q3) (World Bank, 2018), founded upon stagnating productivity growth combined with extensive land expansion. It is important to note this matter does not only impact cocoa production but others too. For example, Ghanaian cereal yields estimated at 1.7t/ha remain lower than key competitors, Côte d'Ivôire (2.7t/ha), Madagascar (2.6t/ha), and Uganda (2t/ha). Regardless, all nations consistently remains below the potential yield estimated at over 5t/ha. For purposes here, Ghanaian cocoa yields average between 400–450 kg/ha amongst the lowest globally (World

Bank, 2018). Similar to the case of pricing inefficiencies, this concern is attributed to the fundamental reliance of the government to primary commodities.

Simply put, this reliance on primary goods has fostered a reduction in the entrepreneurial initiative of the populous (Singer, 1950), eroding the place for innovative capacity and micro-investment. This occurs as the cocoa industry remains a source of easily manipulated revenue the government will seek to provide all necessary support to maintain revenue. Two key examples being: the National Seed Council that is largely involved in regulatory and administrative holdups affecting liberalization of the seed sector (e.g. inspection, certification, subsidies etc.) (Tripp & Mensah-Bonsu, 2013); and prevalence of private licensed companies permitted to purchase and transport the cocoa crop from farms at specified prices set by Cocobod (Kolavalli & Vigneri, 2011). It is true, we cannot dispute these measures have resulted in positive spill-over effects for example Zeitlin (2006) indicates a positive correlation between the concentration of licensed buying companies at the village level and production[4] . However it is crucial to evaluate the inefficiency of policy. Direct agricultural supply chain intervention results in inefficient production as farmers grow dependent on public support, exacerbated by a pseudo-competitive cocoa market inhabited by an informal oligopoly. Such interventions fail to create a competitive environment that generates expected rents for farmers that exceed cost of innovation. Nor do they allow competitive pressures that push producers to endeavor for survival by instigating innovations. Therein on the macroeconomic scale, the government seeks no fundamental improvement in innovation as excess finance may be achieved via policy tuning.

Some consolation is provided through the recent Ghana Commercial Agriculture Project, which hopes to support 'commercialization of smallholder farming through Public-Private Partnership-type arrangements with large agricultural investors' (World Bank, 2018). This aims to enact structural change and improve productivity alongside market linkages through the out-grower model for agribusiness.

Conclusion

This paper has outlined how shortcomings traditionally discarded from or overlooked from the H-O model may suppress further specialization in cocoa production. To summarize, we initially consider the H-O model which maintains that countries must specialize and subsequently export products that intensively use factors they are endowed with. Given the scope of this paper, we have omitted

4 It is important to note outlines there may be a causality issue as buyers will likely locate themselves closest to large quantities of cocoa (Zeitlin, 2006)

the more trivial assumptions of this model and have rather focused upon more unorthodox shortcomings. We reasoned that Ghana possesses an abundance of labor and specialization has given way to increases in the producer price per ton of cocoa beans. Respectively, we establish that predictions lacking informal activity may poorly represent real effects of specialization resulting in unsustainable policy toward such; over-specialization upon singular commodities will induce inefficient pricing mechanism distorting the nominal benefits of trade; government reliance upon cocoa production inherently contributes to reduced innovative capacity of smaller-scale producers. Given the evidence and intuition of arguments we state that Ghana should not specialize further in cocoa production.

A clear improvement to this analysis remains to consider additional models of trade for example the Ricardian or Specific Factors that may more holistically represent the matter of specialization as per the academic perspective alongside associated shortcomings.

Building upon this, we recommend three clear extensions to this study: first, to determine the suitability and sustainability of alternative Ghanaian commodities to better inform policy recommendation considering the analysis to move away from cocoa; second, to evaluate other Sub-Saharan countries regarding primary commodity specialization to isolate similar trends in export policy for example the Côte d'Ivôire; and finally, to begin the process of econometrically testing if the aforementioned points hold statistically significant relationships in the data. To note this latter point will likely involve a data collection phase particularly regarding informal sector variables.

