

Paterson Review of International Affairs



Volume 18, 2018

Norman Paterson School of International Affairs

Carleton University
5306 Richcraft Hall
1125 Colonel By Drive
Ottawa, Ontario, Canada
K1S 5B6



The Paterson Review of International Affairs, is a scholarly journal exclusively showcasing the work of graduate students in the field of international affairs. Managed by students of the Norman Paterson School of International Affairs, the Paterson Review is dedicated to publishing articles on a wide range of emerging issues in the theory and practice of international affairs. Copy requests and submissions may be sent electronically to patersonreview@gmail.com or by mail to Paterson Review c/o Norman Paterson School of International Affairs, 5306 Richcraft Hall, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, K1S 5B6, Canada.

Contents

Editorial Board.....	iv
Acknowledgements.....	iv
Letter from the Editors.....	v
Whose turn? Sparking formal savings through ROSCAs in Morocco.....	1
<i>Adil Ababou and Diana Goldemberg</i> <i>Kennedy School of Government, Harvard University</i>	
Green Bonds: Utility, Opportunity, and Challenge: A Critical Assessment of Green Bonds' Capacity for Engagement of the Private Sector.....	39
<i>Rastko Stanisavljevic</i> <i>Norman Paterson School of International Affairs, Carleton University</i>	
An Unacceptable Reality? The Implications of a Nuclear Armed North Korea.....	56
<i>Adam P. MacDonald</i> <i>Dalhousie University</i>	
The Frozen Sea: Using Spatial Analysis to Inform Policy on Illegal Fishing in the Antarctic Region.....	93
<i>Frederick P. Hemans</i> <i>School of Global Policy and Strategy, University of California San Diego</i>	
Women's Relations to the City: An appraisal of gentrification in New York through a gendered lens.....	112
<i>Shahreen Shehwar</i> <i>Queen's University</i>	

Editorial Board

Editors-in-Chief

Matthew J. Smith
Dani Belo

Associate Editors

Chelsea Badger
Emily Keenan
William O'Connell
Alexandra Pireur
Bridget Steele
Anna Vanderkooy

Expert Reviewers

Environment and Climate Change Canada
Dr. Trevor Findlay, Senior Research Fellow, University of Melbourne
Dr. Tessa Hebb, Distinguished Research Fellow, School of Public Policy and Administration, Carleton University
Chris W. J. Roberts, PhD Candidate, Department of Political Science, University of Alberta and Instructor, Political Science, University of Calgary
Robert Sauder, Professor, Norman Paterson School of International Affairs, Carleton University
Nasser Ary Tanimoune, Associate Professor, International Development and Global Studies, University of Ottawa

Letter from the Editors

The 18th Volume of the Paterson Review of International Affairs serves as another opportunity to showcase excellence in graduate research and highlight emerging topics in international affairs. Upon review of dozens of submissions from programs across the globe, the Paterson Review editorial board identified five high quality submissions to undergo a thorough double-blind-peer-review process that leveraged the expertise of the Paterson Review's own associate editors as well as the knowledge of experts in the field. The result is a collection of exceptional articles from graduate students hailing from the leading international affairs institutes in North America.

The five articles selected to be featured in this 18th Volume cover a multitude of emerging topics in international affairs and provide indispensable insights into contemporary issues. Adil Ababou and Diana Goldemberg explore financial inclusion in Morocco by exploring mechanisms to increase the country's formal savings rate. Rastko Stanisavljevic's piece on green bonds provides a critical assessment of sustainable finance and responsible investing in an age when environmental, social, and governance concepts are becoming increasingly popular within the financial sector. From a geopolitical perspective, Adam P. MacDonald offers a timely analysis of US-North Korea relations within the context of nuclear proliferation and global security. Frederick P. Hemans utilizes geospatial analysis to examine illegal fishing activities in the Southern Ocean and the regulatory challenges that will be posed to the global community. Finally, Shahreen Shehwar uses both qualitative and quantitative methods to examine the intersection of gentrification and gender in New York. From green bonds to nuclear proliferation and everything in between, the 18th Volume of the Paterson Review offers an eclectic mix of ideas that showcase the unique insights of emerging field experts.

As a final note, we would like to thank the authors whose brilliance made this edition as strong as it is, the associate editors whose time and dedication made this all possible, and to the expert reviewers who took the time out of their busy schedules to ensure the 18th Volume was of the highest quality. We would also like to thank the members of the APSIA network who circulated our call-for-papers as well as Princeton University's Journal of Public and International Affairs for their continued support and collaboration. Finally, we would like to thank the students and staff of the Norman Paterson School of International affairs for their continued support and sustained funding that allows this journal to continue.

Matthew J. Smith and Dani Belo
Editors-in-Chief

Whose turn? Sparking formal savings through ROSCAs in Morocco

Adil Ababou and Diana Goldemberg

Kennedy School of Government, Harvard University, Cambridge, USA

Adil_Ababou@hks17.harvard.edu and Diana_Goldemberg@hks17.harvard.edu

Whose turn? Sparking formal savings through ROSCAs in Morocco

The level of domestic savings in Morocco is below that of comparable countries and two-thirds of the Moroccans who save use exclusively informal means. The government wishes to tackle the pervasive informality of savings mechanisms in the country as well as the costly use of cash transactions. Over half of Moroccans use Rotating Savings and Credit Associations (ROSCAs) for informal savings, representing an estimated yearly flow of 40 billion dirhams (about 4.4 billion USD), equivalent to 28% of banks' collected savings in the country.

This paper explores the creation of a formal financial device that would cater to Moroccans using ROSCAs. The proposed device aims to tackle the informality, insecurity and inefficiency of traditional ROSCAs, while preserving their much-appreciated solidarity, flexibility and simplicity. The product design relies on: (1) simplified and free procedures for users, who would be provided virtual accounts, (2) a structure centered on the ROSCA organizer, who would have discretionary power over financial flows, (3) dual device offering, either with or without the formal guarantee of the organizer, (4) a mobile app and the use of non-bank deposit collectors and (5) SMS reminders and reports to ensure transparency, attention and peer pressure.

Keywords: rotating savings and credit associations; financial inclusion; Morocco; human-centred design

1. Context and motivation

1.A. Why spark savings among the financially underserved?

Savings matter, from a macro and micro perspective

Neoclassical growth theory has provided several theoretical models¹ in which capital accumulation is a key determinant of growth rates and long-run income. Accordingly, as long as savings are connected to the formal financial system and can be mobilized

into productive investments, policies aimed at increasing domestic savings would foster a country's economic growth. Around the world, there is a positive correlation between savings and both GDP per capita levels and growth rates². However, there is controversy regarding the causality of this macro-level relationship, with some economists³ suggesting that reverse causality is to be credited for the correlation. Gross domestic savings in Morocco, currently at 22.5% of GDP, have remained stable since the mid-1980s despite financial liberalization reforms⁴. They are lower than countries in the same region and countries in the same income-level: average levels of Middle East North Africa countries are 28.5% of GDP and average levels of Lower Middle-Income countries are 23.2%⁵.

From a microeconomic perspective, saving plays an important role in improving individual welfare, allowing households to smooth consumption across time (life-cycle adjustments), across uncertainty (precautionary savings) and in accumulating capital to enable investments. This is particularly important for lower-income households, who tend to lack access to credit and insurance and whose revenues tend to be more volatile. The ability to save in a secure location is one feature of formal saving that also makes it an efficient first step toward broader financial inclusion⁶.

Financial inclusion is a priority for Morocco

Morocco's financial system remains highly concentrated: three out of the nineteen banks present in the country hold two-thirds of the banking system's assets and deposits⁷. Public banks have declined from a 40% market share in 2002 to 16% in 2014⁸. Microcredit associations represent about 1% of the financial system.

Aligned with international discourse that financial inclusion is key to achieving development goals⁹ and promoting equality, Moroccan authorities made financial inclusion a national priority in 2007. The Moroccan Central Bank, Bank Al Maghrib

(BAM), integrated financial inclusion in its triennial strategic plans, driven by both a desire to reduce the cash economy and the ambition to become a financial hub for the African continent¹⁰.

Concrete actions towards greater financial inclusion have been taken to extend accessibility and affordability for Morocco's lower-income population¹¹. Reforms have focused mainly on the extension of banking facilities, with (1) the creation of Al Barid Bank in 2010 which, *inter alia*, led to the densification of the banking network, (2) the establishment of a national credit bureau in 2009, (3) the creation of a foundation (*Fondation Marocaine de l'Education Financière* - FMEF) to promote financial literacy in 2013 and (4) the diffusion of low-income banking (LIB) to the main banking institutions. Interestingly, BAM relied solely on "soft regulation" - recommendations and guidelines - to push banks towards LIB reforms on the basis of a strategic review of the future of the Moroccan banking system.

In recent years, financial inclusion indicators have improved significantly, with 41% of Morocco's total population using a formal financial product or service in 2013¹². Nevertheless, when comparing Morocco's overall access to finance to that of other countries, it is evident that challenges remain (Figure 1). In addition, there are sharp variations between different population segments, with the 13 million adults who are still financially excluded being disproportionately female, poor and rural. For example, men are 20 percentage points more likely than women to hold a bank account and adults living in urban areas are 24 percentage points more likely than their rural counterparts to hold a bank account¹³.

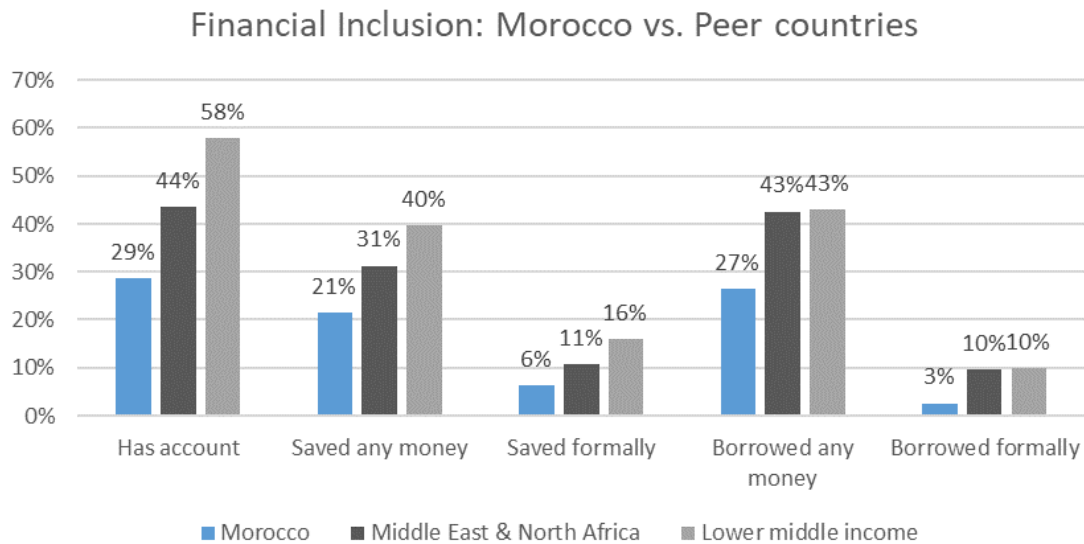


Figure 1- Financial inclusion in Morocco vs Peer countries. Source: WB Findex

Moroccan authorities continue to push the financial inclusion agenda, with the help of NGOs and private stakeholders. The forthcoming *National Financial Inclusion Strategy* (NFIS) is an important forum to align strategies, improve coordination among official bodies¹⁴ and track progress on financial inclusion.

1.B. Why is informality an issue for the Moroccan economy?

Informality is general and pervasive in Morocco

Morocco's informal sector ranks 41 among 88 developing countries, from smaller to largest¹⁵. According to 2015 estimates, the informal economy – untaxed and unregistered by the Moroccan government – represents 42.9% of the country's official GDP and is steadily growing¹⁶. Rising urbanization is thought to be the main driver of informality in Morocco¹⁷, followed by the high tax burden¹⁸. The significant share of informality in Morocco represents an issue from various standpoints: (1) *social*, with a lack of social protection and labor rights for informal workers, as well as limited access to formal sources of credit, (2) *fiscal*, due to tax evasion, which also leads to a

competitiveness distortion with the formal sector and (3) *technical*, as significant informality can lead to biased economic data which can in turn result in misdiagnosed problems and inadequate policy interventions.

Non-cash payments remain minimal in Morocco, leading to efficiency losses in the economy estimated to equal roughly 0.7% of GDP¹⁹. Transactions handled with cash represent 80% in value and 99% of the total number of transactions (see Figure 2). Even when non-cash methods are used, transactions are largely limited to cash withdrawals²⁰. Beyond the support a cash economy provides to informality, it leads to a significant management cost for economic actors, estimated at 6.9 billion dirhams (DHS). This is mostly sustained by banks (4.3 billion DHS), largely due to foregone revenue stemming from deposits.

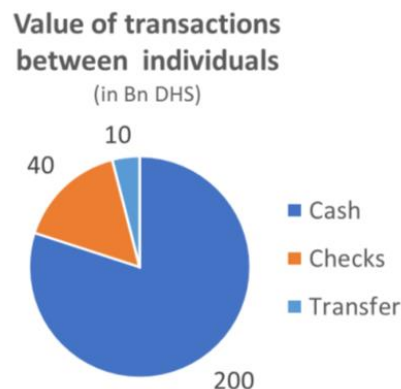


Figure 2 - Cash transactions are overwhelmingly used between individuals (Source: McKinsey 2015)

Informality is even more pervasive within savings

Roughly half of Moroccan adults report saving formally and/or informally (see Figure 3), with roughly two-thirds of those who save choosing exclusively informal means, such as self-help groups and saving at home²¹. Home saving is figuratively called '*zleezha*' (Arabic for tile), denoting the habit of hiding money behind wall or floor tiles.

The low usage of formal savings is not only a consequence of lack of access: many adults believe they do not need formal products or that formal financial institutions do not offer sufficiently valuable services for them.

Financial literacy is positively associated with usage of formal saving products in Morocco, with respondents who do not save or save only informally performing worse on financial literacy tests²².

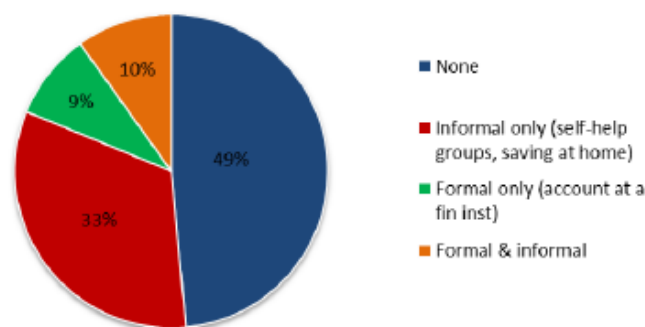


Figure 3 - Prevalence of formal and informal savings among adults in Morocco
Source: World Bank Financial Capability Survey 2013

2. Entry point: formalizing savings through rotating savings and credit associations (ROSCAs)

ROSCAs are an informal financial arrangement in which participants meet periodically to collect monetary contributions which are given in whole to each member in rotation. Participation is equivalent to a credit for those who receive the money earlier, or to a saving for those who receive it at later rounds. The practice usually relies on oral agreements rather than written contracts, with one member often taking up a coordination role. According to the World Bank Financial Capability Survey (WBFCS), 89% of Moroccan adults are aware of products offered by savings and credit self-help groups²³ and these financial products have the highest satisfaction rate²⁴. The WBFCS interviewed a nationally representative sample of 3,000 adults between September and

December 2013 (see Column 1 of Table 2 for summary statistics), creating the most complete and recent portrait of Moroccans' financial behaviour. Disaggregated data from this survey forms the basis of this section's quantitative analysis.

2.A. Why are ROSCAs a good entry point to formalize savings?

ROSCAs are ubiquitous in Morocco

Participation in ROSCAs in Morocco is ubiquitous, though it is not necessarily continuous. According to the WBFCS, 14% of adults are current members of a ROSCA, while 68% report having participated of a ROSCA in the past five years. However, while all respondents were asked about their current use, only a non-random subset of the survey takers²⁵ answered about usage over the last five years. Therefore, to arrive at a more accurate estimate of national usage of ROSCAs, we calculate current use among users in the past five years (18%) and used the bias in this statistic (1.3 times) to de-bias the five years' participation estimate, arriving at roughly 54% of Moroccans using ROSCAs between 2009 to 2014²⁶.

ROSCAs are used by many different types of individuals: debunking the stereotype of poor, rural, uneducated, female users

Development literature often portrays ROSCA users as poor, rural, uneducated and female. However, the characteristics of ROSCA users in Morocco are more nuanced. In terms of income, the WBFCS data reveal that ROSCA usage in Morocco is indeed higher among the poor, although usage still does occur at higher income levels (see Table 1). Given that the two lowest income quintiles have a similar prevalence of ROSCA use (average of 23%), as do the third and fourth quintiles (average of 10%), we pool these groups in our analysis.

Table 1 - ROSCA prevalence according to income

Income Quintile (nationally set)	Sample* (% adults)	Current use of ROSCA	Number of users	Current use of ROSCA
1st	19%	23%	287	23%
2nd	18%	22%		
3rd	18%	9%	110	10%
4th	19%	11%		
5th	22%	7%	38	7%
N/A	4%	7%	10	7%
Total	100%	14%	445	14%

Notes: (*) Ideally, the sample would comprise 20% for each group, since it is a representative survey. However, some households didn't disclose their income (N/A) and some degree of variation from population figures is to be expected. Source: WBFCs 2013 (own calculations)

The survey data also indicates that, contrary to usual reports in wider development literature, ROSCA users are not necessarily mostly rural and uneducated women. Table 2 compares characteristics of users and non-users across income groups. It shows that ROSCA usage at time of survey is comparable between men and women and that, for low income households, ROSCA using households are actually *more* likely to be urban and better educated/more literate. ROSCA users also tend to be older and have slightly lower income within each income grouping.

Table 2 - ROSCA current users versus non-users

	National Statistics (All Incomes)		Low Income (Q1-Q2)		Middle Income (Q3-Q4)		High Income (Q5)	
	Mean	SD	Mean		Mean		Mean	
	ROSCA users and non users		ROSCA user	Non user	ROSCA user	Non user	ROSCA user	Non user
N observations	3,000		287	879	110	1,016	38	528
Demographics								
Is female	48.5%	1.1%	47.5%	50.5%	44.5%	49.0%	44.4%	46.6%
Is married	43.6%	1.1%	48.6%	40.2% *	56.9%	45.8% *	49.0%	39.6%
Lives in rural area	33.8%	1.0%	47.3%	56.3% **	30.4%	30.7%	0.0%	4.7%
Age (years)	35.8	0.3	37.1	33.9 **	39.3	36.3	42.3	36.0 **
Household size	6.6	0.0	6.0	6.7 ***	6.6	6.5	6.8	6.8
Household income (DHS/mo)	7,238	116	2,891	2,976 **	7,748	7,727	11,153	13,882 **
Labor market								
Formal job	39.5%	1.1%	37.9%	39.0%	51.3%	39.3% *	26.1%	39.7%
Informal job	23.3%	0.9%	21.9%	22.6%	20.9%	22.9%	24.5%	25.8%
Self employed	13.1%	0.8%	12.3%	12.7%	11.0%	14.8%	18.5%	11.0%
Schooling								
Years of education	3.8	0.1	3.7	3.3 **	4.0	3.9	4.9	4.3
Is illiterate	14.8%	0.8%	11.8%	20.4% **	9.1%	15.4%	6.9%	8.7%
Can read and write in								
...French	71.3%	1.0%	71.8%	62.3% **	76.2%	71.7%	90.4%	80.9%
...Arabic	33.0%	1.0%	36.3%	32.1%	33.9%	33.6%	29.3%	32.1%
...Tamazight	17.4%	0.8%	20.4%	19.1%	15.5%	14.3%	14.7%	19.7%
Media consumption & connection								
Reads a newspaper	51.0%	1.1%	31.2%	27.4%	65.6%	61.7%	81.8%	69.5%
Listens to radio	53.1%	1.1%	44.7%	47.0%	52.4%	53.3%	59.4%	64.4%
Watches TV	96.8%	0.4%	95.3%	96.5%	94.5%	97.8%	87.3%	97.2% ***
Uses the internet	13.5%	0.8%	7.7%	8.4%	12.8%	16.8%	8.4%	17.7% *
Has a mobile phone	64.9%	1.1%	65.4%	66.2%	65.1%	66.7%	45.5%	61.1%
Financial inclusion								
Has a formal account	43.5%	1.1%	35.8%	31.5%	58.0%	43.2% **	72.3%	59.2% **
Has a formal account active	30.1%	1.0%	27.0%	23.7%	34.7%	25.4% **	59.4%	45.4% **
Ever used insurance	40.5%	1.1%	29.5%	19.2% ***	51.6%	42.3%	55.4%	69.0%
Ever used micro-finance	13.0%	0.8%	23.0%	15.5% **	14.3%	8.2% ***	11.9%	13.2%
Ever used money transfer services	63.1%	1.1%	53.3%	57.2%	60.2%	62.1%	42.3%	79.5% ***
Financial literacy								
Products knowledge (out of 7)	4.3	0.0	3.9	3.7 *	4.5	4.3	4.3	5.4 ***
Correct answers (out of 7)	3.0	0.0	2.6	2.7	3.3	3.3	2.9	3.3 *
...performs simple divisions	90.6%	0.7%	89.6%	89.0%	94.6%	92.1%	79.5%	90.7%
...understand inflation	42.2%	1.1%	35.0%	36.6%	41.7%	44.1%	32.6%	50.6% *
...calculates simple interests	50.1%	1.1%	41.3%	42.5%	56.9%	53.7%	54.7%	56.8%
...calculates compounded interests	31.5%	1.0%	17.7%	21.1%	40.6%	38.4%	20.1%	39.3% *
...understand percentages	20.6%	0.9%	15.8%	15.9%	25.2%	23.6%	12.3%	23.6%
...knows the purpose of insurance	50.6%	1.1%	48.3%	46.8%	43.5%	54.6% **	65.4%	50.7%
...understand diversification	18.5%	0.9%	14.6%	16.5%	25.7%	19.1% **	24.9%	20.3%
Financial capability								
Budgeting	38.2	0.8	18.5	22.1	45.0	44.2	54.1	56.7
Living within means	56.4	0.8	48.1	45.7	53.6	56.5	61.8	74.9 **
Not overspending	37.6	1.0	24.8	22.6	39.2	39.1	42.6	60.8
Monitoring expenses	54.4	1.0	59.5	54.9	68.9	52.3 ***	49.9	52.4
Cover unexpected	66.3	0.9	61.6	57.7 *	68.1	70.0	71.3	73.5
General saving behavior	42.0	0.7	39.5	44.1	40.9	37.2	49.5	48.2
Far sightedness	78.2	0.5	83.0	84.3	73.9	74.7	64.5	75.4
Plans for old age	5.9	0.5	3.8	3.0	8.5	7.8	6.3	7.0
Informed choice	89.1	0.5	87.6	89.6	89.0	88.8	90.1	89.4

Notes: The table reports summary statistics for the entire pool of WBFCs adult respondents (column 1) and for income subgroups, separated by ROSCA participation. For each income subgroup and characteristic, the stars denote a test of mean equality for users and non-users (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$). Source: WBFCs 2013 (own calculations).

Remarkably, across all income groups, ROSCA users are more likely to have a formal account and actively use it. This suggests that Moroccans do not resort to the informal practice of ROSCA usage merely due to exclusion from formal financial services.

Previous use of insurance and micro-finance is positively correlated with ROSCA usage amongst the two lower income groups and negatively correlated for the richer (although not statistically significant). Financial literacy also exhibits a reverse trend: the poor who use ROSCAs are more knowledgeable about financial products than their non-user counterparts while the richer ROSCA users are less knowledgeable than their non-user counterparts, being less likely to understand the concept of inflation and struggling more to calculate compounded interests.

2.B. Why, when and how do Moroccans use ROSCAs?

Qualitative assessment portrays a variety of usages

To better understand why, when and how Moroccans use ROSCAs, we conducted qualitative field interviews in December 2016 with 21 subjects. All interviews were conducted in Arabic and lasted 20 minutes on average. Quota sampling was used to invite subjects for participation in branches of a microfinance institution and the Moroccan Postal Bank in the greater Casablanca area (balanced across gender and the three income groups). Among the 21 interviewees, 18 were aware of ROSCA practice and nine were current members, three of whom were organizers. While the sample is not sufficiently large to allow statistical inferences, it is diverse enough to provide insights on the inherent features of this informal practice.

For the higher income subjects of our sample, the main motivation for joining a ROSCA is the commitment device on savings, whereas the lower income population cited more often as their main motivation to have funds for a large expense or

investment, as a substitute for credit, which is seen by several respondents as too expensive or inaccessible. Across income groups, respondents report that a ROSCA is frequently started by an individual who, facing unforeseen expenses such as medical fees, feels they need recourse to this mechanism. The ‘needy’ member is generally given priority when deciding the withdrawal order. Solidarity is often cited by interviewees as a reason to join a ROSCA, suggesting that social connections and connecting emotionally with the money usage – absent in regular savings accounts – is important to respondents. Not all interviewees value earlier payouts; some say they ask to match their turn to the timing of foreseen expenses, while others prefer to be at the end²⁷. Some users also highlight the insurance aspect of ROSCAs, sharing that if they face an emergency and request an earlier payout, reciprocity and flexibility within the group would be able to accommodate a change in scheduling²⁸.

Several respondents report that the organizer plays a central role and takes a moral risk in the name of the group. As one organizer shares, “organizing [ROSCAs] is an adventure!”. Interviewees explain that the organizer is often given priority in the order, suggesting that their labour in organizing the ROSCA is partly compensated by certainty over the credit to be received. However, priority in the order appears to not always be transparent: some interviewees report mistrust on random drawings they do not witness, stating that organizers and their family members are often assigned to earlier payouts. For ROSCAs formed by poorer subjects, the organizer and ‘needy’ roles may overlap, whereas amongst the richer this is less common, since the organizer tends to be an established and stable member of the group, with the role of organizer repeatedly filled by the same person. In all cases, interviewees explain that high trust between the organizer and a prospective member is a necessary condition to join a ROSCA. This is related to the fact that the organizer represents a moral and often

financial assurance to the group, often seen as an informal guarantor to the process.

Existing ROSCA members can invite acquaintances to join and are expected to guarantee their good financial behaviour.

Respondents report that the overwhelming majority of ROSCA transactions are in cash, although a few report their groups using cheques and transfers. Particularly amongst groups with higher per person contributions, organizers may request security cheques signed by early recipients, to increase protection against defaults. Two interviewees report relying exclusively on bank transfers in their ROSCAs. Importantly for our research, when asked if they would be willing to use non-cash methods of payments, only one out of the nine current ROSCA users strongly oppose it²⁹, provided these methods do not incur fees and are convenient. Even amongst cash-only groups, many do not organize regular gatherings; most users only meet with the organizers, suggesting that the social aspect of ROSCAs is not too salient.

Broader national trends in ROSCA usage can be inferred from a survey of 391 Moroccan ROSCA users conducted by Bousalam and Hamzaoui (2015). They highlight that solidarity is reflected in the preferred ordering criteria, which is mutual agreed upon by members, and the fact that 92% of users report they would tolerate an urgent beneficiary receiving priority, after the order has already been agreed upon. According to their survey, half of Moroccan ROSCAs have between 5 and 10 members, with monthly median contributions of 1,000 DHS (Figure 4). This implies an estimated flow of 40 billion DHS being collected and distributed by ROSCAs every year³⁰, as compared to a total balance in Moroccan banks' saving accounts of 144 billion DHS³¹. It is important to note that, while these numbers are not directly comparable, with the first being an annual flow and the latter a current balance, they still underline the financial volume of ROSCAs in Morocco.

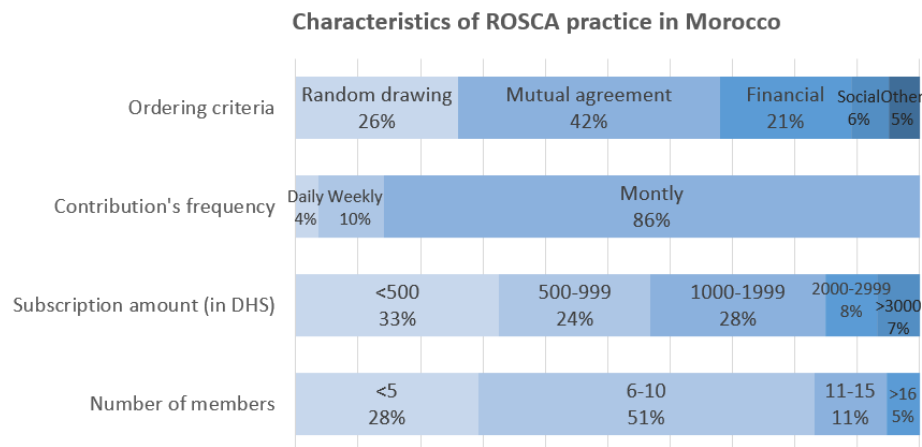


Figure 4 - ROSCA practices in Morocco.

Source: Bousalam and Hamzaoui (2015), from a survey of 391 users

Proposed customer segmentation

The literature explores multiple reasons for ROSCA membership³². We find evidence for three in our qualitative interviews: access to credit, savings commitment device, and solidarity as an insurance. Intra-household conflicts in resource allocation and socialization motivations do not appear particularly salient in our interviews. As such, we propose customer segmentation for ROSCAs along the dimensions of existing financial inclusion and social cohesiveness. Given the variety of ROSCA usage in Morocco³³, segmenting customers/users is crucial to effectively addressing their needs. Besides the degree of financial inclusion of members, which is highly correlated with income level, an orthogonal characteristic is the social cohesiveness of the groups (ranging from mere acquaintances to close family ties). This creates a typology of four ROSCAs profiles (see Figure 5).

