The election of Donald Trump cast a pall over the GPS Class of 2018. It informed nearly everything we did, our classroom discussions, our projects and essays. In our nearly two years in graduate school, current events across the United States and across the world have been marked by a descent back into authoritarianism, repression, and a curtailing of fundamental freedoms and human rights. There has been progress made towards solving the major global issues of our day, such as extreme poverty and inequality, war and conflict, as well as climate change and environmental degradation. But often that progress feels piecemeal and incomplete compared to the monumental scale of these issues.

Introductory Letter from the Editorial Board

by Frederick P. 'Spike' Hemans

Against that backdrop, students in public policy, international affairs, and related areas enter these fields of study to seek solutions to many issues, both well-known and obscure, across the globe. Education and research can be a beacon of light in an often dark and uncertain world. To our readers, we hope the works contained in this journal, which have been penned by graduate students and young professionals, leave you with a sense of optimism. For every problem great and small there are smart, passionate, and dedicated people committed to new approaches and lasting solutions.

The 2018 editorial board is extremely proud to launch the 20th edition of the Journal of International Policy Solutions. Since its founding in 2005, the journal has had the mission of providing a platform for graduate students in public policy, international affairs, and closely related fields. In this edition, and all those that have come before it, you will find works that offer thoughtful and well-researched analysis combined with serious and practical policy recommendations.

It would not have been possible for the journal to have made it this far without the steadfast support from countless authors, editors, administrators, and professors who have come and gone in prior years at the UC San Diego School of Global Policy and Strategy. None of these 20 editions would have been published without their countless hours of hard work and dedication. For this edition, the editorial board would like to thank JIPS co-founder Solomon Messing, our faculty advisor Dr. Elizabeth Lyons, Academic Advisor Jerry Pang, and Director of Academic Degree Programs Dr. Nancy Gilson. We would like to thank the entire GPS administration for supporting our mission and helping us overcome the many challenges we have encountered in our publication process over the past academic year. Lastly, but perhaps most importantly, we would like to thank the JIPS past, current, and future editorial board members, contributing editors, and authors who have joined us in building and maintaining this journal and helping us build a culture of open dialogue, academic excellence, and free exchange of ideas.

In preparation of our 20th issue, we went back to the roots and spoke with Solomon Messing, MPIA '2005, the founder and first Editor In Chief of our journal.

Solomon Messing graduated from IR/PS in 2005 and subsequently obtained his Ph.D in Communication at Stanford University. He has worked as a research scientist at Facebook and Data Labs director at Pew Research Center. Recently he returned to work at Facebook, assuming the role of senior research scientist.

JIPS: What was the story behind JIPS, how did it get started?

S.M.: Maryam Motamedi and I started the journal in 2004. In keeping with what we saw as the spirit of IR/PS, we wanted to create a solution-focused journal, to encourage the great work from the academy to speak as clearly as possible to real-world problems.

We founded the journal after serving as contributing editors for the Journal of Public and International Affairs at Princeton's Woodrow Wilson School. It was a great experience and we wanted to bring that kind of experience to more IR/PS students. We also saw a lot of good work that seemed to be inspired by the journal, and we wanted to be able to showcase more of that kind of work.

JIPS at 20 editions: An Interview with Solomon Messing, Co-Founder of the Journal

JIPS: What were the challenges?

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S.M.: Well, to start a new journal, you really want to have good content. And that can be tough to do without much of a reputation. That meant we had to put a lot of work in to get the word out and attract the kind of quality submissions that we needed to pull the first issue together. We also had to come up with a review process and recruit reviewers, which again, with no prior issues, was a challenge.

JIPS: Did you have a chance to follow the journal through the years? Did it develop the way you expected it to develop?

S.M: Yes, it's great what the current and past board members have done with the journal. The content just keeps getting better and better and I enjoy reading it. It's developed into a much more professional publication with great content.

JIPS: The school itself has changed in last 10 years. What would be your alumni advice to current students?

S.M.: We've seen an explosion in the amount of data that's out there and can be used productively by companies and other organizations. And I expect to see a lot more policy-related jobs open up where you need make sense of that data.

So, take as many quantitative methods courses as you can! If you can push yourself, learn R and maybe even Python. If you invest the time to really learn that material it will give you a leg up for your first job and I'd bet will really pay off down the road.

Economics of
China

Special Economic Zones in China: Are They Still Special?

BY THOMAS MURPHEY

UC SAN DIEGO SCHOOL OF GLOBAL POLICY AND STRATEGY   EDITED BY FREDERICK P. HEMANS

ABSTRACT

How effective have Chinese Special Economic Zones been in generating economic growth? This paper seeks to answer this question by testing the treatment effect of SEZ implementation on GDP growth per capita across 287 prefecture level cities between 2001 and 2014. Unlike most pre-existing research studies which model SEZs as a binary variable turning "on" upon receipt of the treatment, I contribute to the existing literature by modeling SEZ receipt as a cumulative percentage of total land available in each city, to capture variation between SEZ size and scope. This study makes two primary findings: first, it corroborates other research which finds that SEZs have a statistically significant, positive impact on GDP growth per capita; and second, it discovers evidence that the treatment effect is heterogeneous between inland cities, which see a positive impact, and coastal cities, which see a negative impact.

INTRODUCTION

How effective have Special Economic Zones (SEZs) in China been in generating economic growth? This study seeks to answer this question. SEZs in China vary in several ways - some are large, some are small, some focus on exports, while others focus on research and technology. Beyond these differences, however, lie several important unifying links: they are government initiated, carefully demarcated geographic zones within cities equipped with strategic policies intended to foster economic growth in the region and in China overall. This study hypothesizes that the implementation of an SEZ will generate statistically higher GDP growth per capita than that city would have seen otherwise. The policy environment which makes these zones "special" should be conducive to increased foreign direct investment, aggregation of productive entities, technology developments and transfers, and job creation. All these inputs and processes should manifest in higher GDP per capita in the region.

This hypothesis is tested by running several regressions estimating a relationship between GDP per capita and various forms of the treatment variable, SEZ presence. The dataset, compiled from the Chinese National Bureau of Statistics and the Chinese Association for Development Zones, tracks various annual economic and socio-demographic measures for 283 prefecture level and 4 provincial level cities across China from the years 2001 to 2014. The results provide two contributions to the existing literature on SEZs in China: first, SEZs have a statistically significant positive impact on GDP per capita when measured by geographic size. Second, the data provides evidence of a heterogeneous effect of SEZs depending on city location, with a statistically significant positive effect on inland city GDP per capita, but a negative effect on coastal city GDP per capita.

This research is relevant to central government policymakers in developing countries seeking ways to boost GDP growth in strategic cities. Policy implementers can use the SEZ treatment effect size and heterogeneous effect findings to assess whether an SEZ is an optimal development strategy in their context. This study proceeds by first briefly reviewing related literature on Chinese SEZs. I then discuss the data collection, the choice of variables, and the major manipulations to these variables. This is followed by a discussion of the estimation strategy, methodology, and controls for endogeneity. Once these have been established, I reveal and interpret the findings of the study, and implement several robustness checks to assess the validity of the model. The paper concludes with a discussion of these findings, potential shortcomings, and implications for policymakers inside and outside of China.