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Micro-Finance: a Miracle no More? The Jury is Out

Shauna Fitzmaurice, Junior Sophister

While often being praised as a tool for poverty alleviation, Shauna Fitzmaurice takes a look at the real-life performance of micro-finance mechanisms. She shows that while there may be some benefits in the short run, micro-credit services' long run benefits are not well demonstrated in developing countries. In order to give a wider picture, she includes a discussion about micro-insurance and micro-savings. While micro-saving mechanisms are not as well studied as micro-credit, the paper shows that this limited research does point towards a more positive impact on poverty.

Introduction

The poor require financial services suited to involving small amounts of money, earning the name micro-finance. Numerous constraints/difficulties in accessing financial services exist for the poor, who are marginalised by mainstream financial institutions (Hishigsuren, 2007). Nevertheless, informal financial services that are selectively available to the poor have not succeeded in providing any miracle-like result of poverty alleviation in less developed countries. Notably, financial services have a lower penetration and lack widespread access in these countries. Financial markets are challenged by imperfections, holding market failures primarily stemming from the absence of perfect information. This manifests in financial services unsuited to meet the demands of the poor. The results of intervention of financial services in less developed countries have been mixed. Hence, it is questionable if further access to and various formal financial services will alleviate the problems of the poor.

This paper examines each of the three financial services individually that comprise micro-finance, namely; credit, insurance and savings. The impact of each financial service as well as its ability to alleviate poverty is evaluated. This paper concludes that while neither of the three financial services have significantly aided poverty alleviation, savings is the most promising approach. Other poverty reduction mechanisms e.g. cash transfers, may offer a better poverty reduction mechanism.

The Argument for Micro-Finance

The poor face numerous problems due to their low income which makes them poor by definition. Most of their problems stem from the poverty trap. Income uncertainty leads to greater risks in daily life, yet many developed countries boast social security nets that help reduce this uncertainty. Financial services can ensure consumption smoothing, guaranteeing more predictability and stability of income, reducing the risk of lower income.

Due to their proximity to the poverty line, any negative exogenous income shock can have detrimental effects. The poor's reliance on the primary (agricultural) sector for income, which is highly dependent on exogenous weather conditions, acts as an ongoing risk to income. Generally, greater weight is placed on negative income shocks which cause problems of lower consumption from a baseline of subsistence. Positive income shocks are problematic if they are consumed, rather than smoothed, due to temptation and time-inconsistent preferences in human behaviour (Read & van Leeuwen, 1998). This relates to the mixed evidence on the Permanent Income Hypothesis and how it might fail (Fuchs-Schuendeln & Hassan, 2015).

Micro-finance targets the issue of risk associated with uncertain income. Nevertheless, other structural diversity problems exist for the poor that are not targeted for improvement by micro-finance. The poor possess lower human capital which causes problems relating to education, health and skills. School attendance by children depends on income and whether child labour is required to supplement this income. Information problems exist in financial markets and may be particularly acute in less developed countries owing to the low education levels and the often weaker institutional context. The poor live in primarily rural areas, which are isolated and underserved by formal institutions/basic services. Due to the adverse geography and resource endowment of less developed countries, coupled with the poor's rural setting and dependence on agriculture for income, climate change is an unavoidable threat. Because of many countries' colonial past, much private property and resources are owned by a few elites and whom the institutions are biased in favour. In contrast, the poor have little ownership of assets, inhibiting enterprise creation and thus stable income streams. These further problems need to be tackled to achieve the miracle of poverty alleviation.

Microcredit

It is apparent that individuals can prevent deterioration of their position on the poverty line by consumption smoothing. As positive and negative exogenous income shocks balance out over time, access to borrowing when income is low and repaying the borrowing when income is high, ensures that consumption remains more constant over time. This would alleviate the risk of a negative income shock that problematically entails reduced consumption from the subsistence baseline. However, this is contingent in the balancing of positive and negative income shocks which are exogenous. Micro-finance provides this vehicle for consumption smoothing.