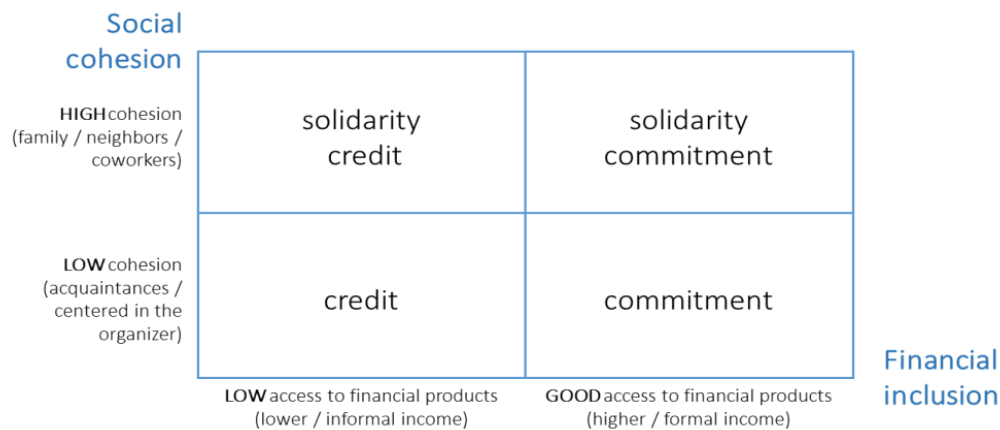


Figure 5 - ROSCA users' segmentation according to motivation to join group

As we saw in our qualitative interviews, while the financially excluded consider access to credit as their major motivation for joining a group, those with access to formal financial products value the commitment device for savings. Furthermore, a high social cohesion is distinctive of a group with a purpose of solidarity insurance, social symmetry amongst members and a lower perception in the risk of default.

3. Designing a formal ROSCA device

Having reviewed the Moroccan context and ROSCA traditional practice, this section outlines our proposed design for a formal ROSCA device.

3.A. What are the principles for a device that formalizes ROSCAs?

Tackle informality, insecurity and inefficiency

Informality, insecurity and inefficient are all issues that should be tackled by a device that formalizes ROSCAs. The costs and benefits of informality may be perceived differently by Moroccan authorities and ROSCA users. Authorities tend to see informality as a drawback, given the economic cost of the cash economy and lost tax revenues, while ROSCA users may see it as a benefit if they feel more comfortable

outside the formal banking system. Lack of trust in formal systems does not appear to be a key reason for low usage of formal systems; only 5% of unbanked Moroccans report trust as a reason not to have a formal account³⁴. As ROSCAs do not generate revenue, there are no tax benefits for individuals opting to use ROSCAs rather than more formal systems.

Insecurity is the most frequently highlighted problem by interviewed ROSCA users, especially by individuals with the weakest social bonds, and can be the main deterrent for joining a ROSCA. The informal guarantee provided by the ROSCA organizer does not always provide the desired level of guarantee, especially when groups are weakly cohesive.

Addressing inefficiency entails a formal savings device that would bring added value to the users. As described during our field interviews, a typical ROSCA in Morocco requires members to: (1) physically deposit their expected contributions on the agreed upon dates to the organizer and (2) physically withdraw their payout at their turn. Importantly, most of the organizational cost is borne by the ROSCA organizer who is usually in charge of: (1) defining the payout ordering³⁵, (2) planning and communicating each member's financial flows, (3) collecting every deposit, (4) managing any issues related to missed payments, (5) handling potential ROSCA member additions or withdrawals and (6) reporting to members as needed. While most of these steps can be subject to human mistake or manipulation, it is hard to imagine an automatized process to handle all of them. This is particularly true for the steps that rely on flexibility, such as the payout ordering, which is group-specific and should adapt to a member's arising financial need in groups that exhibit solidarity.

Preserve solidarity, flexibility and simplicity

Solidarity, flexibility and simplicity are three strong characteristics of ROSCAs that

should be preserved by a device that formalizes ROSCAs. Given the social nature of informal contracts in Morocco it is not desirable to fully externalize the ROSCA process. The importance of social interactions is highlighted by anthropological studies of ROSCAs which find that ROSCAs both rely on social collateral to ensure repayment and serve a social function³⁶; these strengths are factored into individuals' cost-benefit analyses when deciding whether to enter a ROSCA³⁷. This finding is supported in some of our qualitative interviews. Several interviewees underlined that solidarity is an important factor explaining their decision to join a ROSCA and one subject expressed the importance of the social component of ROSCAs, sharing "We organize snacks to do the drawing and we have a lot of fun with all my friends". Economists underline different types of social capital that can be gained through ROSCA interactions, such as information and social contacts³⁸. Solidarity is at the core of the ROSCA model and the development of social capital should be preserved. Indeed, interviewees shared that they often join a ROSCA to support a friend or family who has a short-term need and subsequently ensure that this person benefits from the funds early on. While the drawing of lots determines the order in 26% of cases (with potential agreed-upon swaps), in 42% of cases order is defined by mutual agreement³⁹ to better fit members' individual needs. ROSCAs can be first and foremost seen as a tool to provide a system of mutual assistance⁴⁰, especially in the absence of a welfare state.

The flexibility of ROSCAs is linked to the importance of solidarity, working as an insurance mechanism that adapts to members' financial needs. Flexibility can manifest in a variety of ways: (1) sophisticated payout schedules⁴¹, (2) various payment frequencies, (3) uneven contributions by members, (4) multiple members grouping to provide one contribution, (5) members voluntarily withdrawing before receiving their payoff⁴² and (6) the entry of additional members⁴³.

Lastly, ROSCAs are attractive for their simplicity and the fact that they are free of charge. One study in Morocco found that 47% of ROSCA users are motivated by the fact that ROSCAs are interest-free with no fees and 28% are motivated by their minimal administrative procedures⁴⁴.

3.B. What would be the features of a formal ROSCA device that respects these principles?

The recent push of the Moroccan authorities towards LIB has led to increased competition within this market. As such, banks seeking a competitive edge in the market would have to offer significant incentives for formal ROSCA device customers to capture these customers. Banking institutions looking to tap into the LIB segments in Morocco could be willing to offer a temporarily subsidized product for ROSCA users as an investment in future gains. A formal ROSCA device could generate economic gains for the institution through: (1) the acquisition of new customers, (2) the sustained utilization of banking products (debit card, deposit and saving accounts) as formal ROSCA users would commit to regularly using a card and bank account, which could create a habit of using the formal banking system and (3) the ability to credit score individuals with a thin file through the formal ROSCA history, which could enable the institution to provide credit to these individuals or sell such data to other partners. The banking institution would also generate social value⁴⁵ by improving financial inclusion in Morocco, reducing informality in savings and financial flows and creating an innovative model of ROSCA formalization which could be replicated. Additionally, with the introduction of mobile money in Morocco, a formal ROSCA device could avoid marginalization by allowing banks to reinforce ties with existing customers, attract new customers and further digitize its operations. In this section we propose a model for institutions looking to create a formal ROSCA device in Morocco.

A simple, free and flexible product

The administrative procedure should be kept as simple as possible for ROSCA members (excluding the organizer), by using a prepaid bank card based on a virtual account as the transfer vehicle. This vehicle is the least burdensome that Moroccan banks can propose; customers can receive instant approval from the bank to open the account using only their National Identity Card and the account is free.

The ROSCA organizer should have discretionary power on payout transfers to ensure flexibility. A dedicated banking agent could meet with the organizer when the ROSCA is set up to define dates at which withdrawals would be automatically made from the accounts of each member. The payment schedule should be able to be modified at any time by the organizer. And, consistent with their role as a trusted social figure, the organizer should have complete discretion to allocate funds to members after funds are added to the organizer's current account.

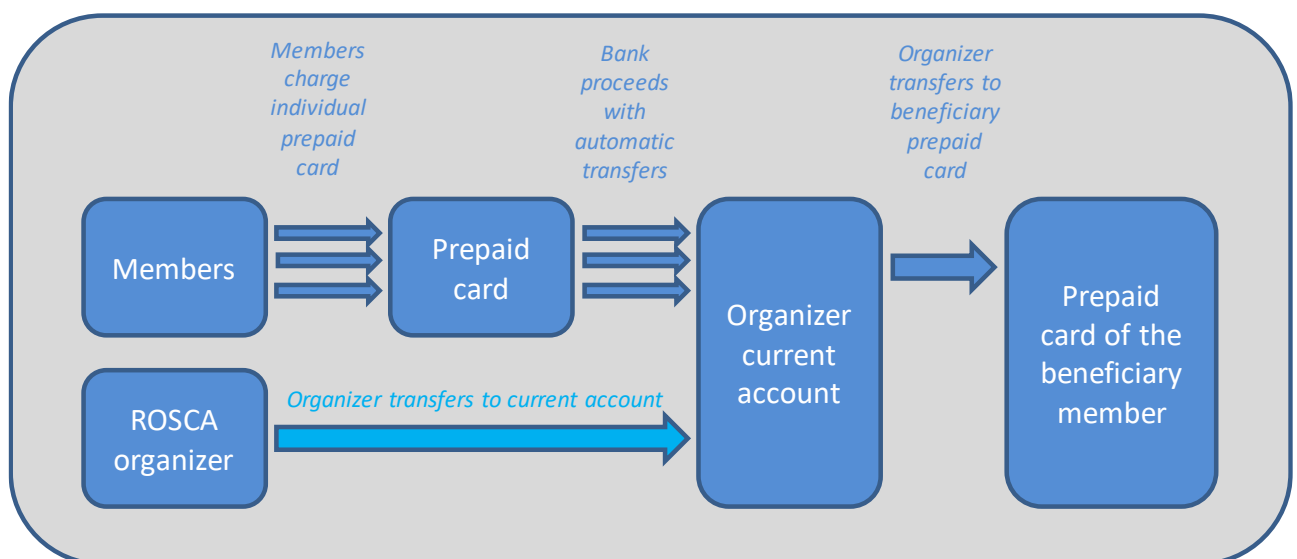


Figure 6 - Financial flows require limited individual actions by the organizer

A device centered around the ROSCA organizer

The ROSCA organizer would handle most of the administrative procedures, in keeping with their traditional role and leveraging their ability to enforce the terms of membership. We suggest that the organizer be provided a current account in order to allow for more operational flexibility. Targeted financial education and support for the organizer could ensure an improved management of the system and allow them to more effectively disseminate information to ROSCA members and other organizers.

Outreach efforts from the bank could primarily be directed towards ROSCA organizers, leveraging organizers' ability to influence members given their status as respected and trusted individuals. Only a motivated organizer with a full understanding of the proposed system could overcome the expected resistance from ROSCA members to switch from an informal and traditional system to a formal and modern system that leverages technology.

The ROSCA organizer decides upon two system guarantees options

Requiring the organizer to assume a central role in our proposed ROSCA device would leverage their unique position to address adverse selection⁴⁶, moral hazard⁴⁷, and contract enforcement problems⁴⁸. The screening to accept a member into a ROSCA would remain the organizer's responsibility, without any additional screening by the formal institution⁴⁹. Innovatively, prospective members would signal their trustworthiness⁵⁰ by signing a sworn statement with the bank when creating their account and picking up their prepaid ROSCA card.

Notably, the formal institution should not provide any guarantee of the ROSCA funds. If the bank were to offer a nonpayment guarantee, even group-cohesive ROSCA members would have an incentive to default on their obligations as soon as they receive

their payout, knowing that their payment would be replaced with the institution's guarantee. Additionally, organizers would have less incentive to carefully screen members. Even though the institution would not formally have "skin in the game", it could increase security for ROSCA members, as compared to the status-quo, through: (1) its reputable bank status, (2) the signing of a sworn statement by each member, and (3) increased social pressure through SMS peer monitoring technology.

In some cases, organizers may choose to act as guarantors to signal the trustworthiness of the whole group to each of its members. Under this approach, the cost of a possible default would be shouldered by the organizer, who would therefore undertake higher efforts on constituting an honest group as they would be responsible for any member's default⁵¹. As the formal guarantor of the system, the organizer would be legally liable in case of a member's default. Therefore, the marginal improvement when switching from an informal to a formal system would be lower for the organizer than the members, which might not justify the organizer's administrative and psychological switching cost to a formal ROSCA. As such, we suggest providing financial incentives to organizers who choose this option. Subsidies can be provided directly by the institution or, potentially, by external partners willing to support the social value of such device. These financial incentives for organizers choosing to act as guarantors could take one of several possible forms, such as: (1) a prize-linked lottery, but this might be perceived as uncertain and might not benefit from the same moral licensing as it does when coupled with savings, as shown in other experiments⁵², (2) vouchers for in-kind products, but these can be perceived as rigid⁵³, (3) direct financial transfers in the organizer's account, which are easier to implement than the two previous options despite operational risks associated with the handling of cash transfers, such as embezzlement. To ensure that incentives are aligned to increase users'

acquisition, financial incentives could be proportional to the number of new formal ROSCA users. This feature would ensure that subsidies decrease over time, as formal ROSCA memberships increase.

As found through our interviews, organizers in higher solidarity groups tend to identify themselves as casual group members who simply volunteer to organize the group⁵⁴. Such groups might be reluctant to have a member engage in a legally asymmetrical relation with other members. This justifies offering a symmetrical device whereby each member simply signs an informal sworn statement stating the payment obligations and schedule of each members. In this case, if financial incentives were to be used, they would have to be the same for each member, potentially limiting their efficacy as incentives.

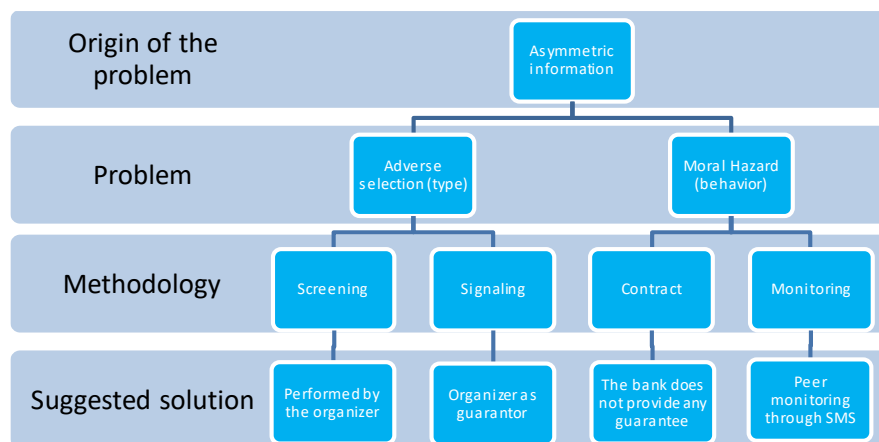


Figure 7- A formal ROSCA device should solve both the adverse selection and moral hazard problems

Consistent with our customer segmentation, we therefore suggest that institutions provide two formal ROSCA device options. The institution should avoid targeting groups with low social cohesion and high financial inclusion, as they represent a reputational risk without serving any social mandate. Rather, the two device options

should target: (1) groups with low solidarity, where the organizer's formal guarantee would be financially incentivized, and (2) groups with high solidarity, where all members would sign a sworn statement, without receiving any financial incentives (Figure 8). In order to ensure a correct allocation, groups should self-select into their prescribed ROSCA device. As shown in the game theoretical model developed in Annex 1, such self-selection should happen with an overall financial incentive in the order of 200 DHS (about 20 USD) for the organizer, who could decide to split it with participants, which might happen in cohesive groups. Consistent with Figure 9, this model advocates for a moderate financial incentive, below the psychological cost of introducing asymmetry within a high solidarity group, which is hard to estimate but could be tested out in the implementation phase .

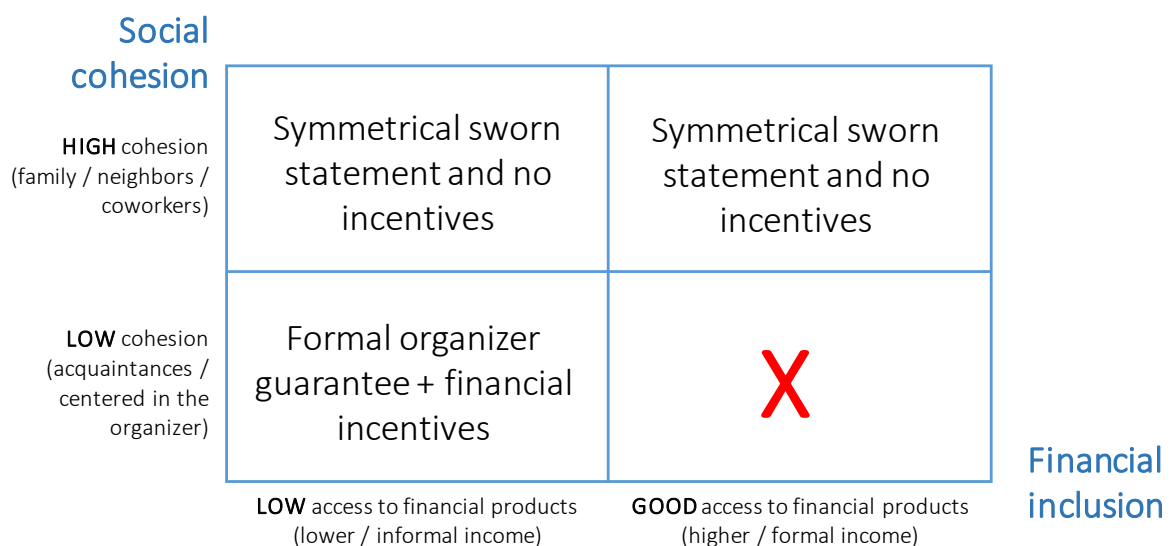


Figure 8 - Formal device solutions for targeted groups

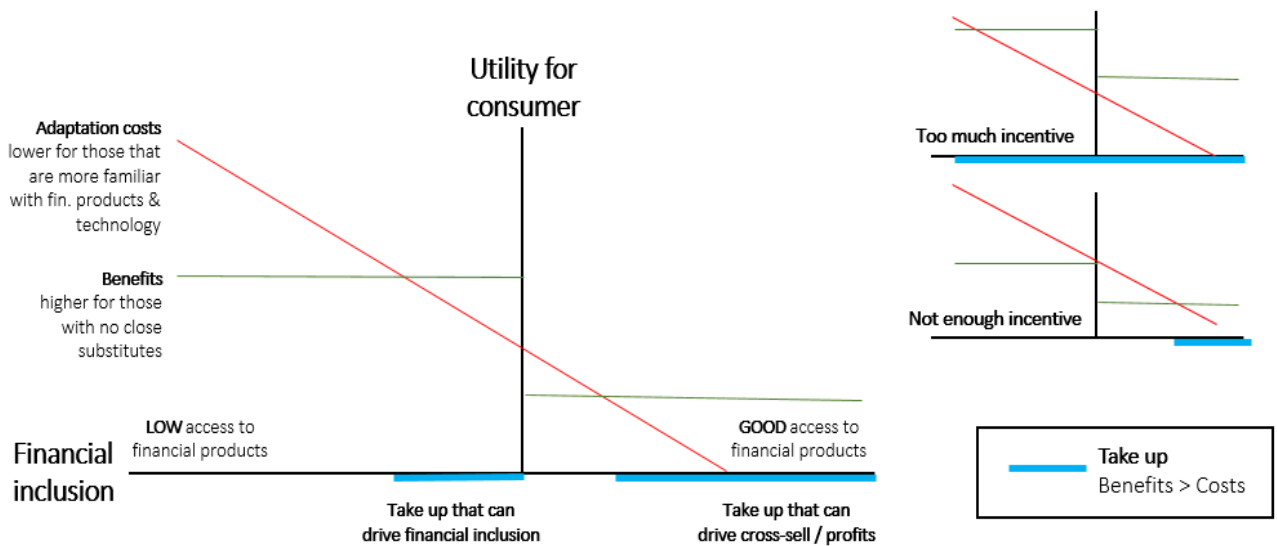


Figure 9 - Exploratory model of take-up sensitivity to incentive

The ROSCA users should benefit from a simplified access

The formal ROSCA device should also come at the lowest non-pecuniary cost to the users, with costs such as transport and waiting costs kept minimal. Studies have shown that decreases in total cost can improve financial services take-up: Flory (2011) shows that the use of “banks on wheels” in Malawi led to increases in formal savings take-up between 33% and 43% while Burgess and Pande (2005) argue that the expansion of bank branches in India between 1977 and 1990 significantly increased financial services delivery to underserved areas.

In addition to keeping non-pecuniary costs low, a formal ROSCA device should have the flexibility of allowing money exchanges beyond typical office hours and at locations convenient to users. Banks’ limited hours can be impractical and might require users to take time off from work, potentially leading to forgone wages or opportunities.

In our qualitative interviews, ROSCA members have underlined the benefit of being able to deposit or receive money outside of working hours.

In order to minimize non-pecuniary costs and to maximize flexibility, financial institutions could explore the expansion of their classic financial services beyond the use of bank agents and ATMs (which do tend to be open at any time, but may not be available in all areas) by introducing new payment and deposit channels:

- Leveraging the “*établissement de paiement*” regulation by training shopkeepers in underserved areas (e.g. grocers) to collect ROSCA deposits on behalf of the formal institution. This would expand the reach of the bank and make financial services “psychologically closer”. This approach should be rolled out carefully given the operational risks of handling money through an external agent.
- Adding a *dedicated space on a mobile application* to monitor and perform ROSCA payments⁵⁵. It should allow for easy, one-click payments from the user’s current account, as suggested in the model below. Ultimately, users should be able to use their mobile money account to perform payments through this application. Given the low (though growing) usage of the internet by ROSCA users (8.9% according to WBFCS 2013 microdata), this option may currently be less impactful than others.
- Offering a *deposit collector* service for remote areas. A randomized experiment in the Philippines⁵⁶ shows significant take-up and usage of a paying deposit collection service⁵⁷. Take-up probability was positively correlated with distance, increasing by 6% for each additional 10 kilometers between the agent and a bank branch. This service could also be leveraged for savings collection, acting as a commitment mechanism.

The product should encourage more transparency, attention and peer pressure

A formal ROSCA solution could bring much-needed transparency within the system. In particular, for lower solidarity groups, our qualitative interviews show that, in the absence of record-keeping and payment receipts, members can feel some vulnerability towards the organizer. Transparency could be ensured by a mobile application that would allow, as in the examples below, the tracking of each ROSCA member's payment record. While being part of a ROSCA appears to have no statistically significant relation with the use of mobile phone⁵⁸, we can infer from the low usage of internet by ROSCA users that there may be relatively low usage of smartphones applications. As such, transparency could additionally be ensured through the use of SMS messages whereby members would receive payment confirmation messages as well as regular recap messages concerning other members' payment situations. While the use of written messages might be subject to a literacy barrier, ROSCA users in Morocco have a lower illiteracy rate than the general population (9.8% as compared to 15.8%)⁵⁹, so the use of voice-based telecom information systems is likely unnecessary.

SMS reminders could also ensure that members don't forget to make their ROSCA transfers, in a more efficient way than requiring the organizer to reach out to members individually. Limited attention plays an important role in explaining saving behaviour, and reminders could make ROSCA payments top of mind, reducing procrastination⁶⁰. Savings reminders have been shown to be more effective when they trigger an implementation mindset, oriented towards action, rather than a deliberative mindset, oriented towards facts or analysis⁶¹. Field experiments on the design of savings reminders⁶² have shown that insisting on goals and financial incentives have the highest efficiency in making individuals stick to their savings target, while reminders regarding late payments do not appear to have an additive effect. Building on existing evidence,

which has investigated different randomly-assigned framings of reminders, SMS could be automatically sent by the bank once per ROSCA round, a few days before the expected payment date. Different drafts could be experimented, with messages like:

“Your next ROSCA payment is due on [date] for an amount of [X DHS]. Don’t forget to load your account. Group members will be notified of your transfer”. If the ROSCA payout has not been received or is late: “Your ROSCA payout of [Y DHS] is/was expected on [date]”.

Peer pressure, the core engine of ROSCAs’ sustainability, can be further reinforced. In the absence of legal documentation, the financial sustainability and spread of ROSCAs can be largely explained by solidarity entrenched through social pressure⁶³. A core task of the ROSCA organizer consists of recruiting reputable members⁶⁴ for whom the reputational cost of defaulting on their group would be higher than the financial benefits. Solidarity entrenched through social pressure can be powerful: for example, the use of peers as a commitment device led the “peer group treatment” to deposit 3.7 times more often in a savings account than the control group in a randomized experiment in Chile⁶⁵. A formal ROSCA device could therefore leverage technology to reinforce the traditional ROSCA peer pressure by: (1) sending a message reminding group members that other members will be notified when they make their payment; (2) addressing a message to all members after the due date, naming potential late members and (3) keeping track of the overall payment behavior of each member, through the mobile app and the bank. The “naming and shaming” peer pressure mechanism should be carefully piloted to avoid embarrassment, potentially deterring members from joining the formal ROSCA⁶⁶, and risky behaviour such as taking out high interest loans to make ROSCA payments.

The launch of the outlined ROSCA formal device carries significant uncertainty and

would require a careful and flexible implementation strategy by banks pursuing this initiative. Despite these challenges, a formal ROSCA device could be beneficial to Morocco by increasing savings channeled through the banking system and reducing informality through increased use of non-cash payments. Moreover, the device could be extremely valuable to banks seeking a competitive edge in the low-income banking segment, where competition is increasingly fierce in Morocco, with potential benefits including acquisition of new customers, sustained utilization of banking products and ability to credit score individuals with thin files.

Table 3 - Summary of costs and benefits of a ROSCA formal savings

	Traditional ROSCA	Formal ROSCA from the perspective of members		Formal ROSCA from the perspective of the organizer	
		Formal organizer's guarantee	Mutual sworn statement	Formal organizer's guarantee	Mutual sworn statement
Administrative procedures	Absent	Prepaid card with light procedures	Prepaid card with light procedures	Current account procedure and formal guarantee	Current account procedure
Formality	Informality	Banking channel	Banking channel	Banking channel	Banking channel
Cost/interest	Cost/interest free	Cost/interest free	Cost/interest free	Cost/interest free	Cost/interest free
Reward	None	None	None	Incentive	None
Access	In person only	Multi channel	Multi channel	Multi channel	Multi channel
Efficiency	Inefficient	Efficient	Efficient	Efficient	Efficient
Pressure	Peer pressure	Reminders	Reminders	Reminders	Reminders
Social interaction	Existing	Limited	Limited	Limited	Limited
Risk	Default risk	Formal guarantee of the organizer	Sworn statement	Default risk	Sworn statement
Improved access to credit	None	Yes	Yes	Yes	Yes

Colors go from green (positive) to red (negative) to describe the perception of each ROSCA characteristics
Multi channel represents the various options laid out to access and transfer ROSCA contributions

References

- Ambec, Stefan, and Nicolas Treich. "Roscas as Financial Agreements to Cope with Self-Control Problems." *Journal of Development Economics* 82, no. 1 (2007): 120–37.
- Anderson, Siwan, and Jean-Marie Baland. "The Economics of Roscas and Intrahousehold Resource Allocation." *The Quarterly Journal of Economics* 117, no. 3 (2002): 963–95.
- Ardener, Shirley, and Sandra Burman, (eds). *Money-Go-Rounds: The Importance of Rotating Savings and Credit Associations for Women*. Oxford/Washington, D.C.: BERG, 1995.
- Ardener, Shirley. "The Comparative Study of Rotating Credit Associations." *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 94, no. 2 (July-December 1964): 201-229.
- Ashraf, N., Karlan, D.S. and Yin, W.. "Deposit collectors." Art. 5. Special Issue on Field Experiments. *Advances in Economic Analysis & Policy* 6, no. 2 (2006).
- Atalay, K., Bakhtiar, F., Cheung, S. and Slonim, R.. "Savings and prize-linked savings accounts". *Journal of Economic Behavior & Organization*, 107 (2014), pp.86-106.
- Bali moune-Lutz, M.. "Financial reform and the mobilization of domestic savings: The experience of Morocco", *UNU-WIDER Research Paper*, no. 2006/100 (2006).
- BAM (Bank Al Maghrib). *Inclusion financière au Maroc : Etat des lieux et perspectives*. Casablanca: BAM 2016
- BAM (Bank Al Maghrib). *Piliers de l'Inclusion Financière : Cas du Maroc*. Casablanca : BAM 2016
- Barro, R. "Determinants of Economic Growth: A Cross-Country Empirical Study". *NBER Working Paper*, n.5698 (1996)
- Besley, T., Coate, S. and Loury, G. "The Economics of Rotating Savings and Credit Associations" *The American Economic Review*, 83, no.4 (1993): pp.792-810
- Bester H. "Screening vs rationing in credit markets with imperfect information's", *American Economic Review*, 75, no. 4 (1985): 850-855.
- Bonnett, Aubrey W. *Institutional Adaptation of West Indian Immigrants to America: An Analysis of Rotating Credit Associations*. Washington, D.C.: University Press of America. 1981

- Bordalo, P., Gennaioli, N. and Shleifer, A., "Salience and consumer choice". *Journal of Political Economy*, 121, no. 5 (2013).
- Bouman, F.J.A.. "ROSCA: on the origin of the species" *Savings and Development* 19, no. 2 (1995): 117–48.
- Bourhaba, O. and Mama H., "An Estimation of the Informal Economy in Morocco". *International Journal of Economics and Finance*. Canadian Center of Science and Education, vol. 8 (2016): pp.140-47
- Bousalam, I. and Hamzaoui, M.. "Bank-based investing RoSCA for Islamic finance: a new alternative to drain households' savings and reduce financial exclusion." *MPRA Paper* (2015), University Library of Munich, Germany.
- Burgess, R. and Pande, R.. "Do rural banks matter? Evidence from the Indian social banking experiment." *The American Economic Review* vol. 95, no. 3 (Jun., 2005), pp. 780-795
- Calomiris, Charles and Indira Rajaraman. "The Role of ROSCAs: Lumpy Durables or Event Insurance?" *Journal of Development Economics*, vol. 56 (1998), pp. 207-216.
- Coleman, J., "Social capital in the creation of human capital" *The American Journal of Sociology*, v. 94, (1988): pp.S95-S120
- Demirgüç-Kunt, A., Klapper, L.F., Singer, D. and Van Oudheusden, P.. "The global finindex database 2014: Measuring financial inclusion around the world." *Policy Research Working Paper* no. 7255 (2015). World Bank
- Dupas, P., and Robinson J. "Why Don't the Poor Save More? Evidence from Health Savings Experiments." *American Economic Review*, 103 no. 4 (2013):1138-71.
- Dupas, P., Karlan, D., Robinson, J. and Ubfal, D. "Banking the Unbanked? Evidence from Three Countries," *American Economic Journal: Applied Economics*, vol 10(2), pages 257-297.
- Fang, Hanming, Rongzhu Ke, and Li-An Zhou. "Rosca Meets Formal Credit Market." *NBER Working Paper* no. 21683 (2015)
- Flory, J.A.. "Micro-Savings & Informal Insurance in Villages: How Financial Deepening Affects Safety Nets of the Poor-A Natural Field Experiment." *SSRN Electronic Journal*, 2011
- Geertz, Clifford. "The Rotating Credit Association: A 'Middle Rung' in Development." *Economic Development and Cultural Change* (April 1962): 241-63.