LITERATURE REVIEW

SEZs in China have already attracted a considerable amount of research attention within the economics and

development literature. In one of the earliest and best-known studies on Chinese economic reforms, Wei (1995) regresses GDP growth on a host of variables, including a binary variable for SEZ presence. He finds no significance for this variable, but other measures often associated with SEZs such as exports are highly significant. Jones et al. (2003) also test the effect of SEZs as a binary variable on economic growth, this time in GDP per capita form. With a larger dataset than Wei which includes city data from the full 1990s decade, their study finds a statistically significant positive correlation between SEZs and GDP per capita .

More recently, Alder et al. (2016) use data on Chinese prefecture level cities from 1990 to 2010 to test for the effect of SEZs on log GDP and log GDP per capita. Alder et al.'s study also uses the binary variable approach but distinguishes between state level (central government initiated) and provincial level (provincial government initiated) SEZs. They observe a highly consistent significant positive impact on GDP per capita from the state level SEZs, but much more limited provincial level SEZ significance. Building upon this, I aim to push this line of research further by improving the precision of the independent variable. The studies heretofore have been largely focused on using a binary variable which switches "on" in the year of treatment. Instead, I use zone geographic size as the primary independent variable, normalized as a percentage of the total area within the city. This continuous form for the variable (as opposed to binary form) can better capture the effect of different SEZ types and prioritizations across the sample of cities. The results of the study therefore serve as a robustness check of the previous literature by studying zones in a new lens, while also raising several new avenues with which to explore the question of central government policy initiatives to generate economic growth.

DATA SOURCES AND MANIPULATION

The data for the dependent variable, GDP per capita, as well as several other potential economic and socio-demographic covariates are obtained from the CEIC database. This data, in turn, was sourced from the Chinese National Bureau of Statistics. The database had consistent yearly GDP per capita values for all 287 prefecture and provincial level cities only for the years 2001 to 2014. Therefore, the statistical analysis of this paper focuses on this time-period exclusively. This means that zones which were implemented in the cities prior to the year 2001 are not included in the estimation. In terms of the independent variable, all data on SEZs - geographic size, time of implementation, and zone type - was sourced from the Chinese Association of Development Zones (CADZ). The CADZ is the Chinese national government entity responsible for implementation and regulation of SEZs.

There were several important manipulations which were made to the data. The first major change was to take the logarithm of the GDP per capita series. This was done because the data conforms more closely to a log normal distribution. Additionally, it allows for any changes in GDP per capita stemming from SEZ implementation to be interpreted in percentage terms. A second manipulation was to normalize the primary explanatory variable, SEZ geographic size. This was important to do because zone size may be determined in part by available city space. A zone placed in a rural, inland city with large tracts of available land might receive more land than necessary to conduct its operations. This would then bias an attempt to use zone size as a proxy for zone importance or value to the city. Therefore, the zone size variable was normalized by dividing its square kilometer value by the total size of the host city, before being multiplied by 100. This allows the zone size to be interpreted as a percent of the host city, which more accurately estimates a zone's importance within the host city's economy.

EMPIRICAL METHODOLOGY AND ESTIMATION STRATEGY

The study follows a Treatment on the Treated (TOT) estimation strategy. All the SEZs included in this data are national government initiatives. The implementation of these zones is a decision made by the central government with a strategy in mind, and cities are not able to refuse. In experimental terms, this means that compliance is not an issue, and therefore an Intention to Treat (ITT) strategy is not relevant. The primary estimating equation modeling the hypothesized impact of SEZs on GDP per capita is as follows:

$$y_{it}=\alpha_{it}+\theta_t+\delta(T_{it})+\beta(x_{it})+\epsilon_{it}$$

In this equation:

y_{it}= Log GDP per capita
α_{it}= Cross-sectional fixed effect
θ_t = Time period fixed effect
δ = Effect size of SEZ zone implementation for coastal cities
T_{it}= SEZ size (percent of total city area)
β = Effect size of enrollment in higher education
x_{it}= Higher education enrollment (thousands)
ϵ_{it}= Error

The model employs a fixed effects estimation to control for time period shocks and cross-sectional variation among the 287 prefecture and province level cities. GDP per capita was ultimately chosen as the dependent variable representing economic growth. Although this variable is not a perfect indicator of economic well-being it does not describe how wealth is distributed, for instance, its ubiquitous usage within the related literature and in the field of economics make it a straightforward choice. All statistical tests in this study use GDP per capita in log form. As discussed earlier, this is both because of functional form considerations, as well as interpretability as a percent change. On the right-hand side, the treatment variable for SEZ size is measured as a percentage of the host city's geographic size. This normalizes the variable and allows for percentage on percentage interpretation. Modeling SEZs as a continuous variable, rather than as a binary variable that turns "on" at a certain point in time has several advantages.

First, it is a cumulative measure which accounts for cities which receive multiple zones over the observation period. Second, zone size as a percentage of city size can be viewed as a proxy for importance within the city's economy. If a zone occupies a larger chunk of a city's real estate, it is more likely to have greater responsibilities within the local economy. The estimating equation also incorporates a control variable for higher education enrollment. As will be shown in the next section, higher education appears to have an endogenous effect on the order in which cities receive the treatment. Excluding it would risk committing omitted variable bias, as enrollment has a plausible causal effect on both SEZ implementation because a higher educated populace might make a zone seem more attractive and on GDP per capita, as higher educated workers may be more productive. Furthermore,

Zone size as a percentage of a city size can be viewed as a proxy for importance within a cities economy. If a zone occupies a larger chunk of a city's real estate, it is more likely to have greater responsibilities within the local economy.

because this enrollment varies across time and city, it is not captured by the two-way fixed effects, and therefore needs to be controlled for manually. Lastly, higher education enrollment is unlikely to be a direct component of the causal chain by which SEZs generate higher or lower economic growth, at least in the short term. The migrants who might be attracted by employment opportunities in a new SEZ are more likely to be unskilled labor than

university bound students seeking manufacturing or export processing work. Thus, including it in the model will probably not siphon off explanatory power flowing down from SEZs.

CONTROLLING FOR ENDOGENEITY

Perhaps the most pressing concern prior to initiating this study is that the decision to create an SEZ in a given city is not random. On the contrary, the cities which receive SEZs are strategically identified and selected by the Chinese central government. One possible selection criteria employed could be high growth potential. Perhaps cities with high levels of education, workers, pre-existing industry, or favorable location are more likely to receive an SEZ. This would bias the estimate upwards, as these cities would probably have seen high GDP growth without the SEZ. On the other hand, the government may view SEZs as a sparkplug with which to jump start growth in underperforming cities or regions. Officials might select a city based on mediocre or disappointing growth statistics, hoping to build these cities into more prosperous regions. In either case, the implementation of SEZs is not random, which means that in experimental terms, the treatment and control groups are not perfect counterfactuals for one another. Instead, they differ in potentially predictable ways. Thus, before moving forward with the estimation, I test the sample for endogeneity with the goal of identifying bias stemming from this lack of randomization, and the extent to which this bias is relevant to the estimation of SEZ impact on GDP growth.