The micro-finance service of credit (microcredit) aims to solve the poor's problem of increasing their income and escaping the poverty trap, through enterprise creation and human capital investment. Credit could alleviate poverty amongst the poor. Notably, enterprise creation requires upfront capital/liquidity which is problematic for the poor due to their variable income and lack of savings. Access to the financial service of credit can allow enterprise creation for the poor, yet current access is limited to them.

Informal networks, generally community-based, may provide some access to credit but this access is selective. Social stigmas often exist. Availing of this informal credit may indicate poor financial management, possibly causing shame/ embarrassment. For the poor, access to informal credit is primarily concentrated on men, due to the often patriarchal-based society in less developed countries (Attanasio et al., 2015). Men generally own the assets, allowing cheaper borrowing rates. Intervention in formal access to microcredit is particularly focused on women, who are generally most left out of the financial market. Access to group loans for women in Mongolia led to a 57% group loan take-up, with remarkably high take-up by uneducated women (Attanasio et al., 2015).

Microcredit is founded on the belief that the poor have a desire and aptitude for entrepreneurship i.e. the 'Lost Einsteins' concept (Chetty et al., 2017). This is questionable as enterprise created due to access to formal credit by women is generally small and not highly profitable (Attanasio et al., 2015). Furthermore, loan take-up and investment in business is more likely if the individual already owns a business, suggesting those with high entrepreneurial ability already own enterprises (Banerjee et al., 2015a). Individuals who do not currently own a business may have access to microcredit but choose not to avail of it. This owes to their lack of entrepreneurial ability which would hinder business success (Banerjee et al., 2015a).

Spandana, a micro finance institute in India, required a business return of over 24% on formal loans, propelled by the poor's lack of collateral, acting as a disincentive to business risk-taking (Banerjee et al., 2015a). Even if the poor own land/assets, they may not hold title deeds to them. However, default rates amongst the Mongolian poor are minimal and delayed repayment is only 7% (Attanasio et al., 2015). The requirement for substantial collateral could be questioned. The high interest rates favour better businesses which are more profitable and can afford the high interest rates, resulting in survival of the fittest (Banerjee et al., 2015a). Nevertheless, credit markets are not efficient and lack observability. The initial wealth of individuals affects future productivity and hence income levels. This means that richer individuals above the poverty line enjoy easier access to entrepreneurship as they can fund investment using their wealth/endowments or can borrow at cheaper rates, due to reduced risk from owning the required collateral. It may thereby be plausible that the credit markets originating from micro-finance can make the underlying inequalities between the rich and poor worse. This refers to the stylized fact where the rich are treated differently in credit markets (Banerjee, 2001).

Overall, the results of formal microcredit have been mixed. Microcredit has not had broad impacts on other problem areas for the poor, e.g. health, that still require addressing. The low take-up rate depicts that access to credit is not what many poor people need to solve their problems. Individual loans tend to be used more for immediate consumption than business investment, which increases current utility but does not aid in increasing future income (Attanasio et al., 2015). Many poor individuals do not wish to be entrepreneurs (Banerjee et al., 2015a). Enterprises creation produces no short-run income effect, owing to the high interest repayment rates and low profitability of the businesses which are small in scale (Attanasio et al., 2015). Micro-credit encourages increased indebtedness, which adds to the problems faced by the poor. The increase in borrowing, from a baseline of 69% of households holding debt (Banerjee et al., 2015a) impacts the likelihood of repayment and resulting social sanctions for repayment difficulties. This caused an increase in farmer suicides in India (Financial Express, 2017). Other supports such as business training may be required with the loan to ensure more successful businesses (Banerjee et al., 2015a). The short-term loan repayment structure ensures better repayment rates but is unsuited to business investment, which is best suited to long-term repayment structures. Nevertheless, while there is little evidence that microcredit is bad for the poor (Banerjee et al., 2015a), it has not produced the transformative effects on the average borrower as anticipated by the expansion of micro-finance (Banerjee et al., 2015b).