- Gugerty, Mary Kay. "You Can't Save Alone: Commitment in Rotating Savings and Credit Associations in Kenya." *Economic Development and Cultural Change*, 55 no. 2 (2007): 251–82.
- IMF. "Financial System Stability Assessment for Morocco" *Country Report* no. 16/37 (2016)
- Ito, S.. "Microfinance and social capital: does social capital help create good practice?" *Development in Practice*, vol. 13, no.4 (2003), pp.322-332.
- Jaffee D. and Russel T. "Imperfect information and credit rationing", *Quarterly Journal of Economics*, 90 (1976): 651-666.
- Karlan, D., McConnell, M., Mullainathan, S. and Zinman, J.. "Getting to the top of mind: How reminders increase saving" *NBER Working Paper*, no. 16205 (2010)
- Kast, F., Meier, S. and Pomeranz, D.. "Saving More in Groups: Field Experimental Evidence from Chile". *HBS Working Paper Series*, 2016
- Kear, Mark. "Peer Lending and the Subsumption of the Informal." *Journal of Cultural Economy*, 9 (3): (2016) 261–76.
- Klonner, S. and Rai, A.S. "Adverse selection in credit markets: Evidence from South Indian bidding ROSCAs". *Working Paper*. Department of Economics, Cornell University. 2005
- Mankiw, G., Romer, D. and Weil, D., "A contribution to the empirics of economic growth". *The Quarterly Journal of Economics*, v.107, issue 2 (1992): pp.407-437
- McKinsey (2015) The McKinsey Global Payment Map, *Report*
- Schneider, Friedrich, Buehn, Andreas and Montenegro, Claudio. "Shadow Economies All over the World: New Estimates for 162 Countries from 1999 to 2007" *Policy Research Working Paper* 5356. World Bank. 2010
- Solow, R., "A contribution to the Theory of Economic Growth". *The Quarterly Journal of Economics*, 70(1): (1956), pp.65-94.
- Soman, D. and Zhao, M., "The fewer the better: Number of goals and savings behavior." *Journal of Marketing Research*, 48(6): (2011), pp.944-957.
- Stiglitz J. & Weiss A., "Credit rationing in markets with imperfect information", *American Economic Review*, 77 (1981): 393-410.
- Varadharajan, S.. "Explaining participation in rotating savings and credit associations (roscas): Evidence from Indonesia." *Working Paper*. Department of Economics, Cornell University. 2004.

Westley, G.D. and Palomas, X.M.. “Is there a business case for small savers?” *Policy Research Working Paper* no. 9457. World Bank. 2011.

Zottel, Siegfried; Ortega, Claudia Ruiz; Randall, Douglas; Xu, Sarah Yan. *Enhancing financial capability and inclusion in Morocco : a demand-side assessment*.

Washington, DC : World Bank. 2014

Annex 1 – A simple model of self-selection into the two formal ROSCA devices

Consistent with our customer segmentation, we would let each group (high or low solidarity) self-select into one of the two formal device offers extended by the bank. In game theory, this is a dynamic game of incomplete information whereby groups know their level of solidarity (high or low) but the banking agent does not. In order to ensure that financial resources are efficiently allocated, with each group self-selecting into its dedicated offer, we need this game to lead to two Perfect Bayesian Equilibriums with the groups signaling their types through their choice between the two ROSCA devices. We propose the following model to estimate the level of the financial incentive.

We denote with an L groups with low solidarity and with an H groups with high solidarity. We denote with a G groups that have the organizer's formal guarantee with a financial incentive, denoted F, and NG for groups with no formal guarantee and no financial incentive. N is the number of group members. We do not take into account potential group dynamics, assuming that groups behave unitarily under the decision of the organizer, whose perspective is taken into account in the following model. In order to have a separating equilibrium, we need organizers of a given type of group to play their best response, which means that the following properties should hold true:

* For L types, in terms of perceived benefits by the organizer: $\text{Benefit}_G > \text{Benefit}_{NG}$, which means that: $\text{Formality}_G + \text{Efficiency}_G - \text{Insecurity}_G + \text{Financial incentive} > \text{Formality}_{NG} + \text{Efficiency}_{NG} - \text{Insecurity}_{NG}$

Assuming that the benefits in terms of informality and inefficiency are similar for G and NG devices, we have: $\text{Insecurity}_G + F > - \text{Insecurity}_{NG}$, which, assuming that default cost is divided amongst all members in NG and bore by the organizer in G, would give: $F - (D_G \times A_G) > - (D_{NG} \times A_{NG})/N$, with D the default probability and A the defaulted amount.

We assume that, for a given type of group (H or L), members will not behave differently if the organizer provides their formal guarantee. Such assumption can be debated as there could be some endogeneity where a member would be more tempted to default if they knew that other members would still be compensated by the organizer in case of default. The following estimation of F can be seen as a lower bound estimate:

$$F - (D \times A) > - (D \times A)/N \text{ which gives } F > A \times [D \times (N-1)/N]$$

In the absence of a Morocco-specific estimate of default rates, simulated default rates in the following table are inspired from Klonner et al. (2005) who estimated default rates for ROSCAs in India between 0.54% and 1.74% depending on the ROSCA cycle. The interviews we had in Morocco showed very limited occurrences of non-recoverable defaults. The table below uses

different hypotheses on D, N and A to estimate F. Our preferred estimate is the one with D=2%, N=10 (average number of ROSCA users in Morocco) and A=10,000 DHS (average total amount of a ROSCA round)⁶⁷, which is a higher bound estimate as it would mean that the defaulter defaulted on the first round.

D	A	N			
		5	10	15	20
1%	10000	80	90	93	95
1%	5000	40	45	47	48
1%	1000	8	9	9	10
2%	10000	160	180	187	190
2%	5000	80	90	93	95
2%	1000	16	18	19	19
3%	10000	240	270	280	285
3%	5000	120	135	140	143
3%	1000	24	27	28	29

The estimated financial compensation F would vary between 90 and 270 DHS with an average at 180 DHS. As noted earlier, this is a lower bound estimate and, if D_G is X times higher than D_{NG} , then F would increase almost proportionally; more precisely, we would have $F > A \times [D \times (XN-1)/N]$.

* For H group types, following a similar reasoning in terms of perceived benefits by the organizer and taking into account C, the cost of introducing asymmetry within the group⁶⁸, we would find:

$F - (D_G \times A_G) - C < - (D_{NG} \times A_{NG})/N$. In groups with high solidarity, we should see that the perceived D is very near zero which leads to:

$F < C$, which means that the financial incentive is below the cost of introducing asymmetry within the group, which makes logical sense.

Henceforth, in order to have a separating equilibrium we should have:

$$C > F > A \times [D \times (N-1)/N]$$

There are other findings we could infer from this model, despite the absence of information on C. If C is very low (below $A \times [D \times (N-1)/N]$), we could not have the desired separating equilibrium, which is an assumption that should be tested out. Even if a higher F might provide more incentive, the formal institution should be cautious to keep it reasonably low not to create incentives for H groups to opt for the guarantee options. Overall, the formal institution should cautiously set a relatively low level of financial incentive as it is launching its pilot, while gathering further data.

- ¹ Solow 1956, Mankiw et al 1992.
- ² Mankiw et al 1992
- ³ Barro 1996.
- ⁴ Balamoune-Lutz (2006) investigates the effects of the Moroccan financial liberalization reforms (1987-99) and its channels.
- ⁵ Gross domestic saving (as % of GDP) from World Bank national accounts data, 2015 [<http://data.worldbank.org/>].
- ⁶ Dupas et al. (2018) reviewed the evidence on what works in financial inclusion, finding positive household welfare impacts of formal saving products.
- ⁷ IMF, 2016.
- ⁸ Ibid.
- ⁹ Such as poverty reduction, women's economic empowerment and greater food security and health protection. Several financial inclusion-related indicators are present in the Sustainable Development Goals (SDGs).
- ¹⁰ Bank Al Maghrib, November 2016.
- ¹¹ Bank Al Maghrib, August 2016.
- ¹² Zottel et al (2014) presents the findings of the World Bank Financial Capability Survey (WBFCs). The WBFCs interviewed a nationally representative sample of 3,000 adults in Morocco between September and December 2013.
- ¹³ Zottel et al (2014): p.12.
- ¹⁴ Such as the Ministry of Finance, Ministry of the Economy, the Central Bank and financial institutions.
- ¹⁵ Schneider et al. (2010)
- ¹⁶ The 2015 estimate is provided by Bourhaba and Mama (2016). For 1998-1999, estimates of the size of the informal economy in Morocco fluctuated between 36% and 38% of GDP.
- ¹⁷ Bourhaba and Mama (2016) echo the literature suggesting a non-monotonic relationship between the informal sector and urbanization, in which the size of the informal sector increases in the early stages of urbanization, then falls in more advanced stages of urbanization.
- ¹⁸ Bourhaba and Mama (2016) estimate that each 1% increase in the tax burden leads to a 0.11% gain in the size of the informal economy in Morocco.
- ¹⁹ According to McKinsey (2015), who, in their calculations of the operational costs of cash, consider the direct expense of producing, collecting, storing and safeguarding it; counterfeiting costs; and time spent processing cash payments in merchant tills, business back offices, government agencies and banks.

- ²⁰ 88% of debit/credit card transactions and 75% of cheque transactions are cash withdrawals (McKinsey, 2015).
- ²¹ Zottel et al, (2014): p.32.
- ²² Zottel et al (2014): p.53.
- ²³ The main financial products that Moroccans are aware of are offered by banks (90%), followed by products offered by savings and credit self-help groups (89%), microfinance institutions (68%) and money transfer operators (65%). Insurance products are known by less than half of the sample (45%).
- ²⁴ The highest satisfaction rates are achieved by savings and credit self-help groups and money exchange offices (70%), closely followed by money transfer operators (69%) and microfinance institutions (67%), while commercial banks achieve the lowest satisfaction rate among all seven financial providers (43%).
- ²⁵ The enumerator proceeded sequentially through a list of financial products, from most formal to least formal, asking if the respondent had used the product within the last 5 years and, if yes, asking if they chose it themselves. Enumerators stopped as soon as they had an affirmative answer. ROSCAs were 11th in the list and therefore only 1,237 households out of the 3,000 households responding to the survey were asked about their ROSCA usage.
- ²⁶ Calculation: $54\% = 68\% * 14\%/18\%$, adjusting the 68% 5 year usage in the subsample by the same bias of the current prevalence in the subsample (18%) versus the unbiased current prevalence (14%). Coincidentally, we arrive at the same estimated participation in ROSCAs as Bousalam and Hamzaoui (2015), who surveyed 725 individuals and found 391 ROSCA users.
- ²⁷ Although a revealed preference for later payouts may seem financially irrational, it can be justified by self-control issues (Ambec and Treich, 2007; Gugerty, 2007)
- ²⁸ Amongst 391 current ROSCA members surveyed, Bousalam and Hamzaoui (2015) find that 92% would tolerate an urgent beneficiary (someone being prioritized for payout after ordering has taken place, due to an expected need).
- ²⁹ Although we did not test specific product designs or features, we enumerated some options, such as the use of pre-paid rechargeable cards; these options will be discussed further in Section 4.B.
- ³⁰ Assuming that, at any given time, 14% of Morocco's 24.3 million adults are participating in a ROSCA and contributing on average 1,000 DHS/month.
- ³¹ BAM, 2016
- ³² Economists have rationalized ROSCA participation in theoretical models around four justifications: (1) to save for purchasing indivisible goods when credit is unavailable

(Besley, 1993); (2) to offer insurance based on balanced reciprocity (Calomiris and Rajaraman, 1998); (3) to alleviate intrahousehold conflicts over resource allocation (Ardener and Burman, 1995; Anderson and Baland, 2002); and (4) to serve as a savings commitment device which helps people to cope with their own self-control problems (Ambec and Treich, 2007; Gugerty, 2007). Anthropologists also highlight the socialization aspect of the ROSCA practice (Geertz, 1962; Ardener, 1964; Bouman 1995).

³³ The Arabic name given to ROSCAs alone is an indication of their user segment. Richer and more financially included individuals interviewed call ROSCAs ‘Daret’ (“it turned”), whereas poorer individuals tend to refer to them as ‘Kour’aa’ (“the random drawing”).

This suggests that poorer individuals may place more importance on the order of payouts.

³⁴ Zottel et al, 2014.

³⁵ Which, in about 26% of cases, consists of organizing a draw (Bousalam and Hamzaoui, 2015)

³⁶ Besley et al (1993), Bouman, (1995).

³⁷ Ardener (1995) state that, “We should not overlook the fact that socializing [in ROSCAs] may have a cost-effective benefit. [Members] may get valuable information on a wide range of topics, advice on many issues or unpaid labor, and so forth”.

³⁸ Varadharajan, 2004.

³⁹ Bousalam and Hamzaoui (2015).

⁴⁰ Geertz (1962) writes that “the primary attraction of the *arisan* [Indonesian ROSCA] is not the money you receive, but the creation of *rukun* (communal harmony) which occurs, the example of *gotong rojong* (mutual assistance) which is demonstrated”.

⁴¹ Such as multiple repayments per member over the course of the ROSCA.

⁴² Which usually leads to that member receiving their accumulated contributions at the end of the cycle.

⁴³ Either to replace a withdrawn member or to increase the size of an upcoming ROSCA cycle. According to Bousalam and Hamzaoui (2015), an estimated 76% of ROSCA users tolerate the addition of a new entrant proposed by an existing member

⁴⁴ Bousalam and Hamzaoui (2015).

⁴⁵ This may be a relevant consideration for some institutions. For example, al Barid Bank, the Moroccan postal bank, has an explicit social mission as part of its mandate.

⁴⁶ The adverse selection theory of credit markets, canonized by Stiglitz and Weiss (1981), relies on the assumption that lenders cannot distinguish, *ex ante*, between borrowers of different degrees of risk. Their analysis concerns solely *involuntary* default on loan contracts subject to limited liability. The close-knit character of many ROSCA networks implies

that organizers possess a great deal of information about prospective members, to a level unmatched by the traditional formal banking system.

⁴⁷ Moral hazard is a risk arising from the lender's inability to observe and monitor, *ex post*, the borrower's actions and efforts to generate returns to repay a loan. Both adverse selection and moral hazard are instances of asymmetric information, which form the basis for credit rationing, as pioneeringly modelled by Jaffee and Russell (1976). It has been shown that credit rationing can be overcome by collateral requirements (Bester, 1985), though collateral is not always available nor is it costless. Collateral is seldom observed in ROSCAs.

⁴⁸ Given that ROSCA participation usually relies on oral agreements rather than written contracts, payments cannot be enforced by formal legal institutions. The organizer relies on informal enforcement mechanisms based on social sanctions, coercion, and the threat of banning future membership.

⁴⁹ This stands in sharp contrast with the traditional banking model that usually relies on setting up screening devices, mostly based on credit history. A screening model is problematic as it relies on past behaviour as an indicator of intrinsic honesty and is at the origin of a "chicken-and-egg" problem whereby poor people who are honest cannot build a credit history when no one lends to them in the first place. In our case, availability of verifiable data is generally limited, given that ROSCA users in Morocco are in large part lower to middle income individuals, less than one-third of whom have an active formal bank account (Zottel et al, 2014).

⁵⁰ Coleman (1988) states that "Without a high degree of trustworthiness among the members of the group, the [ROSCA] could not exist – for a person who receives payment early in the sequence of meetings could abscond and leave the others with a loss".

⁵¹ This would require the signing of a contract, which could be designed by the banking institution as a template for the ROSCA organizer.

⁵² Atalay et al (2014) argue that a pre-packaged bundle (savings and lottery) allows individuals to not buy the lottery in isolation, thus can avoid an action that has the negative moral connotation only.

⁵³ We might anticipate a low acceptance rate of vouchers, especially in rural areas where options to use the voucher might be scarce and entail transportation costs.

⁵⁴ In some cases, there is a rotation amongst members as to who organizes the ROSCA.

⁵⁵ About 45% of the Moroccan population was equipped with a smartphone by April 2016, and 66.5% had access to internet according to the Telecom Regulation Authority (2017).

⁵⁶ Ashraf et al. (2006).

⁵⁷ 28% take up and 14% regular usage of a 0.1 USD service.

⁵⁸ According to WBFCS, 65% of Moroccans use mobile phones as compared to 63% for ROSCA users.

⁵⁹ Analysis based on WBFCS microlevel data.

⁶⁰ Bordalo et al (2013).

⁶¹ Soman et al. (2011).

⁶² Karlan et al. (2010), in the context of commitment savings accounts, which can be easily compared to a ROSCA in the absence of peer pressure.

⁶³ As was expressed during our interviews, some ROSCA members have admitted taking a (high interest rate) loan to pay their ROSCA contribution: “I would not be able to go out of my house if I knew I failed my group”. Even for low solidarity groups, it is deemed to be the role of the organizer to gather information on the ROSCA members repayment behaviour.

⁶⁴ Who are generally known personally by the organizer.

⁶⁵ Kast et al. (2016).

⁶⁶ It could be circumvented by allowing members to decide the number of days after which late payers are notified to the group.

⁶⁷ Bousalam and Hamzaoui (2015).

⁶⁸ Which we assumed was negligible for groups with low solidarity.

Green Bonds: Utility, Opportunity, and Challenge

A Critical Assessment of Green Bonds' Capacity for Engagement of the Private Sector

Rastko Stanisavljevic

*Norman Paterson School of International Affairs, Carleton University, Ottawa,
Ontario, Canada*

rastkostanisavljevic@cmail.carleton.ca

Green Bonds: Utility, Opportunity, and Challenge

A Critical Assessment of Green Bonds' Capacity for Engagement of the Private Sector

The following explores the relative capacity of using green bonds to engage with investors and draw in private capital for sustainable finance. The essay outlines the nature of green bonds, while exploring the relative merits they afford and salient challenges associated with them. The author finds that the unique characteristics of green bonds make them an excellent way to draw in some capital from investors interested in signaling their commitment towards environmental issues, however that green bonds ultimately fail as a tool for attracting a sufficient proportion of private capital for financing a green transformation of the international economy, energy supply, and infrastructure as projected by the International Energy Agency.

Keywords: green bonds; green financing; sustainable finance; economics; responsible investing; environmental relations; sustainable development

Introduction

In order to effectively meet the pressing necessity of combatting climate change while simultaneously growing the economy, state governments¹ have prioritized re-orienting their economies towards a low-carbon and high-resilient (LCR) direction. Specifically, governments hope to achieve this through funding projects aimed at promoting such objectives as the growth of clean technology, better waste management, and carbon-capture (sequestration). Yet, significant hurdles exist towards actualizing these goals. One of the major hurdles involves financing, since states' public budgets are generally not sufficiently large to provide the capital required for said types of projects. However, the financing gap could be met by turning to private investors: given that institutional investors manage significant sums of global capital, they represent both an excellent

potential source of funding and opportunity for sustaining the long-term financial assistance necessary to achieve a global green transformation. While there are several methods of facilitating this, one potential option is through the issuance of green bonds. In theory, green bonds have the capacity to realize benefits for the environment while simultaneously attracting investor capital towards environmentally-conscious projects (that is, responsible investing)². However, are green bonds appropriate finance tools to properly incentivize the private sector to allocate capital towards supporting the growth of green projects internationally? This essay will take an explore the aforementioned point through a critical analysis of green bonds, developed across four parts. Part one will define what green bonds are and explore their potential benefits to the environment and investors; part two will explore opportunities green bonds generate for bond issuers³; while part three of the essay will examine potential challenges associated with utilizing green bonds to foster responsible investment and how these may be overcome to facilitate greater commitment towards the environment by investors. The essay will conclude with a brief, critical summary of the relative utility green bonds present in regards to their capacity to act as sustainable finance tools.

Part I

Green bonds are fixed income securities that raise capital towards transitioning the world towards an LCR economy (Della Croce et. al, 2011). They differ from other bonds as all capital accrued through them is allocated to green projects that have a net positive impact for the environment. Like their conventional counterparts, green bonds may be categorized into one of four, broad categories: asset-backed green bonds that are tied to a specific project; corporate green bonds; bonds issued by global financial institutions (such as the World Bank) to raise funds for green projects; and sovereign and municipal bonds, which may be driven by specific government incentives⁴. Hence,

green bonds may be issued by a variety of sources including multinational companies, multilateral organizations, and states. Moreover, apart from requiring proceeds be earmarked to meet funding for green initiatives, green bonds are identical to conventional bonds insofar as their respective price, yield, and credit quality are concerned. Given that the characteristics of green bonds are virtually identical to conventional bonds - with the caveat of green bond proceeds being tied to green projects and activities - green bonds are playing (and will continue to play) a large role in enabling environmentally-conscious responsible investing. Specifically, green bonds can act as excellent sources of the kind of long-term capital necessary to finance low-carbon infrastructure projects⁵. Incidentally, green bonds are presently issued in Canada through Export Development Canada as a means of raising capital for projects - of which the majority are in the clean tech sector - that are focused on mitigating the effects of climate change and preserving, protecting, and remediating air, water, and soil quality⁶. More precisely, these projects fall into one of eleven broad categories: waste management; remediation and soil treatment; recycling and recovery; water management; sustainable forest management; sustainable agricultural management; renewable energy; biofuels and bioenergy; smart grid energy infrastructure; alternative energy transportation and public ground transport; or industrial process improvements (within the transportation sector)⁷. The central objective of green bonds issued in Canada is to spur forward clean and sustainable economic growth that lowers pollution, addresses the government's crucial mandate of combatting climate change, and protects the long-term health of the environment, communities, and individuals^{8,9}.

With their close resemblance to conventional bonds, green bonds provide investors with the opportunity to create positive environmental impact without having to sacrifice their investment objectives. Such objectives are realized through risk-adjusted

financial returns that simultaneously create benefits for the environment. Through investing in green bonds, investors allow funds to be raised for LCR-related projects or activities. The unique character of green bonds is also a boon to responsible investing insofar as it requires advisors to work more closely with bondholders to ensure that environmental-related investment concerns are met. Similar to shareholders, bondholders play an essential role in the capital structure of green bonds. However, unlike shareholders, bondholders are not given the capacity to voice their concerns over their investments in green bonds through channels such as proxy voting. Hence, intermediaries are required to engage more directly with issuers of green bonds through private dialogue¹⁰. The principal benefit of this is that it enables greater insight into policies, material issues, and management of ESG-related risks and performance surrounding projects green bond issuers seek funding for. Consequently, this ensures that investors are provided with more information about ESG-related issues surrounding green bonds than would be the case for more conventional bonds. According to feedback from investment advising company Breckinridge Capital Advisors, information on ESG-related concerns through deeper engagement with green bond issuers results in enhanced credit analysis of bonds since more comprehensive credit profiles of borrowers are able to be constructed¹¹. Also, through progressively greater issuance of green bonds, responsible investors can focus away from screening out unwanted impacts of carbon-intensive investments to proactively pursuing environmentally positive results through mainstream investments. Thus, green bonds enhance responsible investing by offering investors the option of investing in projects with environmental benefits, rather than merely investing to mitigate environmental harm. As such, green bonds empower investors to exert greater influence over their investments and more consciously pursue environmentally favorable outcomes.

Another important aspect of green bonds that makes them a potentially strong enabler of responsible investing are their unique financial characteristics. First, as a fixed income product, green bonds present a relatively low-risk investment that is well suited to the preferences of most income investors. Indeed, conventional bonds typically represent the most important class of assets for many institutional investors, whose portfolios are often made up of as much as 90% fixed income products¹². Second, green bonds typically group several different projects into a single security. This is beneficial for responsible investors as it simultaneously cuts costs by matching them up with green projects and reduces investment risk due to the bundling of diverse projects under a single green bond¹³. Given this, green bonds present investors with relatively low-risk opportunities to simultaneously "green" and diversify their portfolios. Another benefit of investing in green bonds that could facilitate greater responsible investing is that green bonds have the potential to act as important tools investors can use to hedge investments from financial risk associated with climate-change¹⁴. Although the specific process of how hedging against climate risks could be achieved in an emissions-intensive investment portfolio is beyond the scope of this essay, it is not difficult to imagine such an outcome should said portfolio be diversified to feature green bonds associated with green pure play companies, projects, and asset-backed securities¹⁵.

At this juncture of the essay, it is worth clarifying that while green bonds constitute a distinct category of bond, they fall into a larger market of "unlabeled climate-aligned bonds" that have a similar purpose as green bonds but have not yet been officially recognized as such. Although there are still some concerns surrounding how to more clearly discern between the two, a growing market demand for green bonds has resulted in attempts to set clearer standards for what constitutes a green bond¹⁶. This remains a significant challenge for the continued growth of the green bond market and

this issue will be revisited in greater depth in the second portion of this paper. However, for the purposes of the following argument, it is sufficient to note that the processes associated with designating what makes a green bond "green" have been significantly improved over the last few years to ensure proceeds use and reporting requirements are more transparent. This is important in identifying several more benefits that make green bonds an attractive investment opportunity for investors, with the potential to act as an enabler for more responsible investment. Given that processes associated with proceeds reporting for green bonds have become more stringent, there is generally greater risk assessment for green bonds in comparison to other fixed income assets¹⁷. This is beneficial for investors as it grants them the kind of superiority of insight prior to investing that is vital to allocate finances towards sound investments. More specifically, greater transparency of proceed use and reporting requirements for green bonds provide investors with a greater deal of information relative to more generic bond types. Important additional information provided over green bonds includes spending efficiency, project updates and impact performance. This gives green bond holders a significant information advantage over their investments when compared to equivalent, non-green bonds devoid of such information¹⁸. In addition to this, another advantage provided by meticulous monitoring of proceed use and reporting over projects associated with green bonds is enhanced internal governance structures at the corporate, government, or agency level. Incidentally, there is emerging evidence that improved internal governance also leads to a positive feedback loop that enhances credit quality for issuers of green bonds¹⁹. From the perspective of investors however, this is salient since they are provided with incentives to pursue investment in green bonds out of support for not only environmental objectives, but potentially governance outcomes as well.

Part II

As the previous section of the essay illustrated, green bonds offer many benefits to investors who seek responsible investment outcomes. However, green bonds also provide bond issuers with advantages as well. A very important point is that through issuing green bonds, issuers are able to demonstrate and apply their own unique approach towards addressing ESG-related concerns investors may have. This can also have positive impacts towards meeting issuers' reputation-related or PR goals insofar as issuing green bonds allows issuers to signal their support for responsible investing through green investment. Moreover, through issuing green bonds, issuers raise the credibility of committing to environmentally sustainable strategies and practices. Consequently, this can allow them to market themselves as being environmentally-conscious towards investors (that is, promote responsible investment). Another advantage to for bond issuers is that through issuing green bonds, bond issuers are able to diversify their investor base hence increasing the possibility of reducing exposure to demand fluctuations for bonds²⁰. Bond market volatility may also be decreased as a result of issuing green bonds to bondholders that are more likely to exhibit "buy and hold" patterns of investing²¹. Finally, as was discussed in the previous section of this essay, enhanced tracking of proceeds use associated with green bonds tends to improve internal governance structures for green bond issuers. The benefits from the perspective of green bond issuers are that communicational and information sharing is strengthened, closing any potential knowledge gaps between the project and treasury aspects of business related to green bonds²².

Part III

Despite many of the benefits that green bonds could potentially create for investors and

bond issuers, there are several important challenges that must be noted. The first challenge associated with green bonds concerns the relatively small size of the green bond market. In order for green bonds to be an effective enabler of responsible investing, the market must be grown. However, due to the specific characteristics of green bonds, achieving scalability to ultimately attract more investors and grow the market is difficult. This is particularly salient given that the institutional investors green bonds principally target are typically interested in investing in green bonds if they are offered at sufficiently large scale²³. On the whole however, the green bond market remains relatively small in comparison to other securities such as conventional bonds. Moreover, the difficulty of achieving scalability with green bonds is further compounded by the fact that green bonds have generally still not been included in a large number of investor's benchmarks. Consequently, many fund managers tend to overlook green bonds as a feasible avenue for investment²⁴. Taken together, these issues present key challenges to upscaling green bond investments. As such, green bonds currently remain too small to attract a sufficient number of investors to enable responsible investment at the scale needed to attain significant environmental impact or raise funds in order to achieve a green transformation of the global economy.

Another significant issue is that, as green bonds seek to act as securities for raising proceeds for several "bundled" green projects, they are more complex than conventional bonds. A notable consequence of this is that they may be less liquid in comparison to conventional bonds or other kinds of assets, thus lowering their appeal to investors²⁵. Also, due to the aforementioned characteristic of green bonds, the various projects a given green bond seeks to raise proceeds for may be prone to coordination issues. While there are many problems that may arise, notable examples of project-related concerns include the following: an unavailability of clear pipelines for long-term

LCR infrastructure projects; a risk of mismatch between certain projects and institutional investor demands; a lack of aggregation mechanisms to effectively and consistently bundle different projects under single green bonds; and potential cash flow instability for green projects²⁶. All of these provide areas of heightened risk of having investment fall short of ESG-related goals. Conversely, such issues raise reputational risks for issuers as they may affect the green "credentials" of bonds issued, should there be something amiss with the projects green bonds fund²⁷. The relative complexity of green bonds over more conventional securities also suggest that greater expertise would be needed to analyze them prior to making investments. This could deter potential investments in green bonds as many investors' limited capacity to effectively analyze green bonds prior to investment would be limited. A further problem concerning the complex nature of green bonds is the costs associated with issuing them. Generally, because eligible green projects must be identified and screened prior to bundling them into a single product, green bonds may be less straightforward to issue and relatively more expensive for issuers than other types of bonds. For instance, aspects of green bonds that make them relatively more expensive include transaction costs from necessary labelling practices, administrative fees, certification costs, and prices associated with reporting and monitoring the projects²⁸. As a result of these kinds of additional costs, some bond issuers may opt to issue less (or entirely forego the issuance of) green bonds than they might otherwise, favouring to issue less-expensive securities instead. Accordingly, this affects the total supply of green bonds in circulation.