First, I test for cross-sectional endogeneity to identify which parameters, if any, may be relevant in predicting the difference between cities which receive a zone and cities which do not. To do this, I regress a binary variable for whether a city ever received a treatment (in effect a treatment and control dummy variable) on four potential variables which may have predictive power: higher education enrollment, population, total enterprises, and a binary variable marking cities as belonging to a coastal or inland province. The regression is a cross-sectional regression at constant values from year 2002. It includes all non-treated cities but restricts the treated cities to those receiving a zone after year 2003. This test will measure whether pre-treatment values for each of the potential predictor variables have explanatory power for selection into the treatment or control group. The results, shown in Table 1, indicate that only the coastal variable is a statistically significant predictor of SEZ implementation. Thus, cross-sectional pre-treatment endogeneity appears to be limited to location-based factors.

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Second, I ran similar regressions to determine if the order of entry into the treatment is endogenous. Because there is staggered entry into the treatment, it is possible that cities receiving the treatment at an earlier year differ predictably from those receiving it at a later year. Restricting the sample to treated cities receiving an SEZ after year 2003, I regressed the year of treatment individually on the 2002 values of higher education enrollment, population, total enterprises, and the coastal binary variable. The results, shown in Table 2, indicate that only education is a statistically significant predictor of the order of treatment. Specifically, having higher enrollment is negatively correlated with treatment year; that is, higher enrollment rates leads to earlier entry into the treatment. Thus, higher education enrollment should also be considered as a potential source of endogeneity.

Third, I manually inspected the data for evidence which upholds the parallel trends assumption. I test this first by comparing the trends of the treatment and control group throughout the period 2002 to 2014, restricting the sample to exclude any cities receiving the treatment prior to 2005. Figure 3 plots the first differences of log GDP per capita for both treatment and control groups across years. The trends for both groups appear to be statistically equal, as their 95% confidence trend lines appear to overlap entirely. In other words, the treatment and control groups do not appear to be on differential trends prior to entry into the treatment, which upholds the parallel trends assumption. I also test for parallel trends across staggered entry, once again using differenced log GDP per capita. The result is depicted in Figure 4. Once again, the parallel trends assumption appears to hold across different years of entry into the treatment. Looking only at cities which receive an SEZ in 2003 or later, the trend in differenced log GDP per capita remains constant throughout early and late treatment years. This suggests that the early and later treated cities do not differ significantly with regards to log GDP per capita, and that the parallel

trends assumption holds. This is encouraging, as it appears to reduce some of the concerns stemming from the lack of randomized treatment. However, the potential endogeneity issues related to coastal location and higher education institutions should be kept in consideration moving forward.

RESULTS AND DISCUSSION

I tested the hypothesis of SEZ effect on economic growth by running a simple two-way fixed effects regression of log GDP per capita on a binary variable for SEZ implementation. This is a good starting point, as much of the related literature is based off similar models. The result, shown in Table 3, produces a positive correlation, but no statistical significance. A natural next step would be to change the binary variable into a cumulative counting variable to account for cities which receive more than one zone during the time period of interest. This second regression also lacks significance, and the correlation switches to negative. The lack of significance, combined with the inconsistency of the correlation, appears to suggest that SEZs have no effect on economic growth, which corroborate the results found in Wei (1995).

However, this could also be because the binary variable is not capturing variation in zone type and importance. I therefore replace the binary SEZ variable with the zone size variable which measures the cumulative percentage of land in each city allocated to SEZs. The subsequent regression now shows a positive correlation between SEZs and log GDP per capita. Specifically, a 1% increase in SEZ size normalized on overall city size leads to a 0.374% increase in log GDP per capita. The above model is significant, but it does not address some of the endogeneity concerns raised earlier in the paper. Based upon the reasoning outlined in sections IV and V, there is a need to insert a variable for higher education enrollment to control for endogeneity and omitted variable bias. Controlling for higher education enrollment, magnitude of the SEZ treatment effect size decreases slightly, but remains statistically significant. At this point, we have reached our primary estimating equation outlined earlier, and identified an effect size of 0.361% . In other words, a 1% increase in city land allocated to SEZs is predicted to generate a 0.361% increase in log GDP per capita.

Lastly, I considered expanding the model to test for a heterogeneous treatment effect. In an earlier endogeneity check, it was discovered that treatment selection could be endogenous to city location - that is, whether a city has coastal access or not. Coastal provinces appeared to be more likely to receive an SEZ, which suggests that the process of zone allocation and implementation may differ between coastal and inland cities in some predictable way. To test this, I adjusted the model to interact zone size percentage with the binary coastal variable, while continuing to control for education. The results, shown in the final column of Table 3, are illuminating. Coastal cities which receive SEZs (increase their zone size percentage) are correlated with a statistically significant decrease in GDP per capita. Conversely, inland cities which receive zones are correlated with a statistically significant increase in GDP per capita. This supports the claim that there is a heterogeneous treatment effect depending on whether the city receiving an SEZ is a coastal city or inland city. There are several plausible explanations for this finding. One potential explanation is that the coastal cities and inland cities are on staggered development trajectories. Bearing in mind that this dataset only observes the period from 2001 to 2014, it is possible that the coastal cities received numerous zones during the 1980s and 1990s.

This is confirmed by Wei, whose study conducted in 1993 found that the SEZs at the time were concentrated in the coastal provinces. Because of this, the marginal returns to extra zones within the 2001 to 2014 period may have already become quite low. The benefits traditionally brought by SEZs were high investment levels which might not be as useful as before in generating growth. Furthermore, the higher level of development achieved in the coastal regions could mean that the coastal cities are moving away from a reliance on cheap exports and more towards consumption-based spending. Increased government involvement and SEZ market distortions could be crowding out private sector development, leading to lower GDP growth.

On the other hand, the development of the inland cities has historically lagged behind that of the coastal cities. SEZs during the 2001 to 2014 period might be exactly the spark these cities need to attract investment away from the increasingly expensive coastal cities. Since prior investment has been scarcer, returns to GDP per capita are likely to be higher, which explains the positive correlation. Another explanation for the heterogeneous treatment effect could be political. In the prosperous coastal regions, it is possible that wealthy coastal business and political elites are now capable of successfully lobbying for zones which bring them benefits, but do not necessarily benefit the whole economy. By contrast, the poorer inland cities do not have as many elites with this kind of clout, and so the zones placed in these cities still adhere to the original goal of fostering economic growth in the region.

In short, there are two main conclusions to take away from the regression results. First, SEZs are shown to be effective economic growth instruments when measured in a way that accounts for variation among zones. Second, the effect of the zones is heterogeneous between coastal and inland cities. This may not be because of geography per se, but rather because of the different development moments in time which the two regions find themselves in.