Insurance

While access to credit is beneficial to the poor when they face a once-off random negative income shock, the possibility of a series of independent negative income shocks always exists. Credit is deemed insufficient in this case due to the short repayment duration which may be overcome with negative income shocks, resulting in the inability to repay the loan. Additionally, access to small savings is inadequate. A series of negative income shocks inhibits consumption smoothing causing detrimental effects to the poor living close to subsistence who are pushed below the poverty line. Insurance could solve this problem by reducing the risk of this occurring as a pay-out would be received, allowing constant consumption. If poor people come together and pool their income, thereby risk-sharing, they can smooth their income, but not fully. Changes in household income will still cause some effect on consumption. Yet, owing to the reduced risk to income, insurance makes the poor better-off. Pooling income improves an individual's situation when a negative shock occurs but worsens the situation when positive shocks occur.

Micro-finance faces challenges in building insurance schemes/networks amongst the poor, because of the lack of diversification in occupations (primarily agricultural-based) and hence income streams (Townsend, 1994). This causes correlated income outcomes which reduce the returns to be made by the insurance provider, acting as a disincentive to provide this financial service (Townsend, 1994). The poor can be affected by aggregate shocks to the agricultural network e.g. drought. Informal insurance which is generally community-based is often in place but it only works if incomes are not perfectly correlated. Larger insurance networks that expand across different villages are required to ensure less income correlation due to different villages facing different shocks. However, expansion of the insurance network makes enforcement of repayments more difficult due to information asymmetries and weak legal enforcement of contracts. Moral hazard and fraud in reported outcomes generally occur with insurance (Deaton, 1992), acting as further barriers for the poor creating their own informal insurance network. Thus, this opens the door for formal micro-finance.

Evidence from ICRISAT villages in India indicates that the income of the poor is not perfectly correlated as they have different plots of land and engage in slightly different activities (Townsend, 1994). This provides scope for insurance. Due to consumption being relatively smooth over time despite random shocks to income, it is apparent that there is some informal insurance happening. Morduch's (1995) further research suggests that small farmers and landless labourers (the poor) are not participating in informal insurance as much as well-off individuals. Instead the poor try to eliminate risk themselves by being proactive in their production decisions. Furthermore, Deaton (1992) found that informal insurance may not occur in certain villages, preventing them from risk-sharing.

Formal micro-finance weather insurance might solve the problems of moral hazard and adverse selection which occur with crop insurance. Because of formal insurers' larger size, they benefit from reduced transfer costs and administrative costs stemming from economies of scale. Although the poor cannot afford to pay much for insurance, because of the vast number of poor people, micro-finance insurers can charge a fair price suited to their low income but yet generate substantial profits to remain sustainable. Formal insurers hold specialised expertise on how to price and manage insurance products. They can diversify risk better to attain high returns.

Take-up rates are however low (Carter et al., 2014). This centres on mistrust of poor individuals for large profit-based financial institutions who also apply strict rules/conditions to their insurance products. A recommendation by family, a friend or previous village experience with insurance, particularly if a pay-out was received, leads to increased likelihood of insurance uptake, reducing the trust barrier (Cole et al., 2013). Micro-insurers need to address the demand side factors that are inhibiting the take-up of formal insurance by poor people. Awareness, financial literacy, willingness and ability to pay, affordability and delayed consumption are crucial demand side factors that require reciprocal supply-side initiatives for the sustainability and success of micro-insurance (Mazambani & Mutambara, 2018). Micro-insurers should better tailor their insurance products for the poor. For example, new insurance products are essential to meet the demand for insurance related to increasing climate change shocks, requiring insurance coverage to be expanded to improve disaster resilience (Mills, 2009). Until these factors are considered, insurance will continue to not be sufficient in alleviating poverty in its current form.