An additional challenge to increasing responsible investment through green bonds is the quality of the green bonds being issued. Although the credit quality of green bonds issued by credible, multilateral organizations such as the World Bank are rated relatively high - the credit quality of World Bank Green Bonds is triple-A, the

same as any other bonds issued by the World Bank - it is less clear how high the quality of bonds issued by developing countries would be²⁹. This is an important issue considering that China, for instance, has been progressively adding green bonds to the overall market: for instance, it was estimated that, in 2016 alone, some 40% of green bonds issued globally had come from China³⁰. And while some reports claim that 75% of green bonds issued by Chinese issuers are prime-rated, such assertions are based on analyses conducted by local, Chinese rating agencies³¹. In lieu of more credible international ranking for Chinese green bonds, the credit quality of said bonds remains dubious. However, with more standardized and credible ranking processes, investors may be able to tap into green bonds issued from emerging market economies to spur forward responsible investing.

The final and perhaps greatest barrier from fully actualizing green bonds as a viable instrument to increase responsible investing is the lack of standards defining what actually constitutes a green bond in the first place. Rather than feature a standardized review process, investors must typically rely on secondary agencies to review and evaluate green bonds and projects associated with them. This creates several problems. First, a lack of standardization creates complexity which necessitates meticulous research and analysis of green bonds by professionals to ensure due diligence. Consequently, this creates additional expenses for bond issuers who may not necessarily have access to adequately qualified analysts to fully assess green bonds they seek to issue. Conversely, investors may be reluctant to invest in green bonds that lack systemic overview by a credible third party. Second, in absence of clear standards to qualify given bonds as green bonds, the risk of failing to deliver on investor expectations for whether projects bundled under individual bonds are sufficiently green is heightened³². This is a potentially large problem for bond issuers since a failure to

deliver on said expectations could result in a perception that the integrity of green bonds is compromised. On the other hand, a lack of clear definition surrounding green bonds may expose investors to reputational attack on the basis of "greenwashing", should the integrity of green projects of bonds they have invested in be discredited³³. Third, without stronger standards for what constitutes green bonds, there is a relatively weaker capacity to legally enforce the green integrity of projects associated with green bonds³⁴. This is a salient point for two reasons. The first issue is that, in the absence of legal enforcement to ensure that projects bundled under given green bonds align with a prior accepted standard, there are relatively fewer punitive incentives to bind bond issuers to maintaining the green integrity of green bonds they issue. Second, a limited legal reach over undefined green bonds offers investors limited judicial recourse in the event that the integrity of green bonds is undermined. In all of the aforementioned cases, a heightened risk of compromising the integrity of green bonds and associated adverse impacts to reputation impede the potential utility of green bonds as instruments enabling greater responsible investment.

Despite the aforementioned challenges associated with defining green bonds, there have been several notable developments that seek to develop a consensus of what projects bundled under green bonds are. Perhaps the most noteworthy of these has been the development of the Green Bond Principles (GBP) in 2015. The GBP recognize several different groups of bond-related projects as being "green". Projects recognized by the GBP as green are those that seek to address pressing environmental matters including climate change, depletion of natural resources, waste management, and biodiversity protection³⁵. While the GBP do not explicitly define what green projects are, they nonetheless offer a set of criteria for assessing the "greenness" of bond-related projects that bond issuers and potential investors can use to determine how green

projects (and, by extension, green bonds) they seek to engage with could be. In addition to this, the GBP also provide bond issuers with several different strategies for gaining external input to guide individual bond issuers towards assessing how green potential bonds they are interested in issuing are³⁶. Apart from the GBP, there are also a progressively growing number of third-party organizations that are acting to certify green bonds have met common, credible second-party standards. Incidentally, many of these mirrors those standards proposed by the GBP. The growing number of third-party organization certifying green bonds suggest that there is a growing consensus towards determining what common benchmark exist for identifying green bonds. With more clearly defined standards, the potential to enable responsible investment through growing the green bond market is heightened. However, such a standard has yet to emerge.

Summary

As the prior sections of the essay have illustrated, green bonds have the capacity to empower responsible investment while offering both investors and bond issuers many potential benefits such as greater insight into risks and performance-related issues surrounding green projects; expansion and diversification of investor bases; and communication of commitment to proactive environmental action. However, the relative complexity of green bonds also makes them less liquid in comparison to more conventional securities, which in turn raises risks of serious coordination issues in regard to allocation of resource for given projects they seek to finance. In addition, despite progress on the matter, conclusive international standards defining what constitutes green bonds remain elusory – a problematic issue, potentially compounded by the growing inclusion of green bonds from emerging market economies. Such issues raise legitimate concerns among investors and deter them from demanding a greater

share of green bonds. Ultimately, the consequence of this is that, despite some growth, the green bond market has failed to reach scalability and remained an overly limited market to attract significant amounts of investor capital. Rather, the utility derived from green bonds would be of a more strategic nature and as they have the potential to attract those investors interested in marketing themselves as being environmentally progressive or otherwise wishing to show more global solidarity towards topical environmental issues such as climate change. Hence, as such, green bonds will likely fail to attract sufficient private capital to realize a green transition at the global level but succeed at acting as communication tools for individual investors.

References

- Andersson, M., Bolton, P., & Samama, F. (2014). Hedging Climate Risk. *Financial Analysts Journal* , 72(3), 13-32. doi:10.2139/ssrn.2499628
- BlackRock, Inc. (2015). 21st Century Engagement: Investor Strategies for Incorporating ESG Considerations into Corporate Interactions (Rep.). Retrieved from <https://www.blackrock.com/corporate/en-hu/literature/publication/blk-ceres-engagementguide2015.pdf>
- Climate Change Initiative and China Central Depository and Clearing Company.(2016). China Green Bond Market Market 2016 (Rep.). doi:<https://www.climatebonds.net/files/files/SotM-2016-Final-WEB-A4.pdf>
- Della Croce, R. D., C. Kaminker and F. Stewart (2011), “The Role of Pension Funds in Financing Green Growth Initiatives”, OECD Working Papers on Finance, Insurance and Private Pensions, No. 10, OECD Publishing. <http://dx.doi.org/10.1787/5kg58j1lwdjd-en>
- Department of Finance. "Government of Canada: Budget 2018." Government of Canada. February 27, 2018. Accessed March 16, 2018. <https://www.budget.gc.ca/2018/docs/themes/advancement-advancement-en.html>.

- Export Development Canada. "EDC Green Bond Framework." Export Development Canada Investor Relations. <https://www.edc.ca/EN/Investor-Relations/Documents/green-bond-framework.pdf>.
- Export Development Canada. "EDC Green Bond Report." Export Development Canada Green Bond Program. 2014. Accessed March 16, 2018. <https://www.edc.ca/EN/Investor-Relations/Documents/green-bond-report-2014.pdf>.
- Financial Times. (2017, May 4). China leads world on green bonds but the benefits are hazy. <https://www.ft.com>. Retrieved from <https://www.ft.com/content/84ac893a-028e-11e7aa5b6bb07f5c8e12?mhq5j=e7>
- Inderst, G., C. Kaminker and F. Stewart (2012), "Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations", OECD Working Papers on Finance, Insurance and Private Pensions, No. 24, OECD Publishing. <http://dx.doi.org/10.1787/5k9312twnn44-en>
- International Capital Market Association. (n.d.). Green Bond Principles (Rep.) doi:<https://www.icmagroup.org/assets/documents/Regulatory/GreenBonds/GreenBondsBrochure-JUNE2017.pdf>
- KPMG. (2015). Gearing Up for Green Bonds: Key Considerations for Bond Issuers (Rep.). Retrieved from <https://assets.kpmg.com/content/dam/kpmg/pdf/2015/03/gearing-up-for-green-bonds-v1.pdf>
- Lindenberg, Nannette, Public Instruments to Leverage Private Capital for Green Investments in Developing Countries (March 6, 2014). German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE) Discussion Paper 4/2014. Available at SSRN: <https://ssrn.com/abstract=2405468>
- McSheffrey, (2017, September). Canada's Green Bonds are Red Hot. National Observer. Retrieved from <https://www.nationalobserver.com/2017/09/06/news/green-bonds-sell-red-hot>
- Nikko Asset Management. (2014, December). Green Bonds Go Mainstream (Rep.). Retrieved from <https://en.nikkoam.com/articles/2014/12/green-bonds-go-mainstream>
- OECD (2017), Mobilising Bond Markets for a Low-Carbon Transition, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264272323-en>

- Service Canada. "Government of Canada Action of Climate Change: Clean Technology, Innovation and Jobs." Canada.ca. February 15, 2018. Accessed March 16, 2018. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/clean-technology-innovation-jobs.html>.
- VanEck. (2017, March 27). The Investment Case For Green Bonds. Retrieved from <https://seekingalpha.com/article/4058210-investment-case-green-bonds>
- World Bank. (n.d.). Retrieved from <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>
-

- ¹ Including, notably, the Canadian government
- ² "Responsible (or impact) investing" is defined here as the intentional investment of capital for both financial return and positive environmental or social impact. From hereon in, the term will be used to refer to investments that generate positive impact for the environment.
- ³ In the context of this essay, "bond issuers" refers to governments issuing green bonds to investors.
- ⁴ Inderst, G., C. Kaminker and F. Stewart (2012), "Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations", OECD Working Papers on Finance, Insurance and Private Pensions, No. 24, OECD Publishing.
- ⁵ OECD (2017), Mobilizing Bond Markets for a Low-Carbon Transition, OECD Publishing, Paris.
- ⁶ Export Development Canada. "EDC Green Bond Report." Export Development Canada Green Bond Program. 2014.
- ⁷ Export Development Canada. "EDC Green Bond Framework." Export Development Canada Investor Relations.
- ⁸ Department of Finance. "Government of Canada: Budget 2018." Government of Canada.
- ⁹ Service Canada. "Government of Canada Action of Climate Change: Clean Technology, Innovation and Jobs."
- ¹⁰ OECD (2017), Mobilizing Bond Markets for a Low-Carbon Transition, OECD Publishing, Paris.
- ¹¹ BlackRock, Inc. (2015). 21st Century Engagement: Investor Strategies for Incorporating ESG Considerations into Corporate Interactions
- ¹² Lindenberg, Nannette, Public Instruments to Leverage Private Capital for Green Investments in Developing Countries (March 6, 2014). German Development Institute 4/2014.
- ¹³ Ibid.

- ¹⁴ Andersson, M., Bolton, P., & Samama, F. (2014). Hedging Climate Risk. *Financial Analysts Journal* , 72(3), 13-32
- ¹⁵ Ibid.
- ¹⁶ OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.
- ¹⁷ Ibid.
- ¹⁸ Nikko Asset Management (2014, December). *Green Bonds Go Mainstream*.
- ¹⁹ Ibid.
- ²⁰ VanEck (2017, March 27). *The Investment Case For Green Bonds*.
- ²¹ OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.
- ²² OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.
- ²³ Lindenberg, Nannette, *Public Instruments to Leverage Private Capital for Green Investments in Developing Countries* (March 6, 2014). German Development Institute 4/2014.
- ²⁴ Ibid.
- ²⁵ Inderst, G., C. Kaminker and F. Stewart (2012), “Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 24, OECD Publishing.
- ²⁶ OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.
- ²⁷ KPMG (2015). *Gearing Up for Green Bonds: Key Considerations for Bond Issuers*.
- ²⁸ Lindenberg, Nannette, *Public Instruments to Leverage Private Capital for Green Investments in Developing Countries* (March 6, 2014). German Development Institute 4/2014.
- ²⁹ World Bank, 2017: <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>
- ³⁰ Financial Times (2017, May 4). “China leads world on green bonds but the benefits are hazy”: <https://www.ft.com/content/84ac893a-028e-11e7-aa5b-6bb07f5c8e12?mhq5j=e7>
- ³¹ Climate Change Initiative and China Central Depository and Clearing Company (2016). *China Green Bond Market Market 2016*: <https://www.climatebonds.net/files/files/SotM-2016-Final-WEB-A4.pdf>
- ³² OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.
- ³³ KPMG (2015). *Gearing Up for Green Bonds: Key Considerations for Bond Issuers*.
- ³⁴ OECD (2017), *Mobilizing Bond Markets for a Low-Carbon Transition*, OECD Publishing, Paris.

³⁵ International Capital Market Association, 2017. Green Bond Principles:

<https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/GreenBondsBrochure-JUNE2017.pdf>

³⁶ Ibid. 2017

An Unacceptable Reality? The Implications of a Nuclear Armed North Korea

Adam P. MacDonald

Dalhousie University, Halifax, Nova Scotia, Canada

adam.macdonald@dal.ca; adampmacdonald@gmail.com

An Unacceptable Reality? The Implications of a Nuclear Armed North Korea

Since the end of 2017 North Korea possesses a rudimentary nuclear force capable of targeting the continental United States, prompting some consideration of using military strikes against them. These deliberations are based on the belief that such a capability will inhibit American retaliation against any North Korean aggression and brinkmanship tactics in the pursuit of its revisionist aims on the Korean Peninsula. These apprehensions, however, are misplaced given the view that: 1) Pyongyang's pursuit of nuclear weapons is a regime security and legitimization tool; 2) a non-nuclear form of the Stability-Instability Paradox has existed on the Korean Peninsula for decades and; 3) the historical record demonstrates the deterring effects of nuclear weapons across different regime types with revisionist aims. Maintaining stability is not conditioned on denuclearization, but the US re-committing to a strategy of deterrence and containment against North Korea. The efforts, however, should not inhibit a willingness to negotiate with the regime to ease tensions and create a more durable peace on the Peninsula, though it is extremely doubtful they would fully dismantle their nuclear arsenal. This will require the US' acceptance of a state of mutual vulnerability developing between itself and Pyongyang directly and not just through its regional allies.

Keywords: nuclear acquisition; North Korea; Stability-Instability Paradox; mutual vulnerability; deterrence

Introduction

As indicated by the increasing number of nuclear and missile tests conducted over the past few years, North Korea has become a nuclear-armed state. Pyongyang has possessed nuclear technology at least since 2006, but now has weaponized them via a diversifying and expanding missile arsenal¹. This includes developing a nuclear-armed Inter-Continental Ballistic Missile (ICBM)² capable of reaching the continental United

States ; a condition the Trump Administration has declared an unacceptable reality³.

It is unclear, however, whether this sentiment constitutes a definitive and declaratory red- line for the US, and if so the range of options that would be employed in ensuring North Korea did not maintain this capability⁴. American policy remains pillared on denuclearization of the Korean Peninsula, but whereas there has been *de facto* acceptance⁵ of a nuclear North Korea over the past decade, there were reports throughout 2017 that the White House was seriously considering using kinetic military force in a preventative capacity to deny them a nuclear-ICBM capability⁶. Despite the risks associated with initiating any sort of military attack, these may be deemed tolerable if the alternative – a nuclear-ICBM armed North Korea capable of targeting the continental US - is judged to be a worse outcome. Underpinning such a position would be the belief that North Korea will not abide by or be constrained by the logic of deterrence, but rather will become emboldened in its pursuit of their revisionist aims on the Peninsula⁷. In particular, that they will use their newly acquired nuclear arsenal as a shield against any American retaliation enabling the execution of conventional attacks and brinkmanship tactics designed to erode the US-South Korea alliance, the removal of US forces from the Peninsula, and reunification under their terms.

Such a condition is known in the nuclear literature as the Stability-Instability Paradox whereby stability at a nuclear level facilitates conventional aggression at local levels based on the belief that the escalation of conflict will be capped due to mutual fears of approaching the nuclear threshold. It is important to emphasize that nuclear force comparisons are largely irrelevant after stability is achieved due to a jointly held belief that a state of mutual vulnerability exists where in both are capable of inflicting unacceptable damage on one another and incapable of denying the other from being able to do so. This does not mean they equally possess the ability to destroy one another

but rather can inflict a certain level of damage which, will be seen by policymakers as too great a risk to accept under any conceivable circumstance.

Apprehensions, however, associated with this condition emerging with a perceived undeterrable North Korea are misplaced due to three factors: 1) Nuclear weapons are both a security guarantee as well as a regime legitimization tool generates tense and hostile foreign relations but not reckless pursuits of unachievable objectives; 2) A non-nuclear form of the Stability-Instability Paradox already exists without North Korea possessing a fully matured nuclear arsenal and; 3) the historical record has demonstrated the deterring effects of nuclear weapons across different regime types many of which, like North Korea, were initially perceived as too irrational or malevolent to abide by its logic. These lines of evidence suggest North Korea will become more moderated in its actions (though not necessarily in rhetoric) which is reflected in the decreasing intensity and use of coercive or military actions on the Peninsula since it became a nuclear power. Moving forward, the US should shift focus away from denuclearization efforts and towards a strategy of deterrence and containment against North Korea. This will not involve a seismic shift in the policies and strategies employed currently, but rather ensuring the emphasis on denuclearization does not become the only benchmark of success. Nor should it be an inhibitor in opening and maintaining lines of communication with North Korea including the ongoing diplomatic rapprochement underway since the beginning of 2018.

The paper is structured in the following manner. The first section will outline the external and internal motivations underpinning North Korea's long-held determination of becoming a nuclear power. The second section will introduce the notion of the Stability-Instability Paradox, arguing such a condition has long existed on the Korean Peninsula with North Korea's maturation of their nuclear force and capabilities layering

onto the existing military balance but not fundamentally alter it. The third section explores American anxieties surrounding other adversaries that became nuclear powers, but in fact did not become insatiably revisionist in the pursuit of their interests. This is a behavioral condition North Korea is expected to follow given nuclear deterrence induces caution in all states that possess them, even with different underlying motives. The fourth section dismisses the feasibility of using military force to disarm North Korea and the strategic consequences of attempting to do so. A nuclear North Korea is not a reality the United States supports but a determination to expunge it may in fact put the region in a far more jeopardized state than the current status-quo. The final section emphasizes the necessity to redouble commitments to deterrence and containment while leaving options for progressing current negotiations with Pyongyang to ease tensions and produce a more durable peace on the Korean Peninsula.

Determination to Become a Nuclear Power

A long-held and durable interest of North Korea, spanning across all three Kim regimes, has been the pursuit of nuclear weapons which began in the 1960s with repeated but unsuccessful calls for assistance from the Soviet Union and China. It was not until the 1980s, however, that discernable features of their burgeoning nuclear weapons program became evident to the international community. As a result, there was collective pressure on Pyongyang, specifically from its major power ally in the Soviet Union, to join the Non-Proliferation Treaty in 1985⁸. North Korea, however, continued progressing their nuclear and missile programs, motivating a series of international negotiations throughout the 1990s and 2000s aimed at arresting further developments and ultimately their complete elimination⁹. Though North Korea, particularly under Kim Jong-Il, periodically cooperated and complied with these negotiated frameworks, there has never been a full, comprehensive cessation of their entire program which is

comprised of plutonium, enriched uranium and missile development components¹⁰.

This durable determination suggests that despite the co-existence of other motivations including inter-bureaucratic competition over resources and increased status and reputation associated with being a nuclear power¹¹, the acquisition of nuclear weapons by North Korea is primarily a security driven goal. Nuclear weapons possession is seen as deterring foreign military action against it, offsetting the conventional and nuclear superiority of the United States. Since the end of the Korean War in 1953, Washington has guaranteed South Korea's security via extended deterrence and the continued deployment of American forces to the Peninsula¹². The loss of allies in the Soviet Union and China in the early 1990s¹³ combined with the forceful removal of various regimes by the US in the post-Cold War era¹⁴ motivated the acceleration of the program. In the span of three decades, North Korea has produced enough weapons grade fission material for between 30-60 nuclear bombs and a growing and diversifying missile force, including ICBM and Submarine-Launched Ballistic Missiles (SLBMs) variants expected to be a part of the nuclear arsenal¹⁵. Such results contradict the common characterization of North Korea as a poor, backward and isolated state with various nuclear acquisition theories skeptical that Pyongyang had the monetary, technical and organizational competencies to build such a program, especially without significant foreign assistance¹⁶.

Alongside and complimenting the motivations to protect against foreign military threats, the development of nuclear weapons has contributed towards the continued perpetuation of the totalitarian dictatorship which in part depends on international hostilities and tensions to maintain internal legitimacy¹⁷. The regime operates within and projects upon society a 'siege mentality' of residing within a hostile and dangerous world requiring strong military, nuclear and missile programs and placement of society

on a perpetual war footing¹⁸. Developing these national instruments of power creates new provocations with expected backlash and condemnation from the international community, furthering the narrative of the state under constant threat. Weapons tests, for example, are not just experimental or operational in nature but carry political significance of maintaining the hostile foreign environment narrative. This, in turn, further legitimizes the actual need for nuclear weapons as a security measure against inhibiting foreign military action either directly against this burgeoning force or constraining retaliation due to other provocations. As this regime type has existed for the entirety of the North Korean state's existence alongside the asymmetrical balance of forces on the Peninsula it is hard to untangle these developments, with their primary casual logics – security from foreign attack and regime maintenance via a survival narrative – seen as inter-dependent and mutually reinforcing.

The ascendance of Kim Jong-un as the Supreme Leader of North Korea in late 2011 has seen the continuation of the policies, power relationships and governing philosophies including progressing the nuclear and missile programs which defined his father's and grand-father's regimes¹⁹. Nuclear weapons, in particular, have become a cornerstone of his own regime, with North Korea declared a nuclear power in their constitution and with several prominent scientists and other officials associated with the nuclear and missile programs forming part of the Supreme Leader's inner circle²⁰. A major point of diversion, though, from his predecessors is the near complete non-negotiability his regime has assumed with respect to any aspect of the nuclear and missile programs. While Kim Jong-un has been active diplomatically with direct face to face meetings with the leaders of China, South Korea and the US, these have not produced any detailed, binding agreements but rather the familiar aspirational language

towards the 'Denuclearization of the Korean Peninsula' which does not commit North Korea to enact specific measures²¹.

Kim Jong-Un has doubled down on the existing regime framework. Such a decision has necessitated and legitimized nuclear weapons possession as North Korea continues to fall further behind in the prevailing forces and factors defining the region, including regional economic development, movement away from totalitarian systems, and supporting non-proliferation of weapons of mass destruction. Nevertheless, via its nuclear status North Korea has become an integral component of the regional security architecture²². As an outlier in the region with no allies and a regime survival strategy predicated on pervasive tensions and hostilities to legitimize its organizational structure, North Korea is not expected to abandon or significantly compromise its nuclear or missile programs even amongst the diplomatic détente underway. It is extremely unlikely that North Korea - would be willing to relinquish its arsenal them under any circumstance, Such a decision would be a revolutionary break both from North Korea's diplomatic history with the international community with respect to denuclearization and would make them only the second state ever, after South Africa, to give up its own indigenously produced nuclear weapons arsenal. Nuclear relinquishment, furthermore, is a rarity in world history with the states that did – South Africa, Belarus, Kazakhstan and Ukraine (the latter three inherited these weapons with the dissolution of the Soviet Union) – experiencing not only ameliorating external security situations but were undergoing regime transformations wherein nuclear weapons were determined to be liabilities to these new states.²³ These conditions are not evident in the North Korean case whose security situation remains largely unchanged and its current regime a continuation of previous ones. While it is possible the Kim Jong-un may break from these expectations, in terms of policy planning it is best for the US (and others) to

assume North Korea is not willing to completely dismantlement and abandon its nuclear weapons arsenal and program. This does not, however, necessarily imply that North Korea will become unrelentingly risk-acceptant and aggressive in altering the political and military make-up on the Peninsula.

The Stability-Instability Paradox on the Korean Peninsula

In the beginning period of the Cold War B.H. Liddell Hart asserted that whereas nuclear weapons had significantly reduced the likelihood of major power war, paradoxically such a condition would increase the probability of limited conventional local conflicts²⁴. Glen Synder, often credited with defining this condition, further elaborated that the greater stability achieved at the nuclear level would enable and channel competitive pressure to lower levels wherein a state could engage in limited military action hedging that any kind of retaliation would be limited²⁵. As a result, a range of acceptable military action – such as proxy wars, localized conflict, and crisis-provoking behaviour – would be enabled under the protection of the nuclear umbrella, so long as conflict was limited and not existential in nature²⁶. Nuclear weapons, therefore, do not result in the complete cessation of conflict between states in their possession but rather enables its relocation and confinement towards lower levels as was the case in the 1969 Sino-Soviet Border War and the 1998 Kargil War between India and Pakistan²⁷. The latter case has been studied extensively with respect to the Stability-Instability Paradox, particularly whether Pakistan's initiation of the conflict was in part based on determining India would be restrained in its reactions due to Islamabad's possession of nuclear weapons²⁸.

Despite its lack of well-defined and operationalized components and exact casual relationships²⁹, the application of the Stability-Instability Paradox towards the Korean Peninsula would postulate that the acquisition of a nuclear force³⁰ by North

Korea will develop a stable nuclear relationship with the US. This reality would thereby motivate and allow Pyongyang to pursue more localized acts of aggression in the pursuit of its long-held revisionist aims. Such freedom of action is enabled by the belief that the US will not retaliate significantly due to the fear of elevating these disputes towards the nuclear threshold. With the absence of a precise definition of ‘instability’ associated with the Paradox, Terence Roehrig has argued it should only apply to military action that seeks to alter the status-quo in changes to boundaries or use of nuclear weapons to blackmail others to reconfigure political and military realities as per Pyongyang’s demands³¹. Rhetoric and weapons tests, while provocative, are not included in this definition unless they are specifically conducted to blackmail others to give into articulated demands. Roehrig’s work, along with a number of other studies, has demonstrated that since North Korea became an overt nuclear state in 2006 the number and intensity³² of offensive military action has decreased significantly³³. Anderson, furthermore, demonstrates that North Korean non-weapons test military provocations have fallen to 2.8 incidents per year after 2006 versus 5.6 per year from 1995-2006³⁴. Total military provocations have increased over the past two decades, but the vast majority of them are weapons and nuclear tests that have not been conducted on the basis of achieving a specific, declared demand³⁵.

This is a marked shift from previous decades where terrorist attacks, armed infiltrations into South Korean territory, kidnappings and assassination attempts (including three against the South Korea Presidents) were far more frequent and violent³⁶. These types of actions have not been entirely eliminated³⁷, but have significantly been reduced since the 1990s and continue to decrease over time. This reduction could be in part explained by the removal of their great power protectors in the Soviet Union and China in providing cover to limit retaliation for these attacks, with

nuclear weapons seen as the new shield to re-enable their continuation. The shift away from militarized engagements and towards weapons tests and bombastic rhetoric, furthermore, may be an attempt to minimize the risk of attack against their maturing arsenal at a time of assessed vulnerability, with the securing of a deployable nuclear force marking a switch back to more hostile and offensive attacks and brinkmanship tactics. While plausible these lines of arguments fail to consider that the Korean Peninsula is already defined by a non-nuclear version Stability-Instability Paradox which greatly constrains North Korean behaviour along with that of the US and South Korea.

Even with the loss of its major power allies in the 1990s, North Korea has been able to maintain a stable strategic balance not because of the symmetry of forces but due to the ability to inflict unacceptable damage on South Korea via its conventional and other WMD forces, constituting an existential threat. Despite its qualitative inferiority compared to the US-South Korean alliance, the sheer mass of artillery and rockets arrayed along the border within striking distance of Seoul could inflict hundreds of thousands of casualties within the first few days of a conflict. It would require a massive first strike to attempt to eliminate them which would in effect all but guarantee the eruption of a large-scale conflict³⁸. Such a condition is a non-nuclear version of MAD³⁹ and appears to have been the major motivation of the US not to attack North Korea in 1994⁴⁰.

The deterring effects already in existence by Pyongyang's conventional/non-nuclear WMD capabilities, however, have not resulted in increased aggression nor explicit demands. There have been periods of heightened tensions due to armed attacks by North Korea, specifically the sinking of the South Korean warship *Cheonan* and the shelling of Yeonpyeong Island in 2010⁴¹, but the muted response by the US and South

Korea to these did not translate into an upsurge of such types of attacks⁴². There has not, also, been sensationalist ultimatums issued by the Kim Jong-un regime towards the US or South Korea on threat of attack either with conventional or nuclear forces, indicating (so far) a deterrence-oriented position of its nuclear forces versus one of coercion demanding the yielding to North Korea aims. It is possible, however, that North Korea is buying time to fully develop its nuclear forces before switching back to more aggressive, revisionist behaviour, but this assumes nuclear weapons possession has not nor will not have a cautioning effect on the Kim regime.

Regime Type, Revisionism and Deterrence

North Korea is not the first state that has concerned the US in terms of their underlying intents of acquiring nuclear weapons. The US had major misgivings about both the Soviet Union under Stalin and particularly China under Mao⁴³ becoming nuclear states to the point of seriously considering the use of military force in a preventative strike. There are major differences between both cases, but the decision not to conduct such attacks were premised on similar final assessments that: 1) These states becoming nuclear powers would not significantly alter the Balance of Power or US position in their respective regions; and 2) any preventative attack would almost certainly prompt massive conventional retaliation thereby endangering US interests and allies in these regions⁴⁴. Such a calculation was predicated on the belief that these states would not become insatiably revisionist in the achievement of their political and military goals, but rather would become cautious and respect the logic of nuclear deterrence which would marginalize the risk associated with large scale conflict. Today, the US faces a similar determination about the implication of a nuclear-armed North Korea and whether allowing such a reality is more amicable than initiating a preventative war to prevent its emergence, despite its expected horrific consequences.

While not a great power like the Soviet Union or China, North Korea, as noted above, possess considerable military forces which would threaten the existential survival of South Korea and risk drawing in other powers into a wider regional conflict. Running such risks would require a determination that North Korea is undeterrable and will utilize its nuclear forces (either in a first strike or as a brinkmanship tactic) in the achievement of its revisionist aims. The inability, however, of Pakistan to achieve its revisionist aims, specifically capturing the disputed territory of Kashmir, against India despite conducting a limited war after becoming an overt nuclear power is indicative that such new nuclear states unsatisfied with the current status-quo are not unrelenting and completely risk acceptant of overturning this reality⁴⁵. Instead, while hostilities remain (including periodic border incursions and exchanges of gun fire) and sub-conventional attacks (specifically terrorism) continue to define the India-Pakistan relationship, the prevalence of major conflict has diminished over time since they have both become nuclear powers.