ROBUSTNESS CHECKS

Before making any conclusions, I conducted several robustness checks to test the veracity of the results found in this study. First, it should be noted that all the regression tests conducted in the previous section employ clustered standard errors at the city level. This is to control for autocorrelation within GDP per capita, as a city's GDP per capita in a given year is likely to be highly influenced by the GDP per capita in the previous year. In addition to this, however, I re-ran the experiment to exclude the four cities in the data which actually hold provincial level status: Beijing, Chongqing, Shanghai, and Tianjin. Because these cities hold provincial level rank, they could be biasing the data upwards, as they may have larger economies and their increased autonomy could lead them to receive more investment exogenous from the SEZs. To control for this, I drop these four cities from the data and run the regression again, to test whether the results remain consistent. I specifically focused on two regressions: the first based on the original estimation equation testing the effects of SEZs on GDP per capita irrespective of location, and the other including the interaction term for coastal and inland cities. The results, shown in Table 4, support the results established earlier in the study, as there are no significant changes in the variables of interest.

SEZs are shown to be effective economic growth instruments when measured in a way that accounts for variation among zones.

CONCLUDING REMARKS AND IMPLICATIONS

This study uses panel data on Chinese prefecture level and provincial level cities from 2001 to 2014 to estimate the impact of SEZ implementation on economic growth. The methodology followed is a treatment on the treated; this is because compliance is not an issue, since all zones were central government led initiatives. In the primary estimation model, the treatment variable, SEZs, is measured as a percentage of the total city area. I find that increases in the percentage of SEZ land within a city generate a statistically significant 0.361% increase in log GDP per capita, controlling for high education levels. Thus, this study supports the claim that SEZs generate economic growth.

However, a further look at this result generates a more nuanced picture. The absence of randomized treatment and subsequent tests point to location-based endogeneity in terms of receiving the treatment. Because of this, I test for a heterogeneous treatment effect for coastal cities versus inland cities. This yields the surprising result that SEZs implemented in coastal cities are correlated with decreases in GDP per capita, while SEZs in inland cities

maintain the positive relationship from the previous regression. There are several possible explanations, but perhaps the most plausible is based upon the time period of observation. Economic growth in China began in the large coastal cities in the 1980s and 1990s. By the year 2001, which is when my sample begins, the gains from SEZ may be diminishing or gone. On the other hand, the inland cities in China received less attention and investment in the earlier periods of Chinese growth. With rising costs and diminishing returns in the coastal cities, however, it is possible that SEZs placed in inland are now seeing large gains from attracting and concentrating investment into these heretofore neglected areas. The SEZs could potentially be the spark that generates growth in these areas by attracting initial investments that otherwise might not have been made due to poor location.

There are several issues which should be mentioned as potential concerns threatening the validity of this study. First, there remains the issue of endogeneity based upon the lack of randomized treatment assignment. SEZs are not randomly assigned, and as such, the untreated cities are not perfect counterfactuals for the treated cities. This paper has endeavored to implement controls for this - parallel trends are upheld, two-way fixed effects are employed to control for time-invariant differences between cities, and potentially endogenous time-variant variables such as higher education are included in the regression as controls. However, there is always the risk that other predictable exogenous variables are omitted from the model, thus biasing the estimate. Another issue with this study is that it is underpowered. Using the effect size estimated by Alder et al. and the variance of log GDP per capita in this study's data as 0.9588, we can calculate the minimum sample size needed to detect an effect of the same size. Using the following equation with values ETE = 0.09 (based on Alder et al.), we find that the minimum sample needed is 1284.
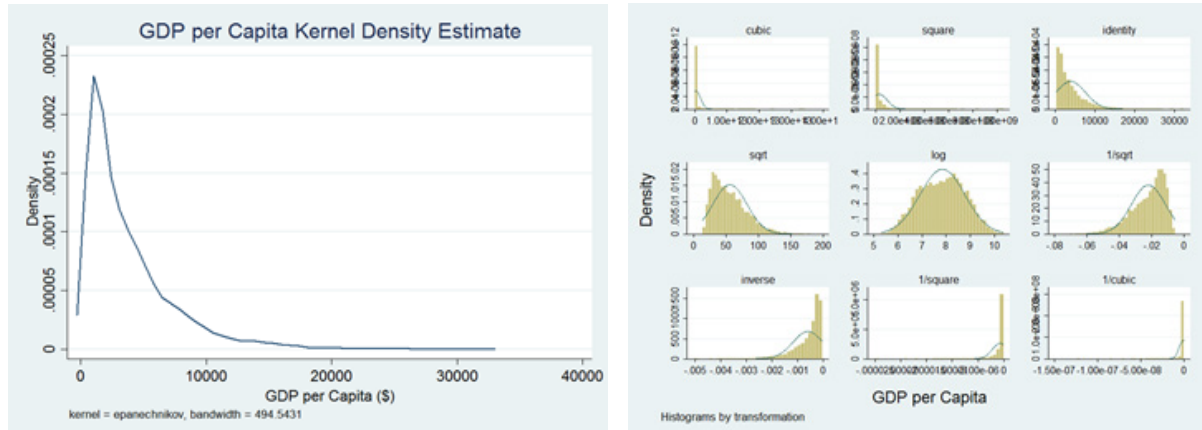
With only 287 cities in this data set, this study is clearly underpowered in terms of sample size. In an ideal scenario, this study would be conducted on a sample size of at least 1184 cities. Lastly, the conclusions drawn from this study are preliminary and need to be parsed out more fully. Further research should examine the difference between coastal and inland cities from a more nuanced perspective. The role of geography could be fleshed out further, by testing other measures of coastal and inland status such as distance from the coast or distance from trade and transport networks. Research on the incentive structures surrounding zone implementation, especially in cities which have already received considerable investment, should also be investigated. Attention should be paid to political motivations and the ability of special interest groups to either lobby for or against an SEZ's implementation. In short, this study provides evidence supporting the claim that SEZs increase GDP per capita, especially for cities which have not yet been successful in leveraging large investments to spark economic growth. The effect is much more limited in the coastal cities which have already developed to a large extent. Policymakers looking specifically to attract investment and generate growth in economically unattractive or marginalized regions should consider SEZs as a potential option.

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APPENDIX
FIGURES 1 AND 2: FUNCTIONAL DATA FORM

FIGURES 3 AND 4: PARALLEL TRENDS

REGRESSION TABLES

	(1)	(2)	(3)	(4)
Table One: Cross-sectional endogeneity tests on treatment group selection				
	Received Zone (1)	Received Zone (1)	Received Zone (1)	Received Zone (1)
Higher Education Enrollment	0.000107			
	(0.000340)			
Population		-0.00000340		
		(0.00000773)		
Total Enterprises			0.0000240	
			(0.0000225)	
Coastal				0.136**
				(0.0423)
Constant	0.134***	0.165***	0.131***	0.0882***
	(0.0249)	(0.0389)	(0.0255)	(0.0263)
N	247	258	268	277
Adj. R^2	-0.004	-0.003	0.001	0.033
RMSE	0.346	0.359	0.353	0.343