Savings

While credit and insurance encounter information problems, savings avoid these information problems. The poor face difficulties in consumption smoothing i.e. transferring resources to future periods. Consumption smoothing is important as the future is uncertain and has high associated risks. This highlights the role for precautionary savings. A negative income shock could be overcome by withdrawing savings. Nevertheless, the poor find saving problematic due to consumption temptation, informal transfer requests by family/friends and time-inconsistent preferences. The poor lack formal saving instruments which causes increased risk of the savings being stolen or spent. The poor tend to use inefficient instruments to save e.g. bullocks, which generate low returns often less than the discount rate (de Janvry & Sandoulet, 2015).

Arguably, the saving instruments best suited to many of the poor are small deposit accounts that allow frequent deposits. This stems from the poor holding micro amounts of money, and frequent deposits prevent the money being spent on consumption. The poor generally live in rural areas and are underserved by banks, limiting access to formal saving accounts. Proximity to a bank is crucial to allow for making these small deposits. Long distances can result in delays in lodging the deposit until a sufficient amount built up. Yet, this may never happen due to the tempting desire to consume, especially with a very low income level. Aportelo's (1998) study of the Mexican government's 'Pahnal' saving programme expanded access to formal saving accounts through local post offices, reaching the poor in rural areas who were otherwise inaccessible. This access to short and long term formal saving instruments with guaranteed real rates triggered the average saving rate of the poorest to rise by more than seven percentage points. This suggests that formal and local saving deposit accounts are often desired.

Another problem faced by the poor which hinders saving relates to time-inconsistent (hyperbolic) preferences. Individuals want to indulge today to maximise current utility by increasing consumption and putting less weight on utility in future periods. Immediacy is an evident problem in human behaviour affecting self-control. The poor need to impose constraints on the individual's future self to follow through on today's preferences for the future, i.e. to save instead of acceding to increased consumption temptation. Education could help provide this sophistication (Ashraf et al., 2006). Intervention of micro-finance offering formal saving accounts entailing commitment mechanisms of a fixed time or amount could help overcome self-control difficulties. This occurred in the Philippines where a study on women whose societal role involves controlling household finances, found that they were over fifth-teen percentage points more likely to take-up the saving commitment instrument (Ashraf et al., 2006). This indicates that individuals are at least partially aware of their hyperbolic preferences and want formal saving commitment devices to supersede their self-control issues.

It is noteworthy that studies from Cameroon focused on introducing formal saving accounts illustrate that despite the poor making deposits, they are reluctant to use these savings to finance business investment or consumption (Baland et al., 2011). Instead they take out loans ('excess borrowing') which entail high interest rates (Spandana charges 24% interest) to spend on increased consumption or business investment that could have been funded with their savings, avoiding interest costs. This is economically inefficient. However, due to strategic reasons derived from the social signals that borrowing holds i.e. financial strain, debt obligations also act as a protective measure against their future or other selves from consuming savings. Nevertheless, microcredit generally tends to be affordable as the amount is generally half the amount of their savings, which lowers risk. It also allows for a formal credit rating to be built up, aiding subsequent cheaper borrowing (Baland et al., 2011). Despite the poor individual repaying the loan with high interest, they still retain most of their precautionary savings and are therefore more prepared for risks associated with the future.

Conclusion

Micro-finance faces challenges in the roll-out and success of each of the three financial services (credit, insurance and savings) at solving the problems of the poor. In general, the results of microfinance have been mixed, with access to the financial services not resulting in the ultimate aim of poverty alleviation. The financial services of credit and insurance encounter informational problems and generally weak institutional and legal context. To date, the evidence highlights that savings are the most beneficial to the poor until credit and insurance better develop to suit their needs.

This paper has argued that evidence on formal micro-finance expansion has not had significant effect on poverty alleviation. In addition, formal micro-finance firms are deviating from their social mission by exploiting the poor. Because of the minimal successes of access to financial services for the poor, academics are also researching other poverty reduction mechanisms e.g. cash transfers, graduation programmes. These poverty reduction programmes are depicting positive short-term effects but the long-run effects have yet to be thoroughly analysed.

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