The extent and nature of North Korea's revisionist aims – the removal of US forces from the region, the ending of the US-South Korean alliance, and reunification of the Peninsula under its terms – are not small, discrete territorial disputes but large and intimately connected to the existential survival of South Korea. As a result, aggressive moves to achieve these in any concerted manner automatically elevates them to the conventional/nuclear threshold of which the US already provides protection to South Korea via extended deterrence. Challenging such a condition directly by North Korea would carry grave risks for the regime and has most likely already limited the nature of its threats to loosely based rhetoric of destroying her enemies should they be attacked versus specific and discrete demands to alter the existing status-quo or risk nuclear war. Continued flare-ups along the border and the Northern Line Limit (a maritime boundary

dispute between North and South Korea in the Yellow Sea⁴⁶) will most likely continue, but these do not constitute an existential threat nor significantly challenge the political and military status-quo on the Peninsula.

Given their relatively recent existence in human affairs and the uncertainties of their proliferation, this framework should not be interpreted as deterministic law, though it is hard to deny that nuclear weapons heavily influence the mindset and behaviour of those possessing them⁴⁷. In particular, nuclear weapons have not eliminated conflict between nuclear states, but it has greatly diminished its frequency and intensity. Part of the rationale for this outcome is the establishment of deterrence based on mutual vulnerability between parties which are able to inflict unacceptable damage on one another. While one or both parties may attempt to escape from such a condition they are in effect locked into a relationship of involuntarily vulnerability: a condition which is easier to achieve than to overcome⁴⁸. In the North Korean context, such a condition already exists given its ability to inflict unacceptable damage on South Korea. Targeting the US via nuclear weapons would be a layer on top of such a condition but not a fundamental change. North Korea may already be in such a state with the US for even the possibility of an experimental nuclear-armed ICBM being able to reach the continental US induces caution in determining possible options to counteract these developments. This, however, is not a new condition for the US which already exists in a state of mutual vulnerability with Russia and China, both able to strike the US mainland but has not resulted in the dismantling of US alliances or extended deterrence arrangements around the world which the Russians and Chinese oppose.

Fears of losing coercive leverage over the Kim regime should they be able to target the US implies that North Korea is a fundamentally different state in character in that is undeterrable and absolutely determined to achieve its revisionist aims at any cost.

Such determination and risk- acceptance, if true, would make North Korea an exceptional case, being the first to deviate from nuclear deterrence: an assessment the US has placed on other militaristic totalitarian regimes which nevertheless over time have conformed more to the expectations of deterrence than deviated from. Despite, furthermore, the plethora of different motivations, postures and strategies adopted by other nuclear states none have been able to figure out how to use nuclear weapons except for deterrence against existential attack. Such a condition will not, however, automatically be established and maintained between the US and North Korea, but rather requires developing communication channels to navigate through inevitable crises and tensions which usually accompany the emergence of new nuclear states. Deterrence is not a guarantee, however, against inadvertent escalation and misunderstandings threatening to exacerbate tensions and threaten nuclear conflict. In order to prevent such a condition, it is incumbent on the US to establish relations with North Korea or intermediaries like China and South Korea to mitigate risk of misunderstanding. In doing so, the US must make subtle but meaningful changes to its current approach in adjusting to, not attempting to overturn, a world populated by a nuclear-North Korea.

Military Considerations and Strategic Consequences

Eschewing the previous Obama Administration's policy of 'Strategic Patience', the Trump Administration has enacted a 'Maximum Pressure' campaign aimed at coercing North Korea to the negotiating table, primarily using economic and diplomatic measures but not ruling out military ones, with denuclearization a non-negotiable goal. A nuclear-armed North Korea, however, is a reality which should be adjusted to versus trying to reverse. Given the importance as a security guarantee against foreign military attack and as a regime legitimation tool it is unrealistic to believe North Korea will

relinquish this capability; a capability they have been work towards relentlessly for over half a century across different leaders and during periods of extreme financial, military and domestic stresses. A commitment to denuclearization, therefore, is an unrealistic precondition to demand before any sort of formal negotiations resume between North Korea, the US and the international community as a whole. Negotiations are an important venture not because they will lead to denuclearization or change the fundamental nature of the Kim regime but rather in establishing networks and channels of communications to be available during crises and tensions which have and will continue to be part of the political environment on the Peninsula. This is even more important given the personalist leadership styles of both President Donald Trump and Kim Jong-Un which can lead to bombastic rhetoric and actions that are vulnerable to being misinterpreted and escalatory in nature, even if not intended to be.

Evidence suggests, a positive correlation between periods of negotiations and a reduction in provocations by North Korea⁴⁹. *De facto* acceptance of North Korea as a nuclear power does not entail *de jure* acknowledgement nor a radical change in policies and measures in place by the US such as sanctions, diplomatic isolation and maintenance of the alliance with South Korea. Efforts should remain focused on denying monetary, material and knowledge streams which could assist in Pyongyang in expanding their nuclear and missile capabilities. What it does entail, however, is a commitment not to attempt to disarm North Korea in a first strike capacity, but rather redouble on a strategy of deterrence by punishment⁵⁰ and containment⁵¹.

There are reports that military options were being seriously considered by the US in 2017 including: 1) conducting a 'bloody nose' attack which would entail a limited and surgical strike on an important, but not existential, target (such as a test launch site)⁵² and; 2) A preventative attack involving conventional forces to eliminate

North Korea's nuclear and missile forces⁵³. Both options present unique challenges, but share a number of major risks and assumptions with possible devastating implications for the region and US geopolitical position and authority. First, to maintain the element of surprise Washington would most likely not advise or plan such an attack with South Korea or Japan or notify other regional partners like China⁵⁴. As a result, any retaliation by North Korea would be borne by local allies with no prior preparations and time to react. Attempts to take out North Korea's nuclear and missile forces, even if successful (which is highly unlikely given the dispersion of these across the country, including within multiple hardened tunneling complexes), would leave them possessing massive conventional forces to attack South Korea or Japan in retaliation⁵⁵. Second, while North Korea possess good surveillance over the Peninsula, any attacks coming from outside this area will be difficult for Pyongyang to discriminate between a limited attack and a regime overthrowing one⁵⁶. Even if North Korea is able to determine the attack is limited in nature, they may conclude it is but the first series of attacks in the execution of a larger attack. An initial attack, also, risks putting the US homeland in danger as it is uncertain the exact capabilities of North Korea's nuclear arsenal which, even if still in an experimental stage, may be launched in retaliation (especially if they perceive this to be a regime change campaign) requiring a high level of confidence in the US Ballistic Missile Defense (BMD) system to adequately defend against. In total, any sort of first strike is fraught with risk and could result in the deaths of millions, with American allies in the region bearing the brunt of North Korea's expected counter-attack.

This is not to suggest that US should not prepare for war on the Korean Peninsula, including greater coordination with China which, while still calling for ensuring stability on the Peninsula, is beginning to prepare contingency plans to intervene in the event of the outbreak of war⁵⁷. Progressing continental BMD will

continue and augment given the increasing capability of North Korea's nuclear arsenal, and while this may frustrate the Kim regime's determination of whether they can reach the US homeland with absolute certainty, the system has a controversial track record of test success and failure⁵⁸ and in any event should not be seen as a fool proof safety net that enables and legitimizes striking first⁵⁹.

Continued stability on the Korean Peninsula is of primary importance to China, North Korea's most important economic and diplomatic partner. Despite opposing its nuclear weapons development, Beijing has been a consistent protector of Pyongyang in softening sanctions measures via its veto position on the UN Security Council and has repeatedly stated the need for a peaceful, diplomatic solution. China and North Korea, however, are not military allies, with Beijing making it clear they will not support the regime if they initiate hostilities. Indeed, relations have degraded noticeably since Kim Jong-Un assumed power, removing his father's key advisors (with close connections to Beijing) and unrelentingly progressing their nuclear and missile program, to the ire of China and the rest of the world. Developing a credible nuclear arsenal demonstrates the regime's fixation on self-reliance believing no one, including China, can guarantee their own security and survival.

Concerns, however, of the implications of conflict have largely motivated Beijing to stress peace and dialogue. Any sort of war or internal collapse of the regime in North Korea would pose major challenges to China. These include massive refugee flows towards their border on the Yula River, impacts on regional trade, nuclear fallout over part of their homeland, possibly direct confrontation between Chinese and American forces, and the forceful reunification of Korea under a pro-American Seoul-based government. On the latter point, it is not so much a desire to maintain the Kim regime or a divided Korea that motivates China but rather a desire to be an influential

player in any change to the military and political status-quo on the Peninsula. As frustrating and challenging their relationship with the Kim regime is as has been, the status-quo is preferable to other alternatives that risk nuclear catastrophe, disruption to one of the world's most economically active regions, and military confrontation between China and the United States. Given, however, North Korea's continued nuclear activities and concerns over the seriousness of the Trump Administration to use military force, over the past year China has increasingly supported comprehensive sanctions against Pyongyang including on fuel and foreign workers. These moves are designed to pressure North Korea to restrain its nuclear behavior and bellicose language while emphasizing non-violent efforts to curtail support for any military predilections voiced by Washington.

Strategically, North Korean belligerence undermines Chinese interests in two important ways. First, its continued nuclear developments have legitimized the deployment of American strategic assets to the region, including missile defence systems (like THAAD in South Korea and AEGIS Ashore in Japan) which China sees as undermining their national security, viewing these as part of an American plan to develop a global web of integrating missile defense system compromising their nuclear deterrent.⁶⁰ Second, China's inability to reign in its smaller, dependent neighbor can be interpreted as a sign of weakness and incapability of providing security goods for the region, thereby legitimizing the maintenance of US forces, influence and leadership throughout East Asia.

Given Kim Jong-un's diplomatic about-face towards negotiations throughout 2018, however, China has been active to ensure they continue to be an important player in such processes. It is noteworthy that Kim Jong-Un's first foreign trip was to Beijing to meet with President Xi Jinping, underscoring the continued importance and pull of

China in North Korea. China, as well, has been identified, by Pyongyang and Seoul, along with the United States, as a necessary partner in any future peace settlement on the Korean Peninsula. As a result, any negotiations on force reductions in the service of such an objective may have strategic ramifications for the standing of the US in the region. Removal of American forces benefits North Korea and China, which is perhaps the greatest overlapping link between them.⁶¹ China is not supportive of a nuclear-armed North Korea but is unwilling to commit unreservedly to Washington's 'maximum pressure' campaign given its concerns about pushing Pyongyang too far either towards responding militarily or leading to the collapse of regime. Instead, Beijing appears to perceive the situation as manageable and possibly of benefit to their larger strategic interests in eroding American forces, power and alliances in the region, especially if the Trump Administration is willing to negotiate these in exchange for denuclearization on the part of Pyongyang.

Coming to Terms with a Nuclear Armed North Korea

Perhaps the greatest psychological change the US confronts is the loss of coercive leverage against North Korea due to its possession of nuclear weapons which in the near future will likely be able to reach the continental US. Successive generations of US military leaders have not been fond of the concept of deterrence, particularly based on the existence of mutual vulnerability which greatly reduces the importance of force asymmetries and the viability of a range of kinetic military options⁶². Being in such a condition with North Korea - a small state with one of the most repressive systems in the world and a penchant for threatening to destroy the US and her allies - is a tough pill to swallow⁶³; but it does not nullify that this reality has been in existence for a number of decades given North Korea's ability to strike American allies in Northeast Asia. Unless American policymakers are willing to sacrifice the populations and governments

of their allies in order to escape a condition of mutual vulnerability, accepting this reality is vital in maintaining stability on the Korean Peninsula, East Asia and the web of US alliance systems around the world.

The US should expect and be prepared for further provocations, sabre - rattling and limited conventional aggression, motivating the continuing development of a suite of responses which are discrete and clearly communicated that do not elevate these matters to an existential level. In support of these endeavors the US, in conjunction with their allies and regional partners, should be conducive to reaching diplomatic agreements in support of regional stability. This could include 'freeze for freeze' proposals such as the pausing of regular US-South Korea war games in exchange for a commitment by North Korea to cease nuclear and missile testing, an arrangement which was, albeit loosely, agreed to during the recent bilateral summit in Singapore.⁶⁴ These types of arrangements should not be seen as expression of weakness but rather efforts to maintain stability on the Peninsula which requires a commitment not to attempt to disarm North Korea and a willingness to work in other frameworks than those based on immediate denuclearization. Maintaining and improving the sanctioning regime (particularly as it relates to maritime trade⁶⁵) should continue to be a primary focus, but a rigid and absolute insistence on denuclearization as a precondition for any sort of formal talks and negotiations is detrimental to the necessity of establishing and maintaining channels of communication with North Korea.

While there will always be doubt with the motives behind any North Korean overtures the US should not eschew these outright but rather cautiously engage within these processes in order to maintain the new reality of a nuclear-armed North Korea. They have secured the perpetuation of their regime via nuclear weapons, but this has not translated into an augmentation of their geopolitical power, wealth, status or attainment

of other revisionist aims. The most immediate challenge associated with an ever-capable nuclear North Korea for the US is to maintain its credibility as a reliable ally and leader by providing security guarantees via extended deterrence and continuing to contain and isolate Pyongyang (but not closing the door of negotiating opportunities to ease these pressures), alongside not undertaking actions which risk inflaming and destabilizing the region. This will require the US' acceptance of a state of mutual vulnerability developing between itself and North Korea directly.

It is reasonable to be suspicious of the latest diplomatic *détente* on the Korean Peninsula currently unfolding, culminating in the bilateral summit between President Donald Trump and Kim Jong-un in Singapore, the first ever meeting between leaders of the two countries. Despite of the Americans demanding complete and timely denuclearization as a condition for beginning a rapprochement in relations and an easing of the Maximum Pressure campaign in the lead up to the one-day meeting, in the end no detailed, mutually binding agreement was produced but rather a short statement wherein both sides pledged to support the 'Denuclearization of the Korea Peninsula'. The aspirational, vague and non-committal language is the continuation of results from previous diplomatic engagements with North Korea, all which ended in failure with Pyongyang steadily augmenting its nuclear program and capability. The return to diplomacy, however, is a welcomed development and departure from the tense threatening exchanges and posturing which has defined the US-North Korean relationship over the past decade, reaching its nadir in 2017⁶⁶. The Summit, however, resulted in a large public relations gain for North Korea which was able to portray that its possession of nuclear weapons had elevated its status to that of an equal with the US. Such a result, though, may have been the intention of President Trump whose bombastic rhetoric against North Korea was perhaps designed to mobilize others, namely China

and South Korea, who did take the initiative to reduce tensions with North Korea due to uncertainty as to what the US would do moving forward. A commitment to denuclearization, as well, does not appear to be a major concern for the US President himself, who after the Summit declared North Korea no longer posed a threat, and thus there may be an avenue to progress negotiations and diplomatic engagements even in full acknowledgement Pyongyang will not relinquish its nuclear arsenal⁶⁷.

The strategy behind the diplomatic reversal of Kim Jong-Un remains a constant source of speculation, though it should not be assumed he is acting out of desperation. Despite an ever tightening sanctioning regime and risk of conflict, North Korea has become a nuclear power with a diversifying nuclear force which while still comparably small has global reach: a capability only a select few states possess. Given, also, the historical penchant for states to retain their nuclear weapons after developing them regardless of changing threat environments, and their specific importance to North Korea as a regime legitimization tool it is highly unlikely Kim Jong-Un is serious about the complete disarming and dismantling of their nuclear arsenal and program despite making certain unilateral concessions, most notably a nuclear test moratorium and the closing of their main nuclear test site.⁶⁸

Indeed, a lack of common understanding of ‘denuclearization’ between North Korea, South Korea and the US could be problematic in future negotiations, creating false expectations of the degree to which each side is willing to compromise. Despite North Korea’s support towards the ‘Denuclearization of the Korean Peninsula’, the ‘six principles’ governing their nuclear policy released earlier this year – including to no transferring of nuclear technology to others, only using nuclear weapons in a defensive manner, and contributing to global nuclear disarmament – sends a message of them becoming a ‘responsible’ nuclear power, not one ready to relinquish them⁶⁹.

This does not mean that Kim Jong-un is unwilling to negotiate a freeze or possible reduction in his arsenal, material stockpiles and overall program in part to establish a new, peaceful relationship with South Korea and the international community. Sanctions relief is a top priority as Kim Jong-Un's governing Byungjin policy is premised on the notion that North Korea can become a nuclear power and develop economically.⁷⁰ After achieving the first objective, he appears willing to negotiate to a certain extent to improve relations to achieve the second. The toning down of hostile rhetoric, cessation of nuclear and missile testing and diplomatic engagements by North Korea are geared towards breaking up the united front of the international community they confronted in 2017. Evidence of continuing their missile production facilities and updating key sites in their nuclear program since the Singapore Summit suggests North Korea is not serious about nuclear rollback⁷¹. Fears that Pyongyang would become insatiably revisionist in attempting to evict American forces from the Peninsula and achieve reunification under their terms have not come to pass. North Korea, like all other nuclear powers is following the pattern of behaviour wherein nuclear weapons (regardless of force, posture, strategy and policy) are only useful as a deterrent, not to compel changes to the military and political status-quo. While critics are justified in questioning the effectiveness of President Trump's North Korea strategy—specifically its consequences for weakening alliance commitments and legitimizing the North Korea regime without enacting binding agreements towards denuclearization – these do not, in and of themselves, raise the risk of renewed North Korea aggression in the relentless pursuit of its revisionist aims⁷².

The US should simultaneously pursue denuclearization talks alongside reaching a more permanent and stable peace on the Peninsula. The latter is not necessarily conditional on the achievement of the former. As long as North Korea retains nuclear

weapons they should face sanctions and efforts to encourage their relinquishing of them. If North Korea, however, continues to adopt a deterrent-based approach governing their nuclear possession it will be possible to make progress on reducing the risk of war on the Peninsula and possibly transforming relations over time, including a formal ending to the Korean War. Stability on the Korean Peninsula is not unacceptably imperilled by the maintenance of North Korean nuclear weapons. American insistence, however, that North Korea must immediately and comprehensively rollback their nuclear arsenal and program, keeping all options ‘on the table’ to ensure this outcome, may become the greater and most threatening obstacle to reaching a last peace. Peace which is not conditioned on mitigating the possibility of North Korea lashing out due to its perceived vulnerability (a state it has existed in for decades), but more importantly in ensuring the US accepts its growing vulnerability to North Korea at home and abroad, this being an entirely new situation for the superpower to be in such a relationship with a non-major power.

References

- Ahn, Mun Suk. “What is the Root of the North Korean Nuclear Program?” *Asian Affairs: An American Review* 38, no. 4 (2011): 175-187.
- Albert, Eleanor. “North Korea’s Military Capabilities.” *Center on Foreign Relations*, 03 January 2018.
- Anderson, Nicolas D. “Explaining North Korea’s Nuclear Ambitions: Power and Position on the Korean Peninsula.” *Australian Journal of International Affairs* 71, no. 6 (2017): 621-641.
- Bader, Jeffrey A. “Why Deterring and Containing North Korea Is our Least Bad Option.” *Brookings*, 08 August 2017.

- “Ballistic and Cruise Missile Threat.” *National Air and Space Intelligence Center (NASIC)*, 2017.
- Bolton, John. “The Legal Case for Striking North Korea First.” *The Wall Street Journal*, 28 February 2018.
- Buhite, Russell D. and Hamel, M. Christopher. “War For Peace: The Question of an American Preventive War Against the Soviet Union, 1945-1955.” *Diplomatic History* 14, no. 3 (July 1990):367-383.
- Burr, William and Richelson, Jeffrey T. “Whether to ‘Strangle the Baby in the Cradle’: The United States and the Chinese Nuclear Program, 1960-1964.” *International Security* 25, no. 3 (Winter 2000/01): 54-99.
- Cheng, Jonathon. “North Korea Is Rapidly Upgrading Nuclear Site Despite Summit Vow,” *The Wall Street Journal*, 27 June 2018. <https://www.wsj.com/articles/north-korea-still-building-at-nuclear-research-facility-despite-summit-diplomacy-1530100351>
- Collins, Lisa. “25 Years of Negotiations and Provocations: North Korea and the United States.” *Beyond Parallel*, 02 October 2017, <https://beyondparallel.csis.org/dprk-provocations-and-us-negotiations>
- Denmark, Abraham N. “The Myth of a Limited Strike on North Korea” *Foreign Affairs*, 09 January 2018, <https://www.foreignaffairs.com/articles/north-korea/2018-01-09/myth-limited-strike-north-korea>
- Fisher, Hannah. “North Korea Provocative Actions, 1950-2007.” *Congressional Research Service*, 20 April 2007.
- “Former Defense Secretary William Perry on Why We Didn’t Go to War with North Korea.” *LA Times*, 14 April 2107.
- Friedman, Uri. “Has North Korea Already Crossed Trump’s Red Line?” *The Atlantic*, 28 July 2017.
- “Gates: America Prevented ‘A Very Dangerous Crises’ in Korea in 2010.” *Business Insider*, 14 January 2014.
- “General: ‘100 Percent Confident’ in North Korea Missile Defense.” *The Hill*, 15 February 2018.
- Haas, Richard N. “The Singapore Summit’s Uncertain Legacy,” *Project Syndicate*, 16 June 2018, <https://www.project-syndicate.org/commentary/trump-kim-singapore-summit-outcome-by-richard-n--haass-2018-06>

- Haggard, Stephen and Lindsay, Jon R. "North Korea and the Sony Attack: Exporting Instability Through Cyberspace." *East-West Center*, No. 117, May 2015.
- Handberg, Roger. "The Symbolic Politics of Ballistic Missile Defence: Seeking the Perfect Defense in an Imperfect World," *Defense and Security Analyses* 31, no. 1 (2015): 44-57.
- Hart, B.H. Liddell. *Deterrent or Defense, A Fresh Look at the West's Military Position*. New York: Praeger, 1960.
- Huebert, Rob. "The Chilling Parallels Between the Trump-Kim Summit and 1938 Munich." *The Globe and Mail*, 18 June 2018.
- Huish, Robert. "How to Sink the Hermit Kingdom: Improving Maritime Sanctions Against North Korea," *Canadian Naval Review* 13, no. 2 (2017): 5-10.
- Hymans, Jacques E.C. "Assessing North Korean Nuclear Intentions and Capacities: A New Approach." *Journal of East Asian Studies* 8, no. 2 (May-August 2008): 259-292.
- Jervis, Robert. *The Illogic of American Nuclear Strategy*. Ithaca, NY: Cornell University, 1984.
- Khoo, Nicholas and Steff, Reuben. "'This Program Will Not Be a Threat to Them': Ballistic Missile Defense and US Relations with Russia and China." *Defense & Security Analysis*, 30, no. 1 (2014): 17-28.
- Kim, Bomi. "North Korea's Siege Mentality: A Sociopolitical Analysis of the Kim Jong-Un Regime's Foreign Policies." *Asian Perspective* 40(2016): 223-244.
- Krepon, Michael. "The Stability-Instability Paradox," *Arms Control Wonk*, 02 November 2010.
- Kristensen, Hans M. and Norris, Robert S. "North Korean Nuclear Capabilities, 2018," *Bulletin of the Atomic Scientists* 74, no. 1(2018): 41-51.
- Lewis, George N. "Ballistic Missile Defense Effectiveness." *American Institute of Physics*, 2017.
- Lewis, James A. and Cha. Victor D. "North Korea's Cyber Operations: Strategy and Responses." *Centre for Strategic and International Studies*, 2015.
- Liberman, Peter. "The Rise and Fall of the South African Bomb." *International Security* 26, no. 2 (Fall 2001): 45-86.
- Luttwak, Edward. "Its Time to Bomb North Korea." *Foreign Policy*, 10 January 2018.
- MacDonald, Adam. "Coming Back Into the Fold? The Motivations Behind the Kim-Xi

- Meeting and Implications for ‘Denuclearization’ on the Korean Peninsula.”
Royal United Services Institute of Nova Scotia, April 2, 2018.
- MacDonald, Adam. “Living With a Nuclear-Armed North Korea.” *Frontline Defence* 13, no. 6(2016): 39-41.
- Mastro, Oriana Skylar. “Why China Won’t Rescue North Korea.” *Foreign Affairs*, January/February 2018, <https://www.foreignaffairs.com/articles/asia/2017-12-12/why-china-wont-rescue-north-korea>.
- McDonald, Mark. “North Korea Suggests Libya Should Have Kept Nuclear Program.” *The New York Times*, 25 March 2011.
- McInnis, Kathleen J., Feickert, Andrew, Manyin, Mark E., Hilderth, Steven A, Nikitin, Mary Beth D. and Chanlett-Avery, Emma. “The North Korean Nuclear Challenge: Military Options and Issues for Congress.” *Congressional Research Service*, 27 October 2017.
- “Military and Security Developments Involving the People’s Republic of Korea.” *Office of the Secretary of Defense*, 2017.
- Miller, Nicholas L. and Narang, Vipin. “North Korea Defied the Theoretical Odds: What Can We Learn From its Successful Nuclearization?” *Texas National Security Review*, 13 February 2018.
- Moore, Gregory J. “America’s Failed North Korea Nuclear Policy: A New Approach.” *Asian Perspective* 32:4 (2008): 9-27.
- Narang, Vipin and Panda, Ankit. “North Korea is a Nuclear Power. Get Used to it,” *The New York Times*, 12 June 2018.
- Nikitin, Mary Beth D., Chanlett-Avery, Emma and Manyin, Mark E. “Nuclear Negotiations with North Korea: In Brief.” *Congressional Research Service*, 04 December 2017.
- “North Korea Blows Up Tunnels at Pungge-ri Nuclear Test Site.” *CNN*, 24 May 2018.
- “North Korea: CIA Director Says Regime Nearly Capable of Nuclear Attack.” *The Guardian*, 20 October 2017.
- “North Korea Threatens to Strike Guam.” *CNN*, 09 August 2017.
- Pak, Jung H., Terry, Sue Mi and Klinger, Bruce. “Ex-CIA Analysts Explain Why a Bloody Nose Policy on North Korea Would Backfire.” *Brookings*, 12 February 2018.

- Panda, Ankit. "A Great Leap to Nowhere: Remembering the US-North Korea Leap Day Deal." *The Diplomat*, 29 February 2016.
- Panda, Ankit and Narang, Vipin. "Nuclear Stability, Conventional Instability: North Korea and the Lessons From Pakistan," *War on the Rocks*, 20 November 2017.
- Park, Yong Soo. "Policies and Ideologies of the Kim Jong-Un Regime in North Korea: Theoretical Implications." *Asian Studies Review* 38, no. 1(2014): 1-14.
- Paul, T.V. *Power Versus Prudence: Why Nations Forgo Nuclear Weapons*. Montreal: McGill-Queen's University Press, 2000.
- Pollack, Joshua. "The Trump-Kim Summit Was Far From 'Epochal' But at Least it's a Return to Diplomacy." *The LA Times*, 12 June 2018.
- _____. "From LeMay to McMaster: The Pentagon's Difficult Relationship with Deterrence." *War on the Rocks*, 29 December 2017.
- Potter, William. "The Politics of Nuclear Renunciation: The Cases of Belarus, Kazakhstan and Ukraine." *The Henry L. Stimson Center*, April 1995.
- Posen, Barry. "The Price of War with North Korea." *New York Times*, 06 December 2017.
- Roehrig, Terence. "North Korea, Nuclear Weapons, and the Stability-Instability Paradox," *The Korean Journal of Defence Analysis* 28, no. 2(June 2016): 181-198.
- _____. "The Abilities and Limits of North Korea Early Warning." *Bulletin of the Atomic Scientists*, 27 November 2017.
- _____. "The Origins of the Northern Limit Line Dispute." *The Wilson Center*, 09 May 2012.
- Sagan, Scott D. "The Korean Missile Crisis: Why Deterrence Is Still The Best Option." *Foreign Affairs*, 10 September 2017, <https://www.foreignaffairs.com/articles/north-korea/2017-09-10/korean-missile-crisis> (accessed: 02 June 2018).
- _____. "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." *International Security* 21, no. 3(Winter 1996/97): 54-86.
- Sagan, Scott D. and Waltz, Kenneth N.. *The Spread of Nuclear Weapons: A Debate Renewed*. New York: W.W. Norton, 2003.
- Sang-Hun, Choe, Rich, Motoko, Reneau, Natalie and Carlson, Audrey. "Rocket Men: The Team Building North Korea's Nuclear Missile." *New York Times*, 15 December 2017.

- Sautin, Yevgen, "Today's Nuclear North Korea is Yesterday's China: Lessons From History." *The Diplomat*, 05 August 2017.
- Solingen, Etel. "The Political Economy of Nuclear Restraint." *International Security* 19, no. 2(1994).
- Synder, Glenn. *Deterrence and Defense: Toward a Theory of National Security*. Princeton: Princeton University Press, 1961.
- The Military Balance 2017*. International Institute of Strategic Studies: London, 2017.
- Tharoor, Ishaan. "Trump Said North Korea Was 'No Longer a Nuclear Threat.' His Spies Disagree." *The Washington Post*, 02 July 2018.
- "The China-North Korea Relationship." *Center on Foreign Relations*, 27 September 2017.
- "Trump and North Korea: The Perils of a Pre-Emptive First Strike," *Financial Times*, 08 January 2018.
- "US Preparing 'Bloody Nose' Cyber Attacks on North Korea." *The Telegraph*, 20 February 2018.
- Waltz, Kenneth N. "Nuclear Myths and Politics Realities." *American Political Science Review* 84(September 1990): 731-745.
- Watterson, Christopher J. "Competing Interpretations of the Stability-Instability Paradox: The Case of the Kargil War," *The Nonproliferation Review* 24, no. 1(2017): 83-99.
- White, Jeremy B. "US and South Korea to suspend war games following summit between Donald Trump and Kim Jong-un." *The Independent*, 19 June 2019,
- "Why Trump's National Security Advisor Thinks it Might Soon be Time to Bomb North Korea." *Business Insider*, 10 January 2018.
- Young-taek, Park, "The Structural Elements of North Korea's Insecurity Applying the 'Regional Security Complex Theory.'" *The Korean Journal of Defense Analysis* 24, no. 3(September 2012): 321-33.

¹ North Korea has possessed nuclear weapons at least since 2006, but it remains unclear if they have developed a reliable vehicle delivery system to deploy them. This, in part, requires the miniaturization of nuclear bombs into suitable warheads for its missile forces which can survive launch, midcourse flight, and re-entry into the atmosphere to reach their target.

“Military and Security Developments Involving the People’s Republic of Korea.” *Office of the Secretary of Defense*, 2017.

² Ballistic missiles are classified by their range. ICBMs are considered any missile with a 5,500 km+ range. See,

“Ballistic and Cruise Missile Threat.” *National Air and Space Intelligence Center (NASIC)*, 2017.