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table Two: Cross-sectional endogeneity tests on treatment order				
	(1)	(2)	(3)	(4)
	Treatment Year	Treatment Year	Treatment Year	Treatment Year
Higher Education Enrollment	-0.0144**			
	(0.00488)			
Population		-0.0000803		
		(0.000115)		
Total Enterprises			-0.000734	
			(0.000390)	
Coastal				-0.892
				(0.548)
Constant	2005.7***	2005.4***	2005.6***	2005.6***
	(0.319)	(0.528)	(0.394)	(0.430)
N	34	39	39	39
Adj. R^2	0.19	-0.014	0.063	0.042
RMSE	1.527	1.712	1.646	1.665

Standard errors in parentheses
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table Three: Main Results Table					
	(1)	(2)	(3)	(4)	(5)
			Log GDP per Capita ($)		
Received Zone (1)	-0.00779				
	(0.0314)				
Cumulative Zones		-0.0413			
		(0.0232)			
Zone Size (percent of city size)			0.374*	0.361*	0.655***
			(0.154)	(0.152)	(0.175)
Higher Education Enrollment				-0.000627***	-0.000619***
				(0.000145)	(0.000144)
(1) coastal # Zone Size Percent (c)					-0.690*
					(0.287)
Constant	6.769***	6.773***	6.765***	6.795***	6.796***
	(0.0123)	(0.0124)	(0.0122)	(0.0128)	(0.0127)
N	3969	3969	3967	3822	3822
Adj. R^2	0.964	0.964	0.964	0.966	0.966
RMSE	0.137	0.137	0.136	0.131	0.13

Standard errors in parentheses
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table Four: Robustness Checks		
	(1)	(2)
	Log GDP per Capita ($)	
Zone Size (Percent of City Size)	0.439**	0.709***
	(0.143)	(0.179)
Higher Education Enrollment	-0.000525***	-0.000511***
	(0.000135)	(0.000138)
Coastal (1)		0.467***
		(0.0711)
(1) Coastal # Zone Size Percent (c)		-0.640*
		(0.265)
Constant	6.770***	6.583***
	(0.0391)	(0.0423)
N	3780	3780
Adj. R^2		
RMSE	0.137	0.137

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Social Policy in

Kosovo

Youth Unemployment In Kosovo: Policy and Governance

BY EDISON JAKURTI
DUKE UNIVERSITY SANFORD SCHOOL OF PUBLIC POLICY

ABSTRACT

The paper discusses the severity of youth unemployment in Kosovo. It includes a chronological description of the context, an evaluation of the scope, scale, and dynamics, a description of the market and government failures, and a stakeholder analysis. The paper also proposes a policy recommendation for the Government of the Republic of Kosovo to reduce youth unemployment. Privatization failures, nepotism, clientelism, and insufficient foreign direct investments are the main causes of youth unemployment. This problem has not only slowed the economic development and increased poverty in Kosovo but has also created devastating conditions that spurred an exodus of 120,000 to 200,000 people to Western Europe over the span of a few months. To reduce youth unemployment, four policy alternatives are presented and evaluated based on specific criteria. Through the Objective Matrix and the Criteria of Alternative Evaluation policy assessments, the results show that a holistic approach which includes agriculture, industry, and services, is most effective for reducing youth unemployment. Finally, a general implementation strategy is presented.

INTRODUCTION

The Republic of Kosovo has a population of around 1.8 million, whose average age is 30.2 years (KAS, 2017). Therefore, youth, individuals between the age of 15 and 24, constitute 327,291 people or 17.38% of the total population (Index Mundi, 2016, par. 2). Despite the advantages that stem from having a young population, the official unemployment rate in Kosovo is around 33 percent (KAS, 2017). Reports estimate youth unemployment to be between 57 and 60 percent with little fluctuations since the end of war in 1999 (World Bank, 2016, p. 59).

Within six years of the 2008 Declaration of Independence, hope for substantive economic improvement has passed. However, over a six-month period in late 2014 and early 2015, 120,000 to 200,00 citizens – about 7 to 11 percent of the total population – illegally migrated to Western Europe (Initiative for Social Action, 2015, p. 11). According to a study by the Initiative for Social Action (local NGO) on migration during this period, almost 70 percent of respondents cited their poor economic status as the main reason for migrating, and over 54 percent said that they were disappointed with state institutions (2015, p. 13). Moreover, 66 percent of the respondents believed that poverty is the most significant issue that the country is facing and over 82 percent believed that unemployment is the main driver behind it (Initiative for Social Action, 2015, p. 13).

PROBLEM DEFINITION

The high youth unemployment rate in Kosovo has led to extreme poverty among the youth and is negatively correlated with economic growth which is necessary for development. For instance, nepotism and clientelism in the public sector have played a huge role in worsening youth unemployment. Moreover, insufficient FDIs and the process of privatization have failed to create a sustainable market that would generate jobs in the private sector. Consequently, a significant portion of Kosovar youth are migrating illegally to Western Europe and over 200 Kosovars have engaged in radical violent activities such as fighting in the war in Syria and Iraq (Kursani, 2015, p. 7). International Alert reports that a lack of economic opportunity has been a major reason that drives the youth to join violent extremist groups (Aubrey et al., 2016, pp. 8-10). Hence, the government of Kosovo should tackle youth unemployment because this portion of the population has the greatest potential in the labor force. An increase in youth employment will accelerate growth and development and discourage migration and radicalization

YOUTH UNEMPLOYMENT

Unemployment is both a cause for and an effect of mal-development. Kosovo's economic growth over the last eight years has not exceeded 4.5 percent annually (World Bank, 2016, p.63). Real annual GDP rates in Kosovo declined from 4.5 percent in 2008 to 1.2 percent in 2014 but began to rise slightly in 2015 (World Bank, 2016, p. 63). Paradoxically, youth unemployment has increased from 55.3 percent in 2012 to 60 percent in 2015 (World Bank, 2016, p. 63). Moreover, 22.4 percent, or over 70,000 youth, of this age range live below the extreme poverty threshold of less than 0.93 Euro per day (less than US $1.2) (UNDP, 2016, p. 31). Although a more detailed study is needed to prove any causation between youth unemployment and economic growth, there is clearly an inverse correlation between the two. The relationship between youth unemployment, extreme poverty, and a lack of growth is a concrete indicator of how youth unemployment is both a cause for and an effect of underdevelopment. An increase in youth unemployment may lead to lower economic output which in turn raises the poverty rate, and vice versa.

HISTORICAL CONTEXT

Yugoslavian Era

Kosovo's historical legacy is vital to understanding youth unemployment. The question of who controls Kosovo has been contested for centuries. It was given to the Serbs and separated from the Ottoman Empire in the fallout of the First World War. (Malcolm, 1999, p. 127). From 1913 to 1989, Kosovo was part of the Yugoslavian Federation. During this time, Kosovo developed some industries and established a university, but it remained the least developed province in Yugoslavia (Knudsen, 2010, p. 25). In 1974, the Federation gave some autonomy to Kosovo, but the autonomy was revoked in 1989 by Serbian President Milosevic (Knudsen, 2010, p. 30). Eventually, the wars in Croatia, Bosnia, and Slovenia spilled over into a bloody conflict in Kosovo which ended in June 1999.