³ Uri Friedman. “Has North Korea Already Crossed Trump’s Red Line?” *The Atlantic*, 28 July 2017.

⁴ It is unclear if North Korea has an ICBM (or other classes of ballistic missiles) capable of carrying a nuclear warhead. US defence and intelligence officials believe North Korea possess a functioning ICBM but are not certain if they have been successful in warhead miniaturization and developed a survivable re-entry vehicle to carry it. The CIA estimates it will only be a matter of months before North Korea attains a functioning nuclear-armed ICBM. “North Korea: CIA Director Says Regime Nearly Capable of Nuclear Attack.” *The Guardian*, 20 October 2017; Hans Kristensen and Robert S. Norris. “North Korean Nuclear Capabilities, 2018.” *Bulletin of the Atomic Scientists* 74, no. 1 (2018): 41-51.

⁵ *De jure* acknowledgement would involve the legal recognition of North Korea as a Nuclear Weapons State under the Non-Proliferation Treaty which is highly unlikely under any conceivable circumstance. The nature of relations with the international community and the US in particular, however, with the other nuclear outliers in India, Israel and Pakistan (which are not part of the NPT like North Korea) demonstrates the differences between *de facto* acceptance of their nuclear possession (i.e not attempting to disarm or sanction them) without legally acknowledging this reality.

⁶ “Trump and North Korea: The Perils of a Pre-Emptive First Strike.” *Financial Times*, 08 January 2018.

⁷ This is not strictly a hypothetical possibility as some in the Trump Administration, specifically former National Security Advisor McMaster, have publicly voiced such concerns. “Why Trump’s National Security Advisor Thinks it Might Soon be Time to Bomb North Korea.” *Business Insider*, 10 January 2018. The current National Security Advisor, John Bolton, also holds similar views on the viability and possibly necessity of using military force if to disarm North Korea. John Bolton. “The Legal Case for Striking North Korea First.” *The Wall Street Journal*, 28 February 2018. The US DOD report, also, speculate North Korea’s acquisition of nuclear weapons is not solely built on regime survival but to assist in the forceful pursuit of revisionist aims. “Military and Security Development s Involving The Democratic People’s Republic of Korea”: 5-7.

- ⁸ This pressure did not only emanate from the West, but primarily from North Korea's ally the Soviet Union. Miller, Nicholas L. Miller and Viping Narang. "North Korea Defied the Theoretical Odds: What Can We Learn From its Successful Nuclearization?" *Texas National Security Review*, 13 February 2018.
- ⁹ For an overview of the US negotiating history with North Korea see: Mary Beth D. Nikitin et al. "Nuclear Negotiations with North Korea: In Brief." *Congressional Research Service*, 04 December 2017.
- ¹⁰ Nicolas D. Anderson. "Explaining North Korea's Nuclear Ambitions: Power and Position on the Korean Peninsula," *Australian Journal of International Affairs* 71, no. 6 (2017): 621-641.
- ¹¹ For example see: Jacques E.C. Hymans. "Assessing North Korean Nuclear Intentions and Capacities: A New Approach." *Journal of East Asian Studies* 8, no. 2(May-August 2008): 259-292. On different motivations of states to acquire nuclear weapons in general see Scott D. Scott D. "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." *International Security* 21, no. 3(Winter 1996/97): 54-86.
- ¹² Anderson, "Explaining North Korea's Nuclear Ambitions: Power and Position on the Korean Peninsula".
- ¹³ The Soviet Union progressively reduced its aid and assistance to North Korea in the late 1980s before its eventual break up in the early 1990s. China remains North Korea's major economic partner and diplomatic protector (including in softening sanctions against Pyongyang), but over the past two decades China has softened its alliance commitment to North Korea, stating it will not assist Pyongyang if they initiate hostilities and throughout 2017 was supportive of increasingly stringent international sanctions against them. Eleanor Albert. "The China-North Korea Relationship." *Center on Foreign Relations*, 27 September 2017.
- ¹⁴ Mark. McDonald. "North Korea Suggests Libya Should Have Kept Nuclear Program." *The New York Times*, 25 March 2011.
- ¹⁵ Missile tests have grown in number and type over time, especially the last five years. ICBM and SLBM variants are still not operational but there have been major improvements in testing success recently. "The CNS North Missile Test Database," *Nuclear Threat Initiative*, <http://www.nti.org/analysis/articles/cns-north-korea-missile-test-database/>. Dedicating resources and expertise, also, towards ICBMs and SLBMs indicates a determination to build a number of nuclear-capable delivery systems which may give clues as to its future nuclear arsenal and posture.

- ¹⁶ Miller & Narang, “North Korea Defied the Theoretical Odds: What Can We Learn From its Successful Nuclearization?”
- ¹⁷ As opposed to Sagan’s Domestic Politics Model wherein parochial interest competition between various bureaucracies (for example the military and nuclear science community) support the development of a nuclear weapons, the need for nuclear weapons is a regime legitimation tool not only in supporting specific bureaucratic interests but indeed maintaining the entire regime configuration which is geared towards depicting and provoking a hostile foreign environment. See Mun Suk Ahn. “What is the Root of the North Korean Nuclear Program?” *Asian Affairs: An American Review* 38, no. 4(2011): 175-187; Gregory J. Moore, “America’s Failed North Korea Nuclear Policy: A New Approach.” *Asian Perspective* 32, no. 4 (2008): 9-27.
- ¹⁸ Bomi Kim. “North Korea’s Siege Mentality: A Sociopolitical Analysis of the Kim Jong-Un Regime’s Foreign Policies.” *Asian Perspective* 40(2016): 223-244.
- ¹⁹ Yong Soo Park. “Policies and Ideologies of the Kim Jong-Un Regime in North Korea: Theoretical Implications.” *Asian Studies Review* 38, no. 1(2014): 1-14.
- ²⁰ Choe Sang-Hun et al. “Rocket Men: The Team Building North Korea’s Nuclear Missile.” *New York Times*, 15 December 2017.
- ²¹ The one exception is the 2012 Leap Day Agreement, with the US agreeing to provide substantial food aid in return for a moratorium on North Korean uranium enrichment and missile testing, which was abandoned by Pyongyang only weeks after the deal had been finalized. Ankit Panda. “A Great Leap to Nowhere: Remembering the US-North Korea Leap Day Deal” *The Diplomat*, 29 February 2016.
- ²² Park Young-Taek. “The Structural Elements of North Korea’s Insecurity Applying the ‘Regional Security Complex Theory.’” *The Korean Journal of Defense Analysis* 24, no. 3(September 2012): 321-333.
- ²³ Etel Solingen. “The Political Economy of Nuclear Restraint.” *International Security* 19, no. 2 (1994): 126-169; William Potter. “The Politics of Nuclear Renunciation: The Cases of Belarus, Kazakhstan and Ukraine.” *The Henry L. Stimson Center*, April 1995; T.V. Paul, *Power Versus Prudence: Why Nations Forgo Nuclear Weapons* (Montreal: McGill-Queen’s University Press, 2000); Peter Liberman. “The Rise and Fall of the South African Bomb” *International Security* 26, no.2(2001): 45-86.
- ²⁴ Liddell Hart. *Deterrent or Defense, A Fresh Look at the West’s Military Position*. (New York: Praeger, 1960).

- ²⁵ Glenn Synder. *Deterrence and Defense: Toward a Theory of National Security*. (Princeton: Princeton University Press, 1961).
- ²⁶ Robert Jervis. *The Illogic of American Nuclear Strategy*. Ithaca, (NY: Cornell University, 1984); Michael Krepon. "The Stability-Instability Paradox" *Arms Control Wonk*, 02 November 2010.
- ²⁷ This does not imply that the exclusive or primary reason both China and Pakistan acquired nuclear weapons is to conduct limited conventional attacks to resolve territorial disputes with nuclear neighbours. Indeed, China's motivations are largely centred on escaping possible nuclear blackmail by the US and Soviet Union whereas Pakistan's motivations include offsetting conventional superiority of India.
- ²⁸ The most often discussed case for the Stability-Instability Paradox is the Pakistan-India rivalry, particularly the 1998 Kargil War and the Twin Peaks Crisis of 2001/02, with a plethora of disagreement as to the role of nuclear weapons in both states' military strategies. For an overview of the extensive debate see: Christopher J. Watterson. "Competing Interpretations of the Stability-Instability Paradox: The Case of the Kargil War." *The Nonproliferation Review* 24, no. 1 (2017): 83-99.
- ²⁹ Despite term's existence for half a century, it has not been adequately operationalized. Part of the issue is that it is a condition stemming from nuclear weapons acquisition and not a theory in and of itself thereby making it difficult to determine the causal forces of when/if such a condition is expected to emerge (i.e is it expected to happen all the time or only under certain pre-existing relations between states?). The emphasis, is on explaining how nuclear weapons possession does not mean the end of war and conflict between states in their possession rather than stating that it is an inevitable, deterministic consequence stemming from the achievement of stability at a nuclear level.
- ³⁰ It is unclear, however, if there should be a distinction in terms of whether North Korea's nuclear arsenal is only capable of striking within the region (including US bases, allies and overseas territories like Guam or possibly Hawaii) versus one that could directly target the continental US.
- ³¹ Terence Roehrig. "North Korea, Nuclear Weapons, and the Stability-Instability Paradox." *The Korean Journal of Defence Analysis* 28, no. 2 (June 2016): 185.
- ³² Intensity in this case is not simply based on the number of incidents but rather the size and extent of kinetic military attacks, including casualties and damage to property and assets.
- ³³ Roehrig, "North Korea, Nuclear Weapons, and the Stability-Instability Paradox", 190-191.
- ³⁴ Anderson, "Explaining North Korea's Nuclear Power Ambitions: Power and Position on the Korean Peninsula,"

629.

³⁵ Lisa Collins. “25 Years of Negotiations and Provocations: North Korea and the United States,” *Beyond Parallel*, 02 October 2017, <https://beyondparallel.csis.org/dprk-provocations-and-us-negotiations/>

³⁶ For a comprehensive cataloguing of such incidents see: Hannah Fisher. “North Korea Provocative Actions, 1950-2007.” *Congressional Research Service*, 20 April 2007.

³⁷ For example, the assassination of Kim Jong-Un’s half-brother in Malaysia in February 2017 demonstrated that North Korea possesses the capability to conduct such attacks on foreign soil but has by and large refrained from doing so, especially against South Korea.

³⁸ On casualty estimates see: Kathleen J. McInnis et al. “The North Korean Nuclear Challenge: Military Options and Issues for Congress.” *Congressional Research Service*, 27 October 2017. On North Korean conventional forces see: “The Military Balance 2017.” *International Institute of Strategic Studies*, 2017: 303-306; Eleanor Albert. “North Korea’s Military Capabilities.” *Center on Foreign Relations*, 03 January 2018.

³⁹ A possible exception would be if the US conducted a comprehensive nuclear First Strike against North Korea effectively destroying the state, society and population.

⁴⁰ “Former Defense Secretary William Perry on Why We Didn’t Go to War with North Korea.” *LA Times*, 14 April 2017.

⁴¹ These attacks, especially the *Cheonan* sinking, were some of the most audacious North Korea provocations in over a decade. Part of the rationale for them is based on information that they were conducted to demonstrate the military’s loyalty to then-Supreme Leader Kim Jong-Il’s successor and son, Kim Jong-Un. A series of deadly attacks, including the terrorist explosion of a South Korean airliner in the 1980s, have also been suspected of being demonstrative actions of the military’s loyalty to Kim Jong-il when he was the anointed successor in waiting to his father. Ahn, “What is the Root of the North Korean Nuclear Program?”

⁴² Former Defense Secretary Robert Gates asserts that the tempered response to the sinking of the *Cheonan* was due to the US restraining South Korea for fear of sparking off a larger crisis. “Gates: America

Prevented ‘A Very Dangerous Crises’ in Korea in 2010.” *Business Insider*, 14 January 2014. The willingness, however, of South Korea to respond with a surgical artillery strike on North Korean batteries which conducted the Yeonpyeong attack demonstrated that Seoul was not completely deterred from using force against Pyongyang provocations which may in part have motivated the movement towards conducting attacks to other realms,

including cyber, to lessen the possibility of violent escalation while retaining plausible deniability. Stephen Haggard and Jon R. Lindsay. “North Korea and the Sony Attack: Exporting Instability Through Cyberspace.” *East-West Center*, No. 117, May 2015. For more on North Korean cyber operation see: James A. Lewis and Victor D. Cha. “North Korea’s Cyber Operations: Strategy and Responses.” *Centre for Strategic and International Studies*, 2015.

⁴³ For a succinct comparison of similar American concerns towards the rationality of Maoist China and North Korea in possession of nuclear weapons see: Yevgen Sautin. “Today’s Nuclear North Korea is Yesterday’s China: Lessons From History,” *The Diplomat*, 05 August 2017.

⁴⁴ Russell D. Buhtie and W.M. Christopher Hamel. “War For Peace: The Question of an American Preventive War Against the Soviet Union, 1945-1955.” *Diplomatic History* 14, no. 3 (July 1990):367-383; William Burr and Jeffrey T. Richelson. “Whether to ‘Strangle the Baby in the Cradle’: The United States and the Chinese Nuclear Program, 1960-1964” *International Security* 25, no. 3 (Winter 2000/01): 54-99.

⁴⁵ Ankit Panda and Vipin Narang. “Nuclear Stability, Conventional Instability: North Korea and the Lessons From Pakistan” *War on the Rocks*, 20 November 2017.

⁴⁶ For more on the Northern Limit Line dispute see: Terrence Roehrig. “The Origins of the Northern Limit Line Dispute.” *The Wilson Center*, 09 May 2012

⁴⁷ Kenneth N. Waltz. “Nuclear Myths and Politics Realities.” *American Political Science Review* 84(September 1990): 731-745.

⁴⁸ As Waltz argues it is not the ability to destroy the other state but what the other is willing to absorb in a retaliatory attack (in which there is not an absolute guarantee they can defend against) after launching an initial strike. The willingness, therefore, to lose even one or a few major urban areas would most likely only be warranted morally, politically and strategically if a state already finds itself in an existential struggle. Scott D. Sagan and Kenneth N. Waltz. *The Spread of Nuclear Weapons: A Debate Renewed*, Chapter 1.

⁴⁹ Collins, 25 Years of Negotiations and Provocations: North Korea and the United States”.

⁵⁰ The opposite of a Deterrence by Punishment strategy is a Deterrence by Denial strategy. Deterrence by Denial is based on inhibiting another’s attempt to acquire a specific capability (including possibly preventative attack to deny such a reality) whereas deterrence by punishment is based on assured retaliation if one attacks the other or its allies.

⁵¹ For similar agreements see: Jeffrey A Bader. “Why Deterring and Containing North Korea Is our Least Bad Option.” *Brookings*, 08 August 2017; Scott D. Sagan. “The Korean Missile

- Crisis: Why Deterrence Is Still The Best Option.” *Foreign Affairs*, 10 September 2017, <https://www.foreignaffairs.com/articles/north-korea/2017-09-10/korean-missile-crisis>
- ⁵² Jung H Park et al. “Ex-CIA Analysts Explain Why a Bloody Nose Policy on North Korea Would Backfire.” *Brookings*, 12 February 2018.
- ⁵³ Edward Luttwak. “Its Time to Bomb North Korea.” *Foreign Policy*, 10 January 2018.
- ⁵⁴ Abraham N. Denmark. “The Myth of a Limited Strike on North Korea.” *Foreign Affairs*, 09 January 2018, <https://www.foreignaffairs.com/articles/north-korea/2018-01-09/myth-limited-strike-north-korea>
- ⁵⁵ Barry Posen. “The Price of War with North Korea.” *New York Times*, 06 December 2017.
- ⁵⁶ Terence Roehrig. “The Abilities and Limits of North Korea Early Warning.” *Bulletin of the Atomic Scientists*, 27 November 2017. Compounding this issue is the fact that to conduct a successful attack they would most likely have to degrade North Korean Command and Control and surveillance systems to avoid detection and interception, thereby blinding a highly paranoid regime attempting to determine the extent and nature of the attack. Proposed ‘Cyber Bloody Nose’ attacks, also, carry such risks and may be interpreted not as a deterrence by denial strategy in coercing North Korea to the negotiating table, but rather a softening up before launch a larger strike. “US Preparing ‘Bloody Nose’ Cyber Attacks on North Korea.” *The Telegraph*, 20 February 2018
- ⁵⁷ Oriana Skylar Mastro. “Why China Won’t Rescue North Korea.” *Foreign Affairs*, January/February 2018, <https://www.foreignaffairs.com/articles/asia/2017-12-12/why-china-wont-rescue-north-korea>.
- ⁵⁸ George N. Lewis. “Ballistic Missile Defense Effectiveness.” *American Institute of Physics*, 2017.
- ⁵⁹ “General: ‘100 Percent Confident’ in North Korea Missile Defense.” *The Hill*, 15 February 2018; Roger Handberg. “The Symbolic Politics of Ballistic Missile Defence: Seeking the Perfect Defense in an Imperfect World.” *Defense and Security Analyses* 31, no. 1(2015): 44-57.
- ⁶⁰ Nicholas Khoo and Reuben Steff. “‘This Program Will Not Be a Threat to Them’: Ballistic Missile Defense and US Relations with Russia and China.” *Defense & Security Analysis*, 30, no. 1(2014): 17-28.
- ⁶¹ Adam MacDonald. “Coming Back Into the Fold? The Motivations Behind the Kim-Xi Meeting and Implications for ‘Denuclearization’ on the Korean Peninsula.” *Royal United Services Institute of Nova Scotia*, April 2, 2018.
- ⁶² Joshua Pollack. “From LeMay to McMaster: The Pentagon’s Difficult Relationship with Deterrence.” *War on the Rocks*, 29 December 2017.

- ⁶³ Adam MacDonald. "Living With a Nuclear-Armed North Korea." *Frontline Defence* 13, no. 6 (2016): 39-41. Vipin Narang and Ankit Panda. "North Korea is a Nuclear Power. Get Used to it," *The New York Times*, 12 June 2018).
- ⁶⁴ Jeremy B. White. "US and South Korea to suspend war games following summit between Donald Trump and Kim Jong-un." *The Independent*, 19 June 2019.
- ⁶⁵ Robert Huish. "How to Sink the Hermit Kingdom: Improving Maritime Sanctions Against North Korea," *Canadian Naval Review* 13, no. 2 (2017): 5-10.
- ⁶⁶ Joshua Pollack. "The Trump-Kim Summit Was Far From 'Epochal' But at Least it's a Return to Diplomacy." *The LA Times*, 12 June 2018.
- ⁶⁷ Ishaan Tharoor. "Trump Said North Korea Was 'No Longer a Nuclear Threat.' His Spies Disagree." *The Washington Post*, 02 July 2018.
- ⁶⁸ "North Korea Blows Up Tunnels at Pungge-ri Nuclear Test Site." *CNN*, 24 May 2018.
- ⁶⁹ Richard N. Haas. "The Singapore Summit's Uncertain Legacy." *Project Syndicate*, 16 June 2018.
- ⁷⁰ "Military and Security Developments Involving the Democratic People's Republic of Korea", 1.
- ⁷¹ Jonathon Cheng. "North Korea Is Rapidly Upgrading Nuclear Site Despite Summit Vow," *The Wall Street Journal*, 27 June 2018.
- ⁷² Rob Huebert. "The Chilling Parallels Between the Trump-Kim Summit and 1938 Munich." *The Globe and Mail*, 18 June 2018.

The Frozen Sea: Using Spatial Analysis to Inform Policy on Illegal Fishing in the Antarctic Region

Frederick P. Hemans

School of Global Policy and Strategy, University of California San Diego, La Jolla, California, USA

Fhemans@ucsd.edu

The Frozen Sea: Using Spatial Analysis to Inform Policy on Illegal Fishing in the Antarctic Region

The rapid rise of the global price of Antarctic Toothfish *Dissostichus mawsoni* and Patagonian Toothfish *Dissostichus eleginoides*, more commonly known as Chilean Seabass in global fishing markets, has led to an increase of illegal fishing activity in the last 25 years. In the Southern Ocean, the vast remote area around the Antarctic continent makes locating and halting illegal fishing vessels extremely difficult. This paper uses spatial and statistical analysis to examine the distribution of illegal, unreported, and unregulated (IUU) sightings of fishing vessels in the areas of the Southern Ocean surrounding the Antarctic continent. As sea ice retracts and the average annual distribution changes, IUU vessels may venture farther south, closer to the permanent ice shelf. Understanding the scope of these illegal activities will be a key challenge for the international regulatory community as it attempts illegal activities and their changing nature due to global climate change. Spatial analysis of the region will be a key tool for the Commission for the Conservation of Antarctic Living Marine Resources in regulation enforcement and when locating illegal activities, as well as for stakeholder nations, such as Australia and New Zealand, to limit the impact of IUU fishing.

Keywords: Antarctica; global commons policy; conservation; geospatial analysis; fisheries management

Introduction

CCAMLR and the Frozen Sea

The story of the Antarctic marine ecosystem has humble beginnings. Across the Atlantic Ocean, deep-water currents carry dense, nutrient-rich cold water southward until contact with the Antarctic landmass causes them to upwell to the surface¹. This global thermohaline circulation forms the basis of a nutrient transport that allows great biodiversity despite the extreme conditions in the circumpolar region. A large variety of

marine life is supported in the Antarctic region by this great influx of nutrients from deep-water circulation. Often called ‘The Last Ocean’ by biologists because of the relative pristine nature of its ecosystem compared to other global locations, this moniker is now in danger due to the dual threats from direct human contact combined with the various negative impacts of climate change.

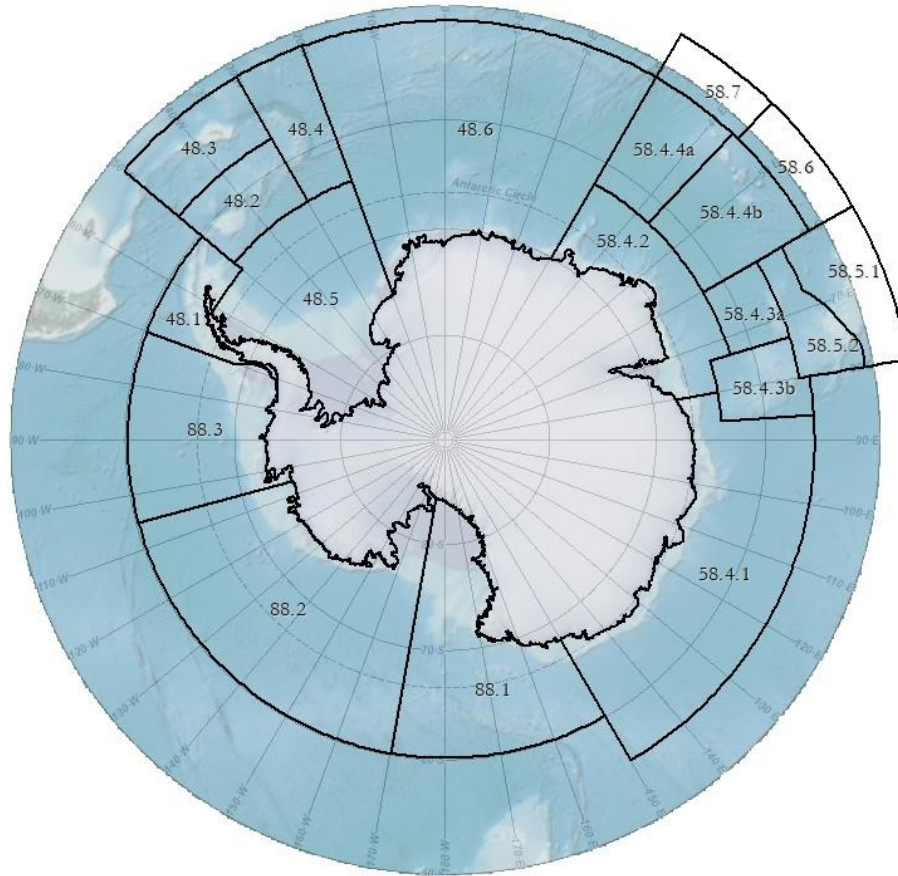


Fig. 1. CCAMLR Statistical Areas, Subareas, and Divisions of the Antarctic Region of the Southern Ocean

Established as part of the 1959 Antarctic Treaty System, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) manages an area that accounts for almost 10% of all the global oceans². CCAMLR is one arm of the Antarctic Treaty System, a multilateral body that manages the conservation of the continent and the surrounding ocean. After its creation in the 1960s, the Antarctic Treaty System suspended all historical territorial claims to portions of Antarctica, and

instead established the region as a global cooperative area for scientific research and commercial harvesting of certain marine species.

However, this treaty came too late to stop the large-scale historical harvesting of fur seals, whales, penguins, and rock cod that has been widespread since the 18th century. While some populations have recovered since the latter half of the 20th century due to conservation efforts, many species have still not recovered to even a fraction of the total population levels that existed before human contact³.

Currently, the main commercially harvested marine species in the region are the Patagonian and Antarctic Toothfish, commonly referred to as ‘white gold’ that is highly valued in seafood markets around the globe. CCAMLR has been working to establish sustainable total allowable catch (TAC) levels in the region, but there are challenges of imperfect information about the size and distribution of the total biomass of Toothfish in the Antarctic, as well as the growth of illegal, unreported, and unregulated (IUU) fishing operations in the region⁴. This paper will examine the frequency and distribution of IUU vessel sightings and the implications of their spatial distribution in the CCAMLR convention area.

CCAMLR currently acts as a multilateral organization with 25 permanent members and numerous non-contracting parties that may observe and follow CCAMLR proceedings. All the large global powers such as the United States, the People’s Republic of China, Russia (formerly the Soviet Union) and Great Britain are members, as well as regional stakeholder nations such as Australia, New Zealand, Chile, and Argentina. Policy is made on consensus basis only, which poses challenges to passing comprehensive ecosystem-based management plans. Agreements to expand the conservational mandate of this multilateral body are often difficult to reach due to the ability of a single nation to exercise a veto⁵. In this sense, is similar to the UN Security

Council, as nations with large fishing interests, such as China, Russia, and Japan, serve as roadblocks to tougher conservation measures and measures that call for stronger action to halt IUU fishing operations in the region⁶.

Generally, conservational practices and rules stipulated by CCAMLR are followed by the clear majority of the parties that conduct legal fishing activities within the treaty area. Fishing activities are often conducted by private enterprises operating fishing fleets that sail under the flag of one or even many different nations. Accordingly, there are some violations that are committed by vessels operating legally in the area, such as under-reporting of catch volume or straying into areas that have already been closed for the season. The compliance of vessels flying under the flag-state of CCAMLR members may often depend on how much emphasis that nation places on compliance and meeting its international conservational obligations. However, a larger threat to the health and sustainability of the fisheries and of the greater marine ecosystem of the Southern Ocean comes from IUU fishing activities, of which the total scale and total negative environmental impact remains largely unknown.

IUU Fishing around Antarctica

One issue that requires further analysis is the potential impact of IUU fishing not only on the biomass of the target species, but on the spatial relationship in respect to local fauna in the region that are most vulnerable to be harmed by unsustainable practices of IUU vessels. Recent analysis shows that illegal vessels commonly use practices that entail large amounts of bycatch, the killing of non-target species like penguins or seals in the process of harvesting target species⁷. By working outside the established guidelines of the regional fishing management organization, these vessels feel no need to comply with established industry regulations that force crews to use more sustainable practices that limit bycatch, such as using limited depth longlines, and ban certain types

of gill-nets and net releases for large marine mammals and birds when trawling⁸. While limited historical data makes it difficult to estimate the total historic losses of different species due to illegal fishing, it is possible to reduce or prevent future biodiversity losses by analyzing indicators of where these IUU vessels are operating to make projections about which vulnerable species may become the most threatened.

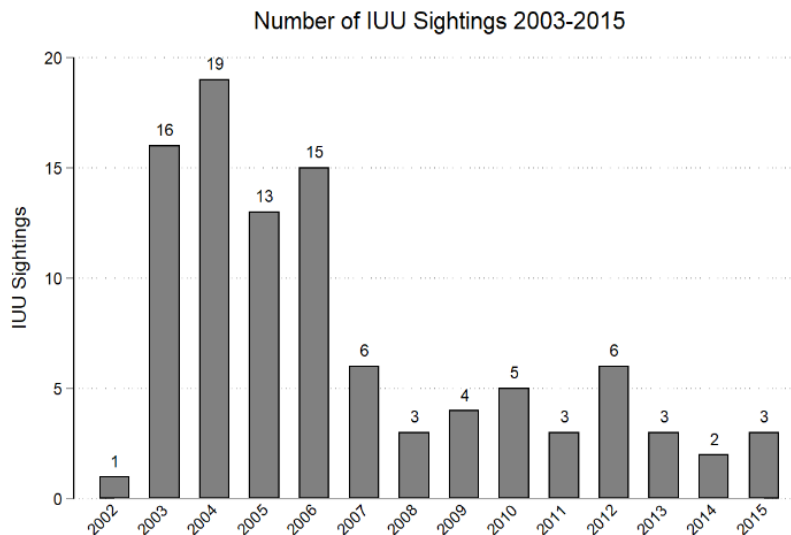


Fig. 2. Total Confirmed IUU Sightings by Year, 2002-2015

IUU vessel sightings have declined sharply since 2006, primarily as a result of new CCAMLR strategies to identify IUU activity in the convention area⁹. Funding and attention to programs that increase IUU sightings and awareness naturally increase the frequency of which they are reported. However, landings of illegally obtained seafood such as ‘Chilean Seabass’ continued to increase throughout the 2000s¹⁰. Future potential increases in the global price of seafood products as new markets emerge could quickly lead to increased IUU activity in the region. Knowing the spatial distribution and locations of possible future IUU fishing activity will be key for future conservation efforts.

Indeed, these IUU vessels can be part of larger organized crime networks that often smuggle banned animal products, such as shark fins, and engage in human trafficking and illegal drug-running¹¹. Law enforcement-type operations to stop IUU vessels can pay huge dividends far beyond the scope of Antarctic marine conservation.

Shifting Annual Sea Ice due to Climate Change

Another key area of concern is shifting annual Antarctic sea ice distributions around the Antarctic continent. One overlooked aspect is that as the global average temperature increases annually, the frequency and distribution of ice around both poles changes and widens the year by year standard deviation of extent and thickness¹². This means there is much larger yearly variation on the distribution and depth of this ice, and that extremely severe or mild winter seasons in the Antarctic are becoming the norm rather than the exception. While humans can undertake more adaptive behaviors in regard to climate change, certain animal species are much more vulnerable to these changes in sea ice distribution as the ice changes.

Greater variations of temperature and sea ice extent outside the normal range means that the distribution and population level of Toothfish may vary, and as ice recedes, may move closer to the permanent ice shelf of the Antarctic continent¹³. As fishing vessels, especially IUU vessels, are forced to move closer to the Antarctic continent to reach profitability in their ventures, this may increase contact with other native species in the region.

One such species is the Antarctic penguin species the Adelie, found in the entire circumpolar region. Adelie Penguins have one of the highest site fidelity of all bird species, meaning that undertaking adaptive behavior to change nesting and breeding grounds, if possible at all, is a slow and arduous process¹⁴. Antarctic sea ice is not receding at nearly the rate as its Arctic equivalent, but the average annual distribution is

shifting, as is the depth and distribution of common Adelie Penguin prey, most notably Antarctic krill, *Euphausia Superba*. Indeed, certain colonies within the analysis area of this paper have recently experienced ‘catastrophic’ breeding seasons with very high chick mortality rates due to a lack of available nutritional opportunities¹⁵.

Overview of Literature

There is an increasing number of biological studies of certain species in the circumpolar region, especially in relation to potential complications climate change may pose in the Antarctic ecosystem. However, research on risks specifically posed by illegal fishing vessels has been limited due to the lack of available comprehensive data. Illegal fishing operations have become a focal point of analysis and policy proposals since the 1990s.

In their landmark work, Brooks et al. note strong increasing evidence that science-based management in the Southern Ocean is declining as a result of leadership by contrarian members, such as China and Russia, who repeatedly challenge the conservation-based mandate of CCAMLR¹⁶. These nations also have some of the worst records of firms operating in the region that falsify catch records, ignore fisheries closures, and operate or finance wholly illegal operations¹⁷.

Other studies have attempted to quantify the global extent of illegal fishing. Agnew et al. choose one key species per regional fishery then match it to illegal markets around the globe¹⁸. This research estimates that as much as 7% of global fish consumption could stem directly from illegal fishing¹⁹. Since the sharp rise of sightings of IUU fishing in the early 2000s, CCAMLR has initiated a series of law enforcement and regulatory activities in conjunction with international agencies, which allows them to work with nations such as Australia and New Zealand in naval operations. These operations have led to the capture or deliberate scuttling of numerous illegal vessels.

This led to a marked decrease in in IUU sightings. Officially reported and confirmed sightings of IUU activities have decreased since 2006, but much of this is due to less enforcement operations rather than decreased activity.

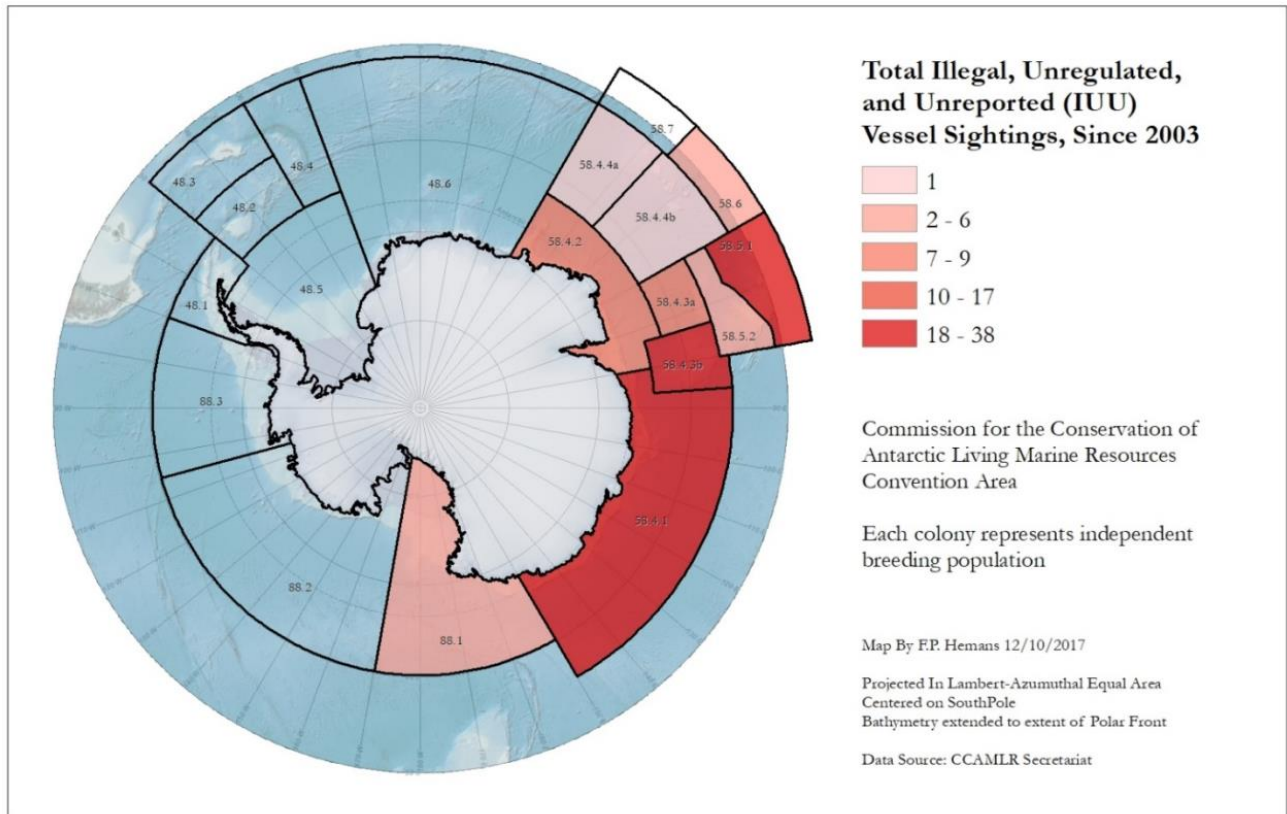


Fig. 3. Total IUU Vessel Sightings Since 2003 in the CCAMLR Convention Area

As for ecological research, Cimino and Lynch note climate change will be a major factor in changing the distribution of Antarctic species, specifically the factor in determining the total biomass of the Adelie Penguin²⁰. As ice distributions change, certain colonies will expand or shrink, and when parts of what was previously considered the permanent ice shelf collapse and break off. This influx of nutrients will have mixed effects for the region's various penguin species. Additionally, Ballerini et al. find in their study of Adelie Penguins that changing annual Antarctic sea ice leads to potential higher mortality rate among chicks due to their species-specific site fidelity

rate²¹. This explains some of the difficult breeding seasons recently recorded in colonies within the analysis region of this study.

Data

Data of IUU vessel sightings in the CCAMLR region is generally divided into two categories: vessels currently active, potentially active or unaccounted for, and vessels known to be inactive, whether from capture, impoundment, intentional scuttling, or being scrapped by the owners. CCAMLR only includes vessels that are considered potentially active on the Non-Contracting Party IUU vessel list, which is freely available via the CCAMLR Secretariat. Historical records of inactive vessels are available via a cooperative list of all IUU vessel sightings published by the seven major Regional Fisheries Management Organizations (RFMOs). RFMOs also maintains all records of sightings since 2000, organized by statistical areas, sub-areas, and divisions. CCAMLR and all other RFMOs subscribe to the official UN Food and Agricultural Organization (FAO) ocean statistical divisions. These areas are further divided into subareas based on the bathymetric features and/or native ecology.

General data on the latitudes and longitudes of the CCAMLR statistical areas, subareas, and divisions were readily available from the CCAMLR Secretariat, as was annual total allowable catch (TAC) data for the two species of Toothfish located in the CCAMLR convention area. Antarctic bathymetry and graticule files, as well as monthly files of Antarctic sea ice extent, were available from the United States National Snow and Ice Data Center (NSDIC). Lastly, data on Adelie Penguin colony locations between the latitudes of 170 degrees west and 30 degrees east, the area of analysis that contains all IUU vessel sightings since 2002, was compiled based on latitude/longitude points of Adelie Penguin colonies available via Cimino and Lynch (2016).

Analysis and Limitations

Analysis

Working with imperfect and incomplete information poses challenges for comprehensive statistical analysis. However, it is critically important to use the data and methods we do possess to create models with predictive power for use in regulatory and law enforcement actions. In this case, acting with the limited information available will be instrumental in leading to the capture or sinking of IUU vessels.

The first task is to ascertain what effect the reduction of sea ice will have on the amount of illegal fishing activity in the CCAMLR-managed region. As total ice average annual distribution changes, and formerly permanent ice breaks away, this induces a nutrient influx into the surrounding sea, causing increased biomass up the trophic scale. Based on the available data on total distribution of sea ice by month during our analysis period, there may be an overall negative relationship between sea ice extent and total IUU fishing activity. The estimating equation in this analysis, generated by OLS, where the independent variable is sea ice distribution and the outcome variable is total IUU sightings. Using OLS methodology to generate an estimating equation, we test this hypothesis, using sea ice extent in kilometers as our independent variable and our outcome variable as individual IUU vessel sightings per year in the CCAMLR convention area.

$$\widehat{IUUsightings} = \beta_0 + \beta_1 \widehat{seaice} + \varepsilon$$

IUU Sightings	Coefficient (robust std. errors)	t-statistic (P> t)
Intercept	65.23*** (14.93)	4.37 (0.002)
Ice Extent	-5.33*** (1.314)	-4.06 (0.001)
n=102 ***99% CI R ² =.443		

Fig. 4. Estimating Equation and Regression Analysis Results

At a 99% confidence interval, there is a correlation between reduced sea ice extent in kilometres and total IUU sightings by year, using robust standard errors. This outcome is not surprising but has implications for future scenarios where baseline sea ice distributions are decreasing year by year. This tells us that years with extremely warm conditions in the Southern Ocean may feature more IUU fishing activity, and this fishing will be closer to the Antarctic Continent and permanent ice shelf.

Another reason for this distribution of IUU sightings not captured in the model is that IUU fishing takes place in these areas is that they are located the furthest away from regional stakeholder nations of Australia, New Zealand, Chile, and Argentina. The statistical subareas that report IUU vessel activities are all located southern of the Indian Ocean. This entire area forms an IUU fishing corridor for these vessels to move and operate, as they generally move through Southeast Asia and southward into the Southern Ocean to avoid contact with patrol vessels of these regional stakeholder nations.

Furthermore, we can test for the presence of spatial autocorrelation in these results using Moran's statistic function in ArcGIS as a robustness check for the findings. Using this tool, we can see that our explanatory variable is distributed

randomly within our area of analysis, which does not necessitate clustering in our regression analysis. By using individual sightings per month for IUU vessels, we limit our total sample size. However, each individual sighting in this analysis is on the month level, which may represent up to 30 fishing days per vessel per sighting, which can involve large amounts of catch per fishing day.

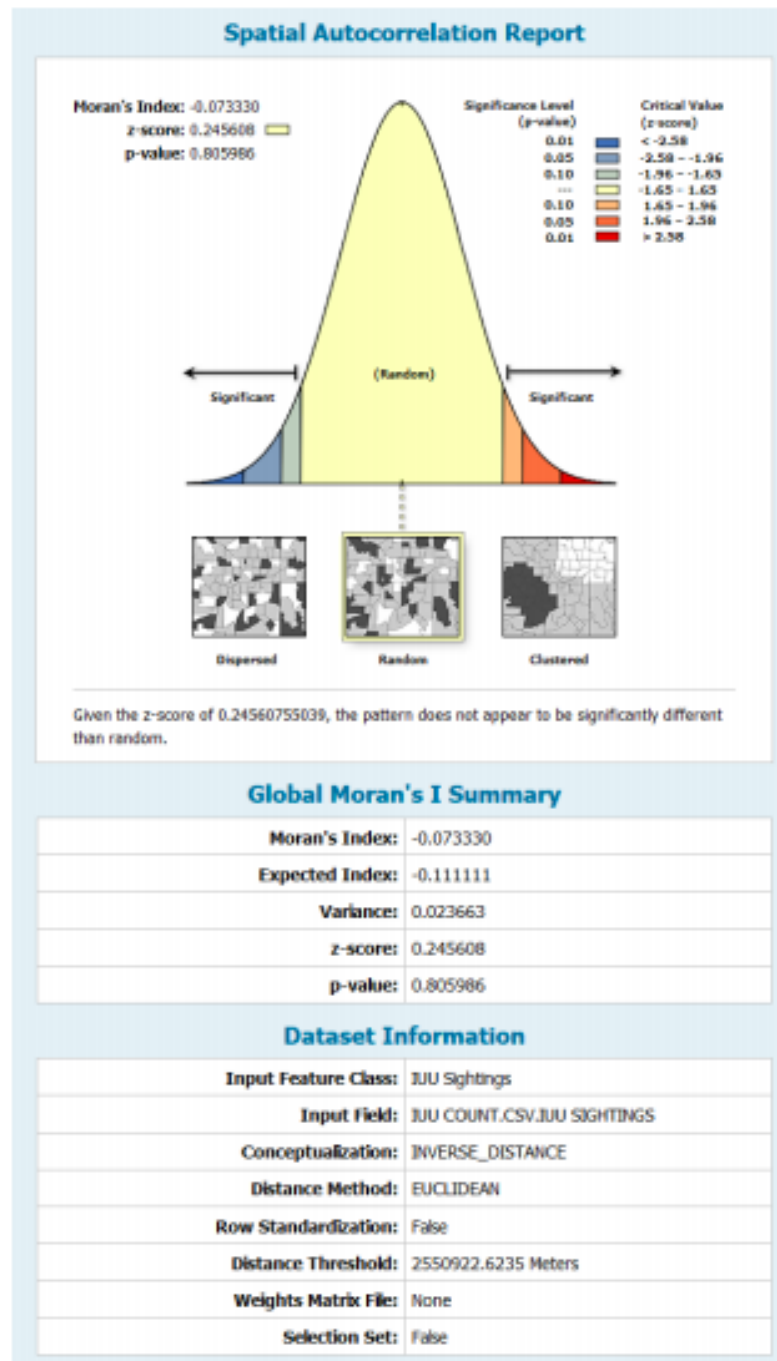


Fig. 5. Moran's Statistic Measuring Spatial Autocorrelation

If we assume that IUU vessels will be operating closer to the to the Antarctic continent, how much overlap will there be between these vessels and native wildlife? The crew of these vessels have no incentive to use sustainable practices, so more interaction will likely lead to higher instances of bycatch and mortality. The widespread distribution of Adelie Penguins in our analysis area makes them ideal to study their distribution in comparison to where IUU vessels are operating.

Overall, what we can see using the Euclidean distance function, a common ArcGIS tool estimating distance from a point or polygon center, is that Adelie Penguins potential feeding and migration range have a total of 63% overlap with the range of IUU vessel sightings since 2002. This number is likely to increase as sea ice retracts and shifts annual average distribution. Adelie Penguins are one of the most widespread but also one of the most susceptible species to bycatch problems due to their size and feeding and migration range in the Southern Ocean²². While vessels operating legally within the CCAMLR convention area typically follow established regulations and fishing practices that limit the amount of bycatch while fishing, IUU vessels do not.

Limitations

Working with limited data naturally restricts the extent of the analysis. As previously noted, the choice to limit our data to confirmed vessel sightings by month is important to avoid speculation and assumptions about IUU vessel activity, but it limits the sample size for analysis. While our OLS coefficients are statistically significant, a larger sample size would carry more predictive power.

RFMOs, as well as the Antarctic Treaty System administration, only allow limited data to become available to the public and do not offer data such as per vessel catch and effort per year, as these are done by private firms operating under the legal permitting system. Additionally, there is imperfect information available concerning

the total biomass and distribution of Antarctic species, including the Adelie Penguin. It is also difficult to gauge causality between the collapse of whole penguin colonies specifically from climate change, illegal fishing, or simply natural competition between species for scarce resources in this harsh ecosystem at the end of the world. Overall, we can only make some broad generalizations about the negative impacts of climate change and IUU fishing and offer clues to regulatory bodies to direct naval task forces or satellites in the region to locate these illegal operators. Given the likelihood of IUU vessels operating in the CCAMLR administered area, this should be a priority for future studies and policy.

Policy Recommendations

Crafting comprehensive policy within CCAMLR and the Antarctic Treaty system will be key to combating the hazards of IUU fishing in regard to Patagonian and Antarctic Toothfish. CCAMLR acts as a consensus organization; all agreements made in its main plenary body must be unanimous. This has proved challenging in creating resolutions and programs that expand the conservational mandate of the Antarctic Treaty System. This is mainly because all the major stakeholder nations that engage in fishing within the region want to maximize the operations of their own flagged and owned commercial fleets.

One key policy recommendation is for all member and observer nations who currently have active commercial fishing activity in the CCAMLR convention area to increase financial contributions to enforcement operations. This financial contribution can be scaled depending on their level of commercial activity or scientific research. This funding can be a significant driver of different CCAMLR programs to halt illegal fishing operations.

These programs and operations vary widely and are often a mix of traditional and modern methods. Traditional methods include naval patrols by Australian, New Zealand, and other stakeholder nations. In the past, they have included participation by non-governmental organizations as well, such as Greenpeace and Sea Shepard. In addition to naval patrols, the use of international law enforcement is also key in establishing a comprehensive policy. These international law enforcement infrastructures, such as INTERPOL, have systems in place to register illegal fishing vessel sightings. Utilizing this registration system is also important to combatting illegal fishing. This registration system is distributed to all coastal nations and has already led to the sinking and capture of many IUU flagged vessels across the globe.

The most comprehensive policy for combatting illegal fishing operations is to utilize the most current technological methods. These methods include using various satellite systems to spot vessels in near real time. Currently, all legal vessels operating in the area are required to register with CCAMLR and register their Automated Information System (AIS) number, which allows them to be tracked as they move within the convention area. The same cannot be said for illegal fishing vessels, which often disable or spoof (illegally tamper with to change their reported position) these devices. There are many open source or commercially available satellite networks that can check for unreported vessels within the CCAMLR region.

One key policy proposal at CCAMLR was the use of various radar systems, specially a methodology know as Synthetic Aperture Radar. This system, known as the Copernicus system operated by the European Space Agency, is specifically suited to the Antarctic region due to its ability to penetrate cloud cover and to use different light refracting wavelengths to differentiate fishing vessels from icebergs. There are currently funding initiatives and pilot projects in place to test these new methodologies.

Using various advanced radar systems in conjunction with regional stakeholder navies is the best policy solution to reduce illegal fishing activity, and by extension preserve the overall biodiversity of the Antarctic ecosystem. Overall, there should be strong impetus by stakeholder nations to fund and cooperate with these programs, actions that will ultimately serve their own economic interests. Overall, there is a need for future research to establish firmer links between direct human activity via fishing, legal or illegal, and changes in the region due to climate change. Increased funding for scientific research and compliance programs will be an important first step.

Conclusion

The natural ecosystem in the Southern Ocean is under threat. Climate change and direct contact with commercial fishing vessels are currently changing how animal populations live and reproduce in the Antarctic region.

According to US NSDIC data on polar sea ice, which dates back to the 19th century, man-made climate change has accelerated polar ice retraction and has made annual distributions more difficult to predict. In this analysis, we have analyzed the spatial distribution of IUU vessels around the Antarctic continent and have found evidence that as sea ice extent decreases, more IUU fishing vessels are drawn into the CCAMLR region. Additionally, there is a troubling correlation between the regions targeted by IUU fishing activities and the feeding grounds of local species the Adelie Penguin, one of the most widespread but also vulnerable species in the region due to their high biological site fidelity of its nesting grounds in the eastern Antarctic latitudes.

Overall, this work is intended to contribute to current projects and policy measures underway at the CCAMLR Secretariat, such as the use of Synthetic Aperture Radar to spot IUU vessels and potentially intercept these vessels. Due to the dynamic nature of illegal fishing activities and the imperfect information available, it is important

to explore all possible avenues of analysis, for potential provision to stakeholder nations such as Australia and New Zealand to the involvement of international law enforcement agencies such as Interpol. Having a large analytical toolbox to combat organized illegal crimes across the globe will be key to mitigating the damage to sensitive ecosystems such as the Antarctic.

Like many other conservation-minded programs, there is need for more research and investment in this area. Given the shifting priorities of CCAMLR member governments, the necessary funding and attention may become increasingly scarce. It will be important that attention is directed towards the areas that can pay the largest dividends with the smallest amount of invested resources. Spatial analysis and remote sensing will be major tools for CCAMLR and other stakeholder nations to work efficiently to understand how the region is changing over time.

References

- Rahmsdorf, S. 2003. The Concept of Global Thermohaline Circulation. *Nature*. 421, 6942 DOI: 10.1145/1188913.1188915
- CCAMLR Secretariat. 2016. Outline of Antarctic Treaty System Boundaries. 393–422. Accessed 12 Dec. 2017, ccamlr.org
- R. Naylor. 2013. Feeding Aquaculture in an Era of Finite Resources. *National Academy of Sciences*, 106, 26. DOI:10.1073/pnas.0905235106
- United Nations Office on Drugs and Crime (UNDOC). 2011. Transnational Organized Crime in the Fishing Industry. New York, NY, 112–117.
- US NSDIC. 2016. Antarctic Sea Ice Distribution Data. Accessed 12/10/2017 at www.nsdic.org
- M. Cimino, H. Lynch, V. Saba, M. Oliver. 2016. Projected asymmetric response of Adelie Penguins to climate change. *Scientific Reports* 6, 28785 DOI:10.1038/srep28785

- C. Brooks. 2016. Science based management in decline in the Southern Ocean. *Science* 354, 6309. DOI:10.1126/Science.aah4119
- D Agnew, J. Pearce, G. Pramod. 2011. Estimating the Worldwide Extent of Illegal Fishing. *Plos One* 4, 4570 DOI: 10.1371/journal.pone.0004570
-

- ¹ Rahmsdorf, Stefan. 2003. The Concept of Global Thermohaline Circulation. *Nature*. 421, 6942 DOI: 10.1145/1188913.1188915
- ² CCAMLR Secretariat. 2016. Outline of Antarctic Treaty System Boundaries. 393–422. Accessed 12 Dec. 2017, ccamlr.org
- ³ Ibid.
- ⁴ Brooks, Cassandra. 2016. Science Based Management in Decline in the Southern Ocean. *Science* 354, 6309. DOI:10.1126/Science.aah4119
- ⁵ Ibid, 37
- ⁶ Ibid.
- ⁷ Naylor, Robert. 2013. Feeding Aquaculture in an Era of Finite Resources. *National Academy of Sciences*, 106, 26. DOI:10.1073/pnas.0905235106
- ⁸ Ibid, 24.
- ⁹ UN FAO. 2016. Regulations and Other Decisions of some Regional Fisheries Managing Organizations Relating to IUU Fishing and Related Activities. *FAO Fisheries Circular* 996, Appendix 2
- ¹⁰ Agnew, David, et al. 2011. Estimating the Worldwide Extent of Illegal Fishing. *Plos One* 4, 4570 DOI: 10.1371/journal.pone.0004570
- ¹¹ United Nations Office on Drugs and Crime (UNDOC). 2011. *Transnational Organized Crime in the Fishing Industry*. New York, NY, 112–117.
- ¹² US NSDIC. 2016. Antarctic Sea Ice Distribution Data. Accessed 12/10/2017 at www.nsdic.gov
- ¹³ Cimino, Megan et al. 2016. Projected Asymmetric Response of Adelie Penguins to Climate Change. *Scientific Reports* 6, 28785 DOI:10.1038/srep28785
- ¹⁴ Ibid, 132
- ¹⁵ Ibid, 134
- ¹⁶ Brooks, 2016
- ¹⁷ Agnew, 2011
- ¹⁸ Ibid, 478
- ¹⁹ Ibid, 485
- ²⁰ Cimino et al., 2016

²¹ Ballerini, Treveccio. 2009. Nonlinear Effects of Winter Sea Ice of the Survival Probabilities of Adelie Penguins. *Oecologia* 161, 2, pp. 253-265 DOI: 10.1007/s00442-009-1387-9

²² Cimino et al., 2016

Women's Relations to the City: An appraisal of gentrification in New York through a gendered lens

Shahreen Shehwar

Global Development Studies, Queen's University, Kingston, Ontario, Canada

17ss22@queensu.ca

Women's Relations to the City: An appraisal of gentrification in New York through a gendered lens

Since the term 'gentrification' was first coined, by British sociologist Ruth Glass in 1964, gentrification has been hotly debated within literature. This debate has been largely concerned with displaced populations because of class struggle. Nonetheless, a critical gap in literature has been the is the lack of an examination of the intersection of gentrification with the feminization of poverty. This paper seeks to fill this gap by critically appraising gentrification through a gendered lens in New York, one of the most expensive states to live in the United States. Through qualitative analysis of policy and quantitative analysis of measures of income inequality and the gender wage gap. It concludes with recommendations for more inclusive ways to foster urban development both at the local and policy level.

Keywords: gentrification; displacement; feminization of poverty; gender; inequality

Introduction

British sociologist Ruth Glass first coined the term 'gentrification' in 1964 after witnessing an enormous increase in London's wealth and the city's new "gentry" displacing working-class residents, who fled to cheaper housing on the city's outskirts. As Glass saw it "the city's liveability, diversity and dynamism were under threat." "One by one," she wrote, "many of the working-class quarters of London have been invaded by the middle classes ... Once this process of 'gentrification' starts in a district, it goes on rapidly until all or most of the original working-class occupiers are displaced, and the whole social character of the district has changed."¹ Since entering the mainstream lexicon, the word "gentrification" is applied broadly and interchangeably to describe a range of neighbourhood changes, including rising incomes, changing racial

composition, shifting commercial activity, and the displacement of original residents.

However, the literature on gentrification nowadays is the site of a contentious debate with a lot of new scholarship seeing gentrification as an “urban renaissance” or a catch-all solution to urban poverty. Scholars and policymakers alike have contributed to this shift in discourse. We are increasingly asking why anyone would want to live in poor housing conditions rather than analysing the socioeconomic factors that have resulted in this “survival of the fittest.” As a result of gentrification, often embedded at the policy level, increasing numbers of people, particularly poor marginalized women, are becoming displaced by the rising costs to live and occupy space in urban neighbourhoods.

A critical gap in the gentrification literature is the lack of an examination of the intersection of gentrification with the feminization of poverty. Liz Bondi identified two angles to look at women’s presence in gentrification. First, women are seen as members of groups prominently fuelling demand for gentrified housing. Second, women are also prominent among those vulnerable to displacement because of gentrification.² This paper takes up the second angle and examines gentrification in the US considering the growing income inequality and gender wage gap. It argues that the growing income inequality fuels a thirst for gentrification and women are disproportionately affected as they make up the larger share of the urban poor due to the feminization of poverty. A special focus is placed on the city of New York and its process of gentrification to examine these trends. Consequently, this paper shows how gentrified neighbourhoods and the poor conditions of many lower-income neighbourhoods are both the result of active policy decisions from the 1960s. It concludes with recommendations for more inclusive ways to foster urban development both at the local and policy level.

Gentrification and its ties to the feminization of poverty

Gentrification is essentially the conversion of blue collar, working-class neighbourhoods into something more bourgeois to attract the wealthier elite who will pay more to occupy the same space. It is a pervasive transformation that often involves the total restructuring of urban spaces. Thus, gentrification is not just the redevelopment of housing but can consist of the introduction of new, pricier cafes or upscaling neighbourhoods through more investments in art and other cultural capital. Where gentrification occurs, socioeconomic classes become more polarized and lower-income populations are put in more precarious and vulnerable positions in maintaining the costs of daily life as new inequalities and class oppositions emerge. One such trend is the “growth in precariously employed workers in sectors that are traditionally considered middle-class” as a result of professionalization, “where many traditional working-class occupations become less important or even obsolete.”³ These sorts of trends cause some scholars to see gentrification as a site of class warfare where one socioeconomic class envelops and then replaces another.

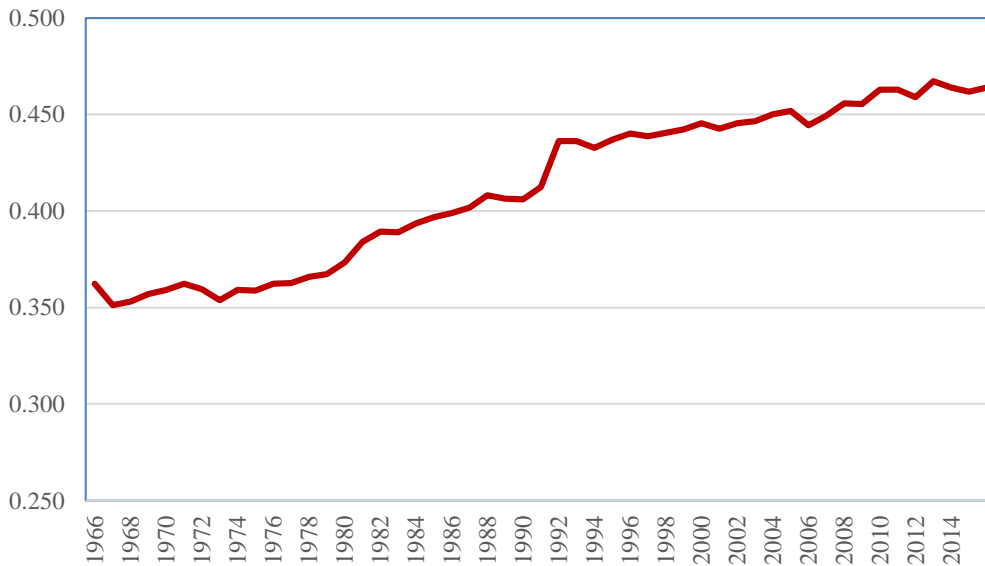
Numerous economic and political-economic processes and structures cause gentrification. When viewed as a top-down process, gentrifiers may come into a working-class neighbourhood and appreciate it as an urban space but see it as cheap or dilapidated and thus become motivated to capitalise on this “up-and-coming” area. In fact, a lot of early literature on gentrification echoed vaguely neo-colonial undertones, looking into “descriptive case studies [that] focused on the middle class and its ‘pioneer’ role in the rehabilitation of the inner city.”⁴ Yet, there are politics of investment at play even before gentrifiers come into these neighbourhoods. When policymakers strategize how much money to invest in housing and urban planning, there are politics of investment at play. Municipal disinvestment can cause lower-

income neighbourhoods to be disinvested spaces, while gentrification ends up being erroneously seen as a necessary way to fill investment gaps through adding more economic diversity.