The Impact of the War

The impact of the war on the economy was devastating. Agriculturally, Kosovo lost 65 percent of its products and cattle (Knudsen, 2010, p. 31). The industry, especially public and socially owned enterprises suffered as well. Damage to these enterprises, which generated most of the jobs before Albanian workers were forcefully expelled, is estimated to be around $700 million (based on the average exchange rates for 2000) (Knudsen, 2010, p. 32). Nevertheless, 75 percent of the 400 public and socially owned enterprises were still functional (Knudsen, 2010, p. 32).

Post-Conflict Structural Changes

After the war, the United Nations (UN) and the North Atlantic Treaty Organization (NATO) established an international protectorate over Kosovo. The UN created a temporary government and they established the United Nations Interim Administration Mission in Kosovo (UNMIK). UNMIK had four areas of competences, which were known as "pillars," and one of them dealt with economic issues, including unemployment (Knudsen, 2010, p. 11). In 2002, UNMIK created the Kosovo Trust Agency whose purpose was to build a capitalist market (Privatization Agency of Kosovo, 2016, par.3). This Agency was later transformed into the Privatization Agency of Kosovo. Through its privatization waves, around 70,000 workers lost their jobs over a ten-year period (Kasolli, 2012, par.12).

PROBLEM SCOPE AND DYNAMICS

Regional Situation and the Trend of Youth Unemployment in Kosovo

Youth unemployment in Kosovo is alarming for two reasons. First, the youth employment rate in Kosovo is the lowest in the Balkans. In 2014, the youth employment rate was 9 percent, while in neighboring countries youth employment rate ranged from 11 to 28 percent. (UNDP, 2016, p. 27). Kosovo's youth unemployment rate of 60 percent is three times the average of the youth unemployment rate in Europe (20 percent in 2016). (Eurostat, 2016, par.7). Second, the trend of youth unemployment has remained stagnant since the end of the war. The youth unemployment rate in 2003 was 70.9 percent (World Bank, 2008). Twelve years later in 2015, the youth unemployment rate is 60 percent (World Bank, 2016, p. 63).

Scale and Scope of Youth Unemployment

The total number of youth in the labor force in Kosovo is 442,716 or 15 percent of the total labor force. Out of 69,173 young people, 39,919 or 57.7 percent are unemployed (KAS, 2016, p. 10). Besides not having material goods due to the lack of income, unemployed youth in Kosovo face stress, emotional, and psychological difficulties. Their families are affected because their parents have a financial burden to provide for them, or because they have dependents of their own. This affects the society because of the opportunity cost of not having the youth participating in the economy and contributing to the output. There is a negative correlation between the output and youth unemployment.

Kosovo's youth unemployment rate, 60%, is three times the average youth unemployment rate in Europe. This unemployment rate has remained stagnant since the Balkan wars.

PROBLEM ANALYSIS

Market Failures

The privatization of socially and publicly owned enterprises has contributed to unemployment (Kasolli, 2012, par.12). Also, the presence of an asymmetry of economic information has played a role as well (Weimer & Vining, 2011, p. 103). For example, foreign direct investments (FDIs) have not been capitalized by the sectors that have the greatest potential to tackle youth unemployment, such as information technology, multimedia, mining and agriculture.

Government Failures

Government failure is another issue that has contributed to youth unemployment (Weimer & Vining, 2011). A major reason why past governments failed to reduce youth unemployment is because they used it as a political tool. Today, it is almost impossible for a young person to find a job in a public institution, unless he or she is a member of the ruling political party (Boletini & Kalaja, 2014, par. 3). Moreover, privatization did not create a market that would effectively generate jobs while the government exacerbated the situation by capturing the public sector through nepotism and clientelism (Boletini & Kalaja, 2014, par. 2). Regarding the 258,118 or 78.87 percent of youth who are not part of the labor force, they are either discouraged workers or still in school. Past governments have opened six additional public universities throughout Kosovo, despite the lack of qualified faculty, weak infrastructure, and limited funding. Therefore, these students do not have the opportunities to get a quality education or find jobs.

Major Stakeholders

Youth unemployment in Kosovo is a major concern that involves several stakeholders, which are organized into four main categories. The government of Kosovo and its ministries constitute the key stakeholders while the youth are the primary stakeholders since they are directly affected by the unemployment. The families of these unemployed youth – both parents and dependents – are secondary stakeholders. In addition, the private and public sector which seek qualified youth and the universities which prepare the youth for employment are also secondary stakeholders. External stakeholders are civil society, NGOs, and multilateral institutions.

Goals and Objectives

The main goal of this policy analysis is to help the government of Kosovo implement thoroughly analyzed

policies that will reduce youth unemployment. By increasing youth employment, the government would achieve several other important goals including increasing economic growth (GDP and GDP per capita), decreasing the youth poverty rate, and decreasing the number of youth who leave the country by illegally emigrating or joining violent extremist groups. To achieve both the main and secondary goals, the following four objectives need to be met.

First, the government needs to unify the political parties through inclusiveness. Considering the deeply polarized political scene, bringing the political parties to a consensus is imperative. The Prime Minister should invite the representatives of the opposition to participate in negotiating a plan that engages all state institutions in promoting youth employment. Second, the government should develop production-based platforms. Kosovo's economy suffers from a trade deficit which peaked at 214 million Euros in October 2016 due to the lack of manufacturing production and qualitative services (Trading Economics, 2016). Because it is difficult to cover imports without producing and exporting, the government should concentrate on platforms that generate new resources in addition to deploying the existing ones such as overemploying the public enterprises.

Third, the government must connect education to the economy. It is imperative to understand the demand and potential within the domestic economy. Focusing education on strategic sectors of the economy may not only lead to an increase in youth employment but would also lead to a more productive economy that utilizes resources more efficiently. In effect, a more productive economy provides the means to improve the education system. This symbiotic relationship between education and economy is a catalyst for social prosperity. Hence, the Government of Kosovo should determine the sectors of strategic importance and should reform the curricula to respond to the economic needs. Fourth, the government should capitalize on abundant and underutilized resources. Kosovo has limited resources, but this has not been the only factor preventing the economy from improving youth employment. Instead, many abundant resources have not been deployed, including both tangible resources, such as land, and intangible ones, such as talent.

Selection Criteria Measures

The Criteria Alternative Matrix evaluates each policy alternative based on the following criterion and respective weight. Since reducing youth unemployment is the main purpose of this policy analysis, the effectiveness of policy alternatives is crucial as it measures the outcomes with regard to intention. Therefore, the weighted score for Effectiveness is 5. For Kosovo, which is a poor country with very limited resources, the cost of implementing a policy plays a crucial role. Hence, the weighted score for Efficiency is 5. The impact of a policy on the youth is also crucial. For example, a greater attention must be paid to equity in terms of gender. Therefore, the weighted score for Equity is 5.

In the last two years, the political situation has been very tense. Political feasibility has proven to be a core challenge for every policy implementation. Hence, the weighted score for Political Feasibility is 5. Also, since the status quo is unsatisfactory to the population, policies that could improve the situation even by small margins have a high probability to be accepted by the society. Therefore, the weighted score for Social Acceptability is 3. In addition, the government of Kosovo has a large administration that sometimes becomes cumbersome. However, it includes many sectors that deal with specific stages of policy implementation. Hence, the weighted score for Administrative Feasibility is 3. Finally, technological advancement and skills are components that developing countries usually lack. Kosovo is no exception in this regard. Therefore, the weighted score for Technical Feasibility is 4

POLICY ALTERNATIVES

Policy Alternative A: Despite having a relatively small territory, land remains one of the most precious resource in Kosovo. As described in the historical context of Kosovo's economy, the industrialization of the country mostly took place in the late 60s and early 70s (Knudsen, 2010, p. 25). Due to the lack of industrialization, most of the

population practiced agriculture. Although the current contribution of the agricultural sector to GDP is only 13%, a few young entrepreneurs in some parts of the country have discovered what the fruit production expert Mr. Maxhun Shehaj calls "the red gold," or red raspberries (Telegrafi, 2013, par. 2). Raspberries are easily planted and do not require significant work or expertise. The cost of planting the seeds in one hectare is estimated to be around 12,000 Euro and this size of land can yield up to 15 tons of raspberries (Telegrafi, 2013, par. 5 & 6). The domestic price of 1kg of raspberries is 2 Euros, which means that the gross profit from 1 hectare of raspberries generates 30,000 Euros (Telegrafi, 2013, par. 6). Kosovo has 257,000 hectares of arable land (KAS, 2014, par.18). Therefore, a set of concrete agricultural policies on raspberry cultivation can increase employment. The government would need to accompany these agricultural policies with fiscal policies. For example, the government can offer a tax exemption to farmers that cultivate raspberries or similar fruits or vegetables that present a similar comparative advantage. This can help contribute to increasing youth employment.

Besides fiscal policies, monetary policies can also help. For example, the central bank and the private banks can sign a memorandum which sets favorable interest rates for agricultural loans that are to be invested and can also increase youth employment. Moreover, the government can directly subsidize new farmers with proportional amounts of seeds, fertilizer, and pesticides for every additional youth that they employ. Based on simple estimates, if only 2,570 hectares, or 1%, of the workable land is planted with raspberries, the potential gross contribution of its production is over 70 million euros. If only 50% of this contribution to the GDP goes to wages, with an average wage of 500 Euros (the average wage in Kosovo is around 365 Euro) the direct number of employment among youth has the potential to increase by 10% in the first year.

Policy Alternative B: Technological revolutions have pushed adaptation to become continuous especially with the Kosovo Center for Innovation (ICK) established by the Norwegian Ministry of Foreign Affairs. The center "was founded to support entrepreneurship, innovation and commercially based business development, with a focus on information and communication technology" (ICK, 2016, par.2). ICK hosts tens of startups and several pre-existing companies who seek advice (ICK, 2016, par. 3). Also, there are several sub-incubators such as ICK in other cities around Kosovo which aim to encourage youth entrepreneurship. Moreover, there is a growing interest among the youth to start their own businesses but maintaining them is a major challenge.

The Kosovar government can dedicate a special fund under the Ministry of Economic Development to innovation in multimedia and software engineering. The asymmetry of information between investors and the government has influenced declining FDIs. Youth entrepreneurial initiatives that have graphic design, programming, web developing, and coding skills could easily be viewed as concrete and attractive ventures for investment. Yet, these service-providing start-ups require talent and hard work. So, in a 5 to 20-year period, the Ministry of Education should also reform its curricula in public universities to introduce specific programs that prepare youth for different multimedia and software engineering fields.

Policy Alternative C: As mentioned earlier, Kosovo was the poorest province in Yugoslavia (Knudsen, 2010, p. 25). However, it has offered mined minerals to build the Federation of Yugoslavia. A major contributor was Trepça, which is an industrial mining complex that consisted of over 70% of mineral wealth of ex-Yugoslavia (Trepça, 2010, par.1). Trepça was the Balkans' long-time leading exporter of zinc, lead, silver and gold (Trepça, 2010, par. 2). In the 1970s and 1980s, it employed over 23,000 workers, and many more where employed in secondary industries that worked with the minerals extracted in Trepça's mines (The Economist, 2011, par. 3). Today, Trepça has 50 million tons of zinc and lead reserves (Trepça, 2010, par. 5). Hence, Kosovo should utilize this public asset to generate employment.

The funds raised by the pension trust and the privatization process, which involved other socially and publicly owned enterprises, could be invested in Trepça to modernize equipment and increase production. If these two funds could be efficiently invested, Trepça has a capacity to employ an additional 8,000 workers (Lëvizja

Vetëvendosje, 2013, p. 14). Consequently, the direct employment in the mining sector and revitalization of Trepça can provide revenues to re-build other industries such as the tobacco and wine.

Policy Alternative D: Every country's economy is comprised of three main sectors: agriculture, services, and industry. Each sector contributes to the country's GDP. An increase in aggregate contribution would increase GDP, which in turn increases employment. Looking at Alternatives A, B, and C from this perspective, each one consists of policies that would help a certain sector in the economy. Alternative A suggests agricultural policies that focus on raspberry production and exports, which would fall under the agricultural sector. Alternative B suggests policies on promoting innovation and entrepreneurial initiatives, with a focus on multimedia and software engineering, which would fall under the service sector. Finally, Alternative C suggests policies that would revitalize mining and fall under the industry sector. Although the service sector prevails in most economies, Kosovo's potential in agriculture and industry should not be overlooked. The Kosovar government should recall that these policies work in different time frames. Alternative A can be easily undertaken and implemented within weeks. On the other hand, Alternatives B and C require education, training, and expertise which can take months or even years to reach their full potential. Therefore, a simultaneous combination of three policies would have the highest potential to reduce the youth unemployment rate most efficiently.

Future Consequences: Spillovers and Externalities

It is crucial to understand that to decrease youth unemployment, the economy needs to undergo significant improvements. As described in the last alternative, the three previous recommendations (A, B and C) consist of policies that mainly focus on certain parts of the economy. Yet, there are both positive and negative consequences from each of them, and these spillovers and externalities go beyond the specific sectors where each alternative is concentrated. If Alternative A is implemented by itself, one of the externalities can be a widening gap between female and male youth unemployment. Although there have been successful cases of women that have managed to create very successful farms, most farmers in Kosovo are male. Moreover, most of the students who study agriculture are male. Therefore, agricultural policies may create a negative externality by presenting opportunities that are more appealing to male than to female youth.

To decrease youth unemployment, the government needs to focus on the economy first.

On the other hand, Alternative B may result in a positive externality by further boosting youth interest in multimedia, software engineering, or web design, all of which are jobs that require critical and creative skills. If we look at reports by the International Labor Organization or the World Economic Forum, we find that such skills are going to be needed for jobs in the future. Therefore, Alternative B may inspire the youth to acquire skills that will not only get them a job in Kosovo, but also make them very competitive in the global market. Moreover, Alternative C suggests a set of policies that would revitalize Trepça, which indeed would have a major impact on almost all other industries in Kosovo. Due to a high demand for Trepça's minerals, which could either be manufactured in Kosovo or exported as raw minerals, a completely new chain of production can be created. Indeed, Trepça's revitalization may have spillover effects on other industries and sectors, contributing to not only reducing youth unemployment, but also reducing the total unemployment rate. One caveat is that potential environmental externalities should not be neglected.

Political Feasibility and Constraints

A major constraint for implementing either alternative is the allocation of resources. Specifically, financial resources are limited and efficiently distributing them has been difficult in the past. Another concern lies in the scope of the individual alternatives that solely focus on certain sectors of the economy or certain subgroups of

society. This may present a limitation to their potential to meet the goal of reducing youth unemployment at scale. Besides technical constraints, political feasibility can also be a cause for concern. As discussed earlier, clientelism and nepotism have contributed to youth unemployment. Thus, the implementation of any of the policy alternatives requires high levels of transparency and accountability. For instance, revitalizing the mining industry through Trepça is likely to be contested by the Serbs. Indeed, Trepça is the main reason for the remaining parallel structures that operate under the instructions of Belgrade in the northern territory of Kosovo. Thus, to revitalize Trepça, the government of Kosovo should ensure that this enterprise would benefit both the Albanian and Serb youth.
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POLICY RECOMMENDATIONS

After assessing the four alternatives by using the Criteria Evaluation Matrix, the final alternative, or the combination of the first 3 alternatives, seems to be the best option.

Outline of Implementation Strategy

The combination of alternatives requires a multi-step strategy, based on short, medium, and long-term implementation plans. The first step for this strategy would be for it to be drafted by experts and representatives from both the government and the opposition. This process would ensure a higher level of consensus and political feasibility. Also, a major part of the strategy is to secure and efficiently allocate the financial resources. Two main funds that can be used include the Pension Trust Fund and the fund raised by the privatization of public and socially owned enterprises. Moreover, a monitoring team needs to be included to continuously evaluate the process and report findings in the Kosovar Assembly. This will allow the government to resolve any political issue and increase transparency and accountability.

Once the strategy is drafted and approved, the execution of the agricultural policies can begin. The Kosovar government should announce that it has developed a package of policies that will help farmers who specialize in raspberry production. Of course, there can be other types of fruits, but it is important to consider the comparative advantage that the country has so that the production would reduce unemployment more efficiently. Simultaneously, the government should announce its intention to promote youth initiatives through incubators such as the Kosovo Center for Innovation (ICK). A positive campaign should be launched to attract investors from other countries and acquire the support from both domestic and international NGOs. While individual and entrepreneurial initiatives are supported in incubators, the Ministry of Education can revise public university curricula and introduce more courses in the fields of multimedia and software. By doing that, there would be a high probability that the private universities would follow a similar path to remain competitive. While agricultural and service policies are being implemented, the government should work intensively on a grand strategy to revitalize Trepça. This process may take longer and may require international experts.

CONCLUSION

Youth unemployment is a major concern for the population, civil society, and the Kosovar government. The historical context, especially the colonial legacy, and the recent war have devastated the economy. After the war ended in 1999, the privatization process did not result in a functional market that could generate jobs. Consequently, FDIs declined and clientelism and nepotism in most state institutions and public enterprises remained. As a result, corruption became a major obstacle that prevented the economy from flourishing and generating jobs for the most vital part of society – the youth. Under these circumstances, the government of Kosovo was presented with several alternatives that can reduce youth unemployment. The best alternative was the combination of policies directed towards the agricultural, service, and industrial sectors. The agriculture sector would utilize Kosovo's comparative advantage in raspberry production, the service sector would encourage entrepreneurial initiatives in multimedia and software engineering, and the revitalization of Trepça would help other industries to grow and prosper. Due to resource constraints and difficulties in terms of political feasibility, these policies

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would work best if implemented through a strategy that involves short, medium, and long-term steps. An efficient combination of these policies coupled with a smart management of the resources could soon have a positive effect on decreasing youth unemployment.

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APPENDIX

Results from the Criteria Alternative Matrix

Criterion	Total Weight	Alternative A	Alternative B	Alternative C	Combination
Effectiveness	5	4	4	4	5
Efficiency	5	5	4	4	4
Equity	5	2	3	2	4
Political Feasibility	5	3	3	2	2
Social Accessibility	3	2	3	3	3
Administrative Feasibility	3	3	2	2	2
Technical Feasibility	4	3	2	2	3
Total Max: 159		97	93	83	102

Immigration Policy in the

USA

The Role of State Level Policy in Driving Migration from Central and South America

BY DAVID PRICE

UC SAN DIEGO SCHOOL OF GLOBAL POLICY AND STRATEGY

ABSTRACT

Laws allowing state governments to offer driver's licenses to undocumented immigrants have been adopted in several states around the US. These laws have an unclear impact on migration from Latin America and it has been argued that they increase migration from the region. This analysis uses a reduced form fixed effects model to explore this relationship and finds evidence of a causal link between state-level policy aimed at undocumented migrants and changes in migration flows from Mexico. Evidence is not found for a causal link between state-level policy decisions and changes in migration from Central America.

INTRODUCTION

As of 2014, there were approximately 11 million undocumented immigrants living in the United States (Pew 2016). This undocumented population has had several social and economic impacts in the US, one of which comes from the number of unlicensed drivers on roadways. Unlicensed drivers are unable to be screened for their driving abilities and cannot obtain car insurance without a license. This leads to increased insurance premiums and ultimately results in a public safety hazard (Gonzalez, Margulies and Tirado-Alcaraz 2016). To deal with this challenge, US states have passed laws allowing undocumented immigrants to receive licenses. With these laws in place, undocumented immigrants can obtain insurance and are screened for proper training before receiving a driver's license. There has been limited examination of the impact of these driver's license laws on the insurance market, but several studies have found evidence of a link between these laws and reductions in traffic accidents and insurance premiums (Colorado Fiscal Institute 2015). Furthermore, undocumented migrants have benefited the US economy and provided a source of affordable unskilled labor for US businesses (G. H. Hanson 2009).

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Although laws that allow undocumented immigrants to obtain licenses aim to deal with the externality that affects public safety and insurance markets, some politicians and stakeholders make arguments against the driver's license laws based on the impact that these laws have on migration. For example, an article from the Center for Immigration Studies argues that providing driver's licenses to undocumented immigrants "legitimizes" their status in the United States, even if they are unauthorized to be in the country. This perspective suggests that offering driver's licenses to undocumented migrants encourages migration from nearby regions to the US (Federation for American Immigration Reform 2013). The causal theory for this argument goes as follows: migrants weigh various factors in making decisions regarding whether to emigrate. Domestic policy in the US plays a role as a transaction cost reducer or a source of increased transaction costs. In the case of laws that allow undocumented immigrants to receive driver's licenses, these policies could lower the costs of obtaining employment.

Migrants that can drive have an easier time connecting with employers because they are less geographically limited and, therefore, states with undocumented license laws seem marginally more attractive than states without these laws. Thus, migrants travel to states that have lower transaction costs in obtaining employment rather than states where it is costlier. In line with this theory, a report published by the Migration Policy Institute discusses the role that state level immigration