Gentrification in the US and its disproportionate adverse impacts on women can be linked to the growing income inequality, compounded by the persistent gender wage gap and the resulting feminization of poverty. From the 1960s-1990s and onwards, income inequality intensified within the United States. Especially since the 1970s, income has grown significantly more for wealthier populations and has shrunk for the poorest populations as a result of policies that favoured the rich and harm the poor. Alan B. Krueger, Chairman of the Council of Economic Advisers of former U.S. President Obama, rightly observed, “The rise in inequality in the United States over the last three decades has reached the point that inequality in incomes is causing an unhealthy division in opportunities, and is a threat to our economic growth.”⁵ Krueger’s statements ring very true; as income inequality continues to rise and the richest continue to thrive off the poorest, it remains to be seen how growth will continue when much of the population find it increasingly difficult to own property or maintain savings. Chart 1 presents the Gini coefficient of income inequality in US between 1966 and 2016.⁶ As one can see here, especially from 1974 and onwards, the Gini coefficient steadily rose from 0.359 in 1974 to 0.464 in 2014. This was during the same period as increased gentrification occurred within the United States and the same time that the US started

following more neoliberal policies, which can be traced to the second half of the Carter Administration of the late 1970s.

Chart 1: Gini Coefficient of US income inequality, 1966-2016



Source: U.S. Bureau of the Census, Current Population Survey, 1968 to 2017 Annual Social and Economic Supplements.

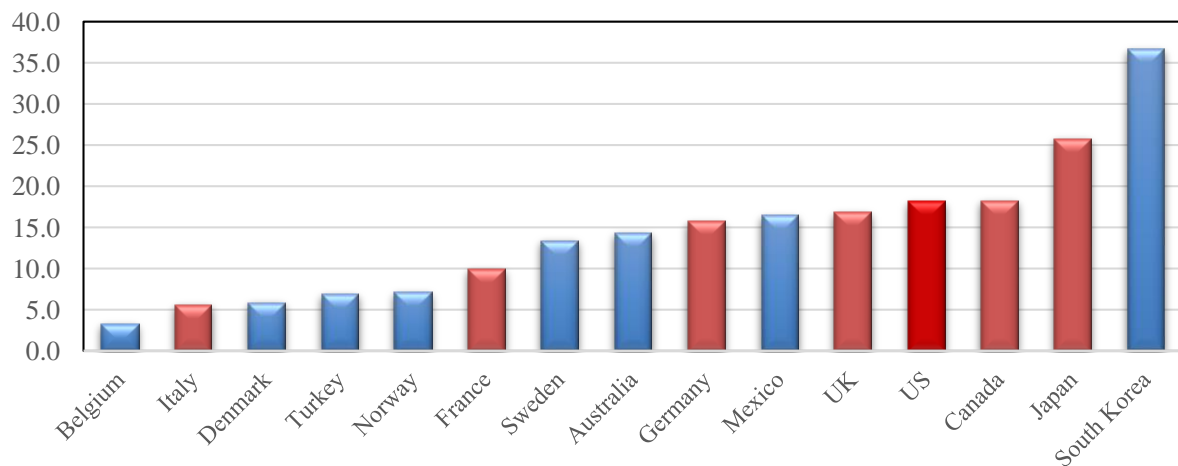
From the 1970s and onwards, the United States increasingly implemented a policy regime that transformed Keynesian welfare states into neoliberal capitalist states. This involved rolling back the welfare state and the power of unions, which were “institutions that encouraged rent-seeking behaviours and deterrents to entrepreneurial activity.”⁷ The overall goals of this regime were to turn state capacities against unions and social spending and towards boosting private wealth. This restructuring resulted in exacerbations of gender inequity.

The growing income inequality fuels a thirst for gentrification as the higher income segment of the society – the beneficiaries of the growing income inequality – need better upscale urban homes and neighborhoods. Women are particularly affected by gentrification as they make up a disproportionately larger share of the urban poor due to the feminization of poverty. The feminization of poverty is essentially a trend of

the increasing numbers of women in poverty resulting from a number of social and economic factors, which includes “dramatic changes in family structure, economic transformations and shifting government policies, most notably welfare reform.⁸ The feminization of poverty is not only a consequence of lack of income but is also the result of the deprivation of opportunities and gender biases present in both society and the labour market. These biases create ‘Gender Wage Gap’ and all the socioeconomic consequences of inequity and gentrification with a disproportionately higher impact on women.⁹ Chart 2 below presents the gender wage gap in a selected group of countries, including the ‘Group of Seven Highly Industrialised Countries’ (G7), in 2016.

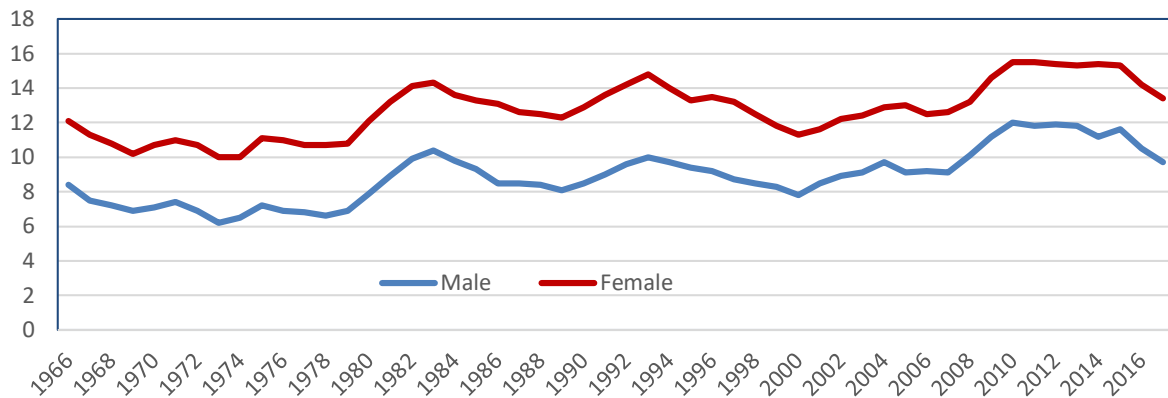
The United States stands at the higher end of the distribution - the third-highest in the G7 countries.

Chart 2: Gender Wage Gap in 2016 (or latest available) in Selected Countries



Source: Compilation with data from OECD (2017), Gender wage gap (indicator). doi: 10.1787/7cee77aa-en

Chart 3: Percentage of Population Below Poverty Line (Age group: 18-64)



Source: U.S. Bureau of the Census, Current Population Survey, 1968 to 2017 Annual Social and Economic Supplements.

Chart 3 plots the last five decades' time series of US populations in the age group 18-64 below the poverty line. It is evident that the male-female poverty gap in US (Chart 3) has been persistent, and, if anything, the gap somewhat widened since the early 80s. In 2016, 13.4 percent women lived below the poverty line, markedly higher than the 9.7 percent men below the poverty line. This implies that 58 percent of the poor in the United States in 2016 were women.

The gender-wage gap and the resulting higher percentage of women below the poverty line ensures that the working-class and low-income women are the group who are most vulnerable to gentrification in that they live in the areas that are being targeted by this process. Having lower wages means that these working-class women will be unable to resist or withstand the process of gentrification and remain in their homes and neighbourhoods. This is because lower wages mean that an increase in the amount on rent or mortgage costs is extremely difficult for women who are already dealing with wage deficits.

Women are affected more by urban poverty because the lack of infrastructure and services in low-income neighbourhoods increases women's burden of reproductive labour. Women thus end up spending more time on tasks associated with reproduction than production, with more time and effort going into domestic and care activities. These burdens of caregiving can make women especially susceptible to gentrification. It is also evident that women share a complicated relationship with gentrification. A lot of mainstream explanations of gentrification and gender point to how the increased participation of women, particularly married women, in the labour force have stimulated the rise of gentrification through swelling the ranks of "yuppie" populations.¹⁰ These studies mostly speak of middle-class women in well-paying jobs. However, this explanation neglects that women are also prominent in the populations most likely to be displaced by gentrification. A *NY Times* exposé on gentrification in Brooklyn demonstrated this when it interviewed former residents of the Crown Heights area. For Ms. Coward, an African-American woman maintaining a female-headed household, having young daughters further tightened her housing options after she was displaced from her old apartment:

Ms. Coward, 35, a receptionist at a Manhattan hospital, wanted to stay. She tried looking for apartments in Crown Heights, Ms. Coward said, but she struck out even when she pushed her budget to \$2000 a month. With young daughters, she said, she did not feel safe moving to Brownsville or East New York. So, she and her children remained with her mother, Ms. Coward sleeping on the living room couch and her children sharing two bunk beds.¹¹

As Ms. Coward's situation shows, the feminization of poverty is often the result of deprivation from opportunities due to women's higher burdens associated with care labour. It is especially important to consider that, for women of colour, these deprivations can be compounded by institutional-level racism and implicit

discriminatory practices that end up exacerbating socioeconomic inequity. Due to women being some of the most affected by gentrification, it is pertinent to weigh in on gentrification from a gendered lens to identify gendered socioeconomic inequities in any given context so that the solutions derived can improve conditions for women.

Policy framework, municipal disinvestment and gender inequities

The current policy framework in the United States is an environment that has been established over the years and has doubly been a barrier to the advancement of women. As stated, gentrification essentially challenges the right to space for lower-income populations while bettering the physical conditions of urban spaces. This causes considerable controversy. As articulated by geographer Elvin Wyly:

On the one hand, the process usually replaces things that many agree are bad: it seems to rescue distressed, run-down old neighbourhoods from poverty, decay, abandonment, crime, and many other bad things. It brings in a lot of new investment, and it often leads city governments to provide better public services. Yet these new services and new investments are often not enjoyed by the original lower-income residents, who are displaced by rising rents and house prices.¹²

As shown by Wyly's quote, the main, contributing factor to gentrification processes is that low-income neighbourhoods are traditionally disinvested places. So, when higher-income and higher-status individuals invest and capitalise on low-income neighbourhoods, the influx of new money causes property values to abruptly inflate, causing lower-income individuals to be displaced, and the cultural geography of these neighbourhoods to be visibly altered. Thus, the policy environment of municipal disinvestment in the United States is inexorably tied to both gentrification and municipal disinvestment.

According to Daniel Bell, as found in Wyly and Drionvz' publication, gentrification was triggered by the broad social changes associated with "post-industrial society" that included "the shift from manufacturing to services, the rise of new science- and expertise- based industries and activities, and the increasing influence of artistic avantgardes in shaping the priorities of consumer culture." The most prominent features of gentrification could perhaps be traced to the 1960s. Although massive suburbanization was taking place, at the same time, government-driven urban renewal programs were producing widespread signs of "spontaneous neighbourhood revitalization" in small pockets of the inner city. Due to the oil embargo of 1973-1994, gasoline prices spiked, causing commuting costs to greatly increase for suburbanites despite the effects of recession, inflation, and high interest rates "playing havoc with housing market activity." This drew more of these individuals to the city. As more urbanization took place, displaced populations resulted in the suburbanization of poverty.¹³

As the neoliberal state became more entrenched, increased privatisation occurred, which resulted in more leeway for private investors in the housing market through policy shifts, such as the gradual reduction of rent controls and tenant protections. From the 1990s onward, despite enduring trends of strong economic growth, the proportion of low-income women without health coverage rose between 1994 and 1998, demonstrating that women faced the brunt of the economic inequity that had been perpetuated by policies which constantly favoured rich gentrifiers to the harm of low-income populations.

The women who are especially affected by policies of disinvestment are the increasing numbers of women working in precarious, casual, and low-security employment. These consist especially of women from "pink-collar" jobs who are often

a pay check away from homelessness. These jobs are called “pink-collar” because they are traditionally seen as women’s work and devalued in the American labour market. One of the most significant changes in the labour markets of developed countries, like the United States, has been the generalization of flexible labour markets. As the labour market has become more segmented, “new types of flexible and non-standard work such as temporary employment, contingent and other non-standard work arrangements have become more prevalent.”¹⁴ Due to the current economy of care labour, “pink-collar” jobs have endured, even when men’s “blue-collar” jobs, like machine operator or vehicle repair jobs, have been threatened. However, this resilience of “pink-collar” jobs has only further solidified the gendered divisions in the labour force.

Neoliberal policies cannot entirely be blamed for a longstanding legacy of gender inequity in the United States but what I have strived to show is that certain neoliberal policies exacerbate poverty for women. Through a policy framework that is structured by capitalism’s relentless pursuit of profit, the United States is creating various intersections of oppression that disadvantage women and other vulnerable groups.

The State of Gentrification in the City of New York

The City of New York (NYC), one of the most expensive cities to live in, with the median rent for a two-bedroom apartment coming to \$1,638 in the metro area, is home to some of the most rapidly gentrifying areas in the United States.¹⁵ The city serves as a great illustration of the effects of gentrification. Gentrification in New York could be traced to the late 1970s, when the City decided to rehabilitate “blighted areas” by “seizing more than 100,000 distressed housing units from tax delinquent owners and investing its own resources to save them.”¹⁶ In many ways, the revitalization of urban

spaces has yielded strong economic growth, channelling business capacities in New York and gearing it to be a strong megacity.

A recent report produced by the Furman Centre of New York University presents a treasure of information on the nature and dynamics of gentrification in New York city over 1990-2014. The study analysed 55 NYC neighbourhoods, of which 15 were classified as ‘gentrifying’, 7 as ‘non-gentrifying’ and the rest as ‘high-income.’ It considered gentrifying neighbourhoods as those that were relatively low-income in the 1990s but have seen a dramatic increase in median rent in the last 20 years. Non-gentrifying neighbourhoods were those neighbourhoods that were low-income in the 1990s and haven't seen a dramatic change in the last 20 years, and high-income neighbourhoods are those that were already in the top 60 percent of the income bracket back in the 1990s.

The Furman Centre study presents direct evidence supporting some key gentrification hypotheses. Table 1 below, extracted from the study, presents the mean household rent increase since 1990. The 15 gentrifying neighbourhoods saw average rent increase ranging between 18.1 percent and 78.7 percent between 1990 and 2010-2014, with a mean increase of 34.3 percent compared with the 22.1 percent increase citywide.

Table 1: Average Percent Change in Mean Household Rent by Neighbourhood Type

	1990-2000	2000 to 2010-14	1990 to 2010-14
City-wide	1.9	18.9	22.1
Gentrifying	3.0	30.4	34.3
Non-Gentrifying	-2.5	16.1	13.2
Higher-Income	1.8	15.8	17.8

Source: NYU Furman Centre (2015), *Focus on Gentrification*

The analysis of data presented in the Furman Centre report (Table 4) gives a startling picture of income growth in the NYC neighbourhoods. Between 1990 and 2010-14, the gentrifying neighbourhoods saw inflation-adjusted average income growth of 13.9 percent. Over the same period, the non-gentrifying and higher-income neighbourhoods lost their inflation-adjusted average income by 8.4 percent and 0.5 percent, respectively. This income growth statistics is consistent with the business growth statistics presented in a recent report of the New York City Comptroller, which showed that between 2000 and 2015 the city's 15 gentrifying neighbourhoods experienced a 45 percent jump in businesses. In fact, of the ten neighbourhoods experiencing the fastest business growth during the period, all but one was a gentrifying neighbourhood.¹⁷

Many other findings in the Furman Centre study are consistent with the key gentrification hypotheses. The study found that since 2000 young adults have made up a growing share of the population in gentrifying neighbourhoods. Between 2010 and 2014, 60.8 percent of the recent mover adults in gentrifying neighbourhoods were young adults between the ages of 20 and 34, compared to 47.9 percent in non-gentrifying neighbourhoods and 54.7 percent in higher-income neighbourhoods. The gentrifying neighbourhoods also experienced an increasing share of non-family households (that, is people living alone or with roommates). Between 1990 and 2014, the share of such households grew by 8.2 percentage points in gentrifying neighbourhoods, compared with 3.2 and 0.1 percentage point growths, respectively, in non-gentrifying and higher-income neighbourhoods.

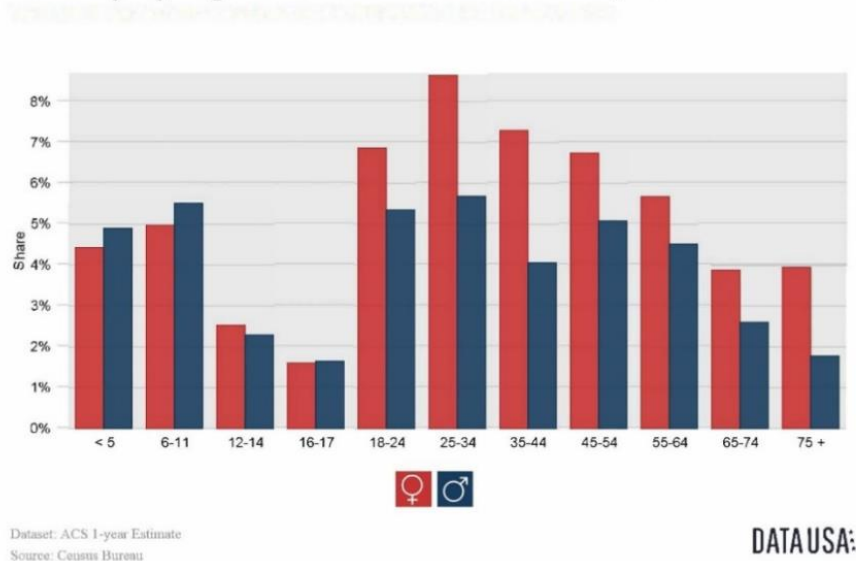
The evidence presented in the Furman Centre study is generally consistent with the key hypotheses of gentrification. The large growth of income and businesses,

increasing shares of young adults and non-family households all point to the displacement of poor, women with children, and other vulnerable people from gentrified neighbourhoods. The study did not, provide any finding on the displacement of long-time residents of gentrifying neighbourhoods. However, it found that although many poor people still live in the gentrifying neighbourhoods, the share of poor people notably dropped. Between 1990 and 2010-14, the share of persons below poverty line dropped by 3.2 percentage points in the gentrifying neighbourhoods, while the shares notably rose in non-gentrifying and higher-income households.

A critical deficiency of the Furman Centre study is to ignore the gender dimension of gentrification. The data and trends presented in the Furman Centre study can be usefully analysed along with the gender and age-disaggregated data compiled by Data USA to deduce some solid inferences on the adverse effects of NYC gentrification on women.¹⁸

According to the Census Bureau data compiled by Data USA, income inequality in New York is higher than the national average. In 2015, New York's Gini coefficient

Poverty by Age and Gender in New York, NY



of wage distribution was 0.503, markedly higher than the national average of 0.486. NYC also has a higher share of poverty compared with the national average. In 2015, 20 percent of the city's population lived below the poverty line, compared with the 14.7 percent national average. The chart below presents age and gender disaggregated 2015 poverty data for NYC extracted from Data USA.

The female population has a markedly higher incidence of poverty, accounting for 56.5% of the NYC population that live below the national poverty line. The feminization of poverty is very prominent and persistent after the age of 18 as the female population continues to have a higher proportion of the poverty rate, a trend that continues for the rest of their lives. This trend reflects the pronounced gender wage disparity in USA. In the 18-64 age category, female population represented the largest demographic group accounting for 35.2% of the city's female population living below the poverty line, compared with the 24.7% for the male demographic group in the same age category. In almost every common type of employment, male employees earn noticeably higher than their female counterparts, contributing to an overall trend of men making 129 times more than women. Thus, despite hosting some of the most revitalised urban spaces and experience high levels of business growth, New York has an increasingly hostile financial environment for women who must work harder and longer to afford the same necessities of life.

While there is no direct quantitative evidence in the Furman Centre study that women bore the brunt of the adverse gentrification impacts, the data from Data USA still gives strong grounds to conclude it is the women in poverty and women with children, in the age group 18-64, who are most adversely affected by gentrification and ultimately showing that the negative effects of gentrification are gendered.

How to foster inclusive urban development

A 2017 study done by the Office of the New York City Comptroller went to a great length to highlight the job growths in the city's gentrifying neighbourhoods.¹⁹ The report also shed lights on the racial distribution of the beneficiaries of the city's economic growth. The data-rich 2016 Furman Centre study of gentrification in NYC also covered such racial impacts. Ironically women, who form the largest share of the population below the poverty line, are absent from both studies. This further demonstrates how there are "missing women" in datasets and policy frameworks, which restricts the implementation of policies that promote inclusive urban development.

The 2016 US presidential candidate Bernie Sanders was the mayor of Burlington, Vermont, in the 1980s. As the mayor, he rejected a plan for converting a run-down complex of 336 townhouse-style units near Lake Champlain waterfront into high-priced condos, which would have driven out its low-income tenants. Sanders' administration created a non-profit entity that bought the complex from its private owners to protect low-income tenants from evictions.²⁰ In addition, he supported the local Onion River Collaborative market (now City Market), instead of accepting a proposal for a large, unpopular supermarket in the centre of town. Bernie Sanders efforts in the 1980s and the absence of the gender dimension in the above-mentioned two studies are cited here to highlight that, while policy makers must foster more inclusive urban development, there is also a need for female-led social movements to draw policy makers attention to the issues of women surrounding poverty and gentrification.

History shows that "despite a rich and proud heritage of female organizers and movement leaders, the field of community organization has been a male-dominated preserve... much of the focus within the dominant practice methods has been non-

supportive or antithetical to feminism (Stall and Stoecker 1998).” This has been the case in New York, as evidenced in the New York Tenants Movement. Female activists in this movement were restricted to grassroots organizing while the men did the higher-level negotiating (ibid). This shows that the gendered division of labour is hampering women’s ability to organize collectively and is a testament that women need to carve their own spaces within the spaces of resistance as they are best suited to address the issues that affect them. Considering the racial diversity in New York, it is necessary to cross traditional identity-based boundaries, especially considering that the feminization of poverty intersects with race and class identities. For example, in many communities of colour, some identities are considered both racially and sexually deviant, like the “single mother.”²¹ These identities are then deployed to stigmatise poverty, preventing proper solutions from being created. When the internal diversity and identity politics within a community of colour is negotiated properly, it can create a tighter-knit community that, aligned on several fronts, can mobilize more effectively to challenge the gender inequities that are exacerbated under gentrifying environments.

Furthermore, to promote inclusive urban development, gentrification cannot, in good faith, continue with the intensity it has while the government does not strengthen the welfare state, especially things like rent controls and tenant protections. A stronger welfare state is needed to protect a large chunk of the population from poverty. The gendered division of labour the wage gap is tied to wage growth. In New York, one of the most precarious demographics are women working “pink-collar” jobs. Obviously, trends such as the gendered division of labour and the wage gap cannot be tackled overnight, but stronger community-based organizations and civic engagement can start the conversation.

Concluding remarks

Liz Bondi stated that “people are never the passive bearers of class interests, but that class identities are subject to constant negotiation and renegotiation through social practices that express the mediation between structure and agency.”²² Unfortunately, gentrification is ultimately based on a legacy of oppression and discrimination, which has left women especially vulnerable due to systematic displacement. Due to the feminization of poverty which itself is tied to trends such as the gender wage gap and the gendered division of labour, some women continue to face the brunt of the negative consequences of gentrification. In New York, where gentrification has perhaps been the most intense, this is identified with trends of gender inequity and their correlation with the high, disproportionate number of women in poverty. Unfortunately, there are a lot of “missing women” in the quantitative data available on gentrification, which makes it difficult to analyse the gendered effects of gentrification.

From the outside, gentrification has the guise of revitalisation, but it can lead to devastating effects for poor urban women, as evidenced by my data analysis from the Furman Centre study and from the data presented by Data USA. The erosion of the welfare state and other characteristics of the neoliberal state compound the consequences of gentrification. As we see in the actions Bernie Sanders took to preserve public housing in Vermont, policy can improve when the right people become policymakers. Hope lies in local, civic resistance, especially if female-led community-based organizations can emerge, making their voice heard and mobilizing resources to obtain alternate channels of investment. It becomes apparent, time and time again, that the local, affected population is the best vehicle to drive change, as they know their concerns best. If women collectively organize to make their voice heard, we may have better policymakers that bring about policies that promote inclusive housing

development, leading to improved quality of life for, not only women, but affected populations at large.

References

- Betancur, John J. "The Politics of Gentrification: The case of West Town in Chicago." *Urban Affairs Review*, 2002: 780-814.
- Bondi, Liz. "Gender Divisions and Gentrification: A critique." *Transactions of the Institute of British Geographers*, 1991: 190-198.
- Boris, Eileen, and Marcos Vargas. *Challenging the Feminization of Poverty: Women in Poverty in the Central Coast Region of Ventura and Santa Barbara Counties*. Ventura, CA: Central Coast Alliance United for a Sustainable Economy (CAUSE), 2002.
- Data USA. *New York, NY*. 2015. <https://datausa.io/profile/geo/new-york-ny/#economy>.
- Glen, Alicia. *Housing New York: Five-year borough, ten-year plan*. New York : City of New York, 2014.
- Hochstenbach, Cody, and Sako Musterd. "Gentrification and the Suburbanization of Poverty: Changing urban geographies through boom and bust periods." *Urban Geography*, 2017: 1-28.
- Krueger, Alan B. "The Rise and Consequences of Inequality in the United States ." Washington: Center for American Progress, 2012.
- Menendez, Maria, Joan Benach, Carles Muntaner, Marcelo Amable, and Patricia O'Campo. "Is precarious employment more damaging to women's health than men's?" *Social Science & Medicien*, 2007: 776-781.
- NYU Furman Centre. *State of New York City's Housing and Neighborhoods in 2015*. New York: NYU Furman Center, 2015.
- Schmidt, Ingo. "There were Alternatives: Lessons from efforts to advance beyond Keynesian and Neoliberal economic policies in the 1970s." *Journal of Labor and Society*, 2011: 473-498.
- Seelye, Katharine Q. . *As Mayor, Bernie Sanders was More Pragmatist than Socialist*. 25 November 2015. <https://www.nytimes.com/2015/11/26/us/politics/as-mayor-bernie-sanders-was-more-pragmatic-than->

socialist.html?_r=0&mtrref=undefined&gwh=30A94D6D7BABD9DEAA128B233FE90E85&gwt=pay.

Stall, Susan, and Randy Stoecker. "Community Organizing or Organizing Community: Gender and the crafts of empowerment." *Gender and Society*, 1998: 729-756.

Wallace, Nick. *SmartAsset*. 10 November 2017. <https://smartasset.com/mortgage/what-is-the-cost-of-living-in-new-york-city>.

Wyly, Elvin K, and Tim Drinovz. *Gentrification*. Vancouver: University of British Columbia, 2002.

Yee, Vivian. *The New York Times*. 27 November 2015. (accessed November 28, 2017).

¹ Ruth Glass, *London: Aspects of Change*, (London, Centre for Urban Studies at University College London, 1964)

² Liz Bondi, "Gender Divisions and Gentrification: A Critique." *Transactions of the Institute of British Geographers* 16 (1991): 190-198

³ Cody Hochstenbach and Sako Musterd, "Gentrification and the Suburbanization of Poverty: Changing urban geographies through boom and bust periods." *Urban Geography* 39 (2017): 1-28

⁴ John J. Betancur, "The Politics of Gentrification: The Case of West Town in Chicago." *Urban Affairs Review* 37(2002): 780-814

⁵ Alan B. Krueger, *The Rise and Consequences of Inequality in the United States*. <https://www.americanprogress.org/events/2012/01/12/17181/the-rise-and-consequences-of-inequality/> (accessed November 21, 2018)

⁶ The Gini coefficient is a measure of statistical dispersion intended to represent the equality of a distribution and is the most commonly used measure of inequality. Values range from 0 for perfect equality to 1 for perfect inequality.

⁷ Ingo Schmidt, "There were Alternatives: Lessons from efforts to advance beyond Keynesian and Neoliberal economic policies in the 1970s" *Journal of Labor and Society* 14(2011): 473-498

⁸ Eileen Boris and Marcos Vargas. "Challenging the Feminization of Poverty: Women in Poverty in the Central Coast Region of Ventura and Santa Barbara Countries." Ventura: CAUSE (2002). Accessed November 21, 2018.

- ⁹ The gender wage gap is defined as the difference between median earnings of men and women relative to median earnings of men.
- ¹⁰ Liz Bondi, "Gender Divisions and Gentrification: A Critique." *Transactions of the Institute of British Geographers* 16 (1991): 190-198
- ¹¹ Vivian Yee. "Gentrification in a Brooklyn Neighbourhood Forces Residents to Move On," *New York Times*, November 27, 2015. (accessed November 21, 2018).
- ¹² Elvin K. Wyly and Tim Drionvz. *Gentrification*. Vancouver : University of British Columbia, 2002).
- ¹³ Cody Hochstenbach and Sako Musterd, "Gentrification and the Suburbanization of Poverty: Changing urban geographies through boom and bust periods." *Urban Geography* 39 (2017): 1-28
- ¹⁴ Maria Menendez et al. « Is precarious employment more damaging to women's health than men's?" *Social Science & Medicine* 64(2007): 776-781
- ¹⁵ Nick Wallace. "What Is the True Cost of Living in New York City?" <https://smartasset.com/mortgage/what-is-the-cost-of-living-in-new-york-city> (accessed November 22, 2018).
- ¹⁶ Alicia Glen. "Housing New York: Five-year borough, ten-year plan." (2014)
- ¹⁷ Scott M Stringer. *The New Geography of Jobs: A Blueprint for Strengthening NYC Neighborhoods*, (April 2017). <https://comptroller.nyc.gov/reports/the-new-geography-of-jobs-a-blueprint-for-strengthening-nyc-neighborhoods/> (accessed November 22, 2018).
- ¹⁸ Data USA. <https://datausa.io/profile/geo/new-york-ny/#economy> (accessed November 22, 2018).
- ¹⁹ Stringer. "The New Geography of Jobs: A Blueprint for Strengthening NYC Neighborhoods."
- ²⁰ Katharine Q. Seelye. "As Mayor, Bernie Sanders was more pragmatist than socialist." *The New York Times*. November 25, 2015.
- ²¹ Some elaboration on this example can be found in Ivy Kennelly's article, *"That Single-Mother Element": How White Employers Typify Black Women*, (Sage Publications, 1999)
- ²² Liz Bondi, "Gender Divisions and Gentrification: A Critique." *Transactions of the Institute of British Geographers* 16 (1991): 190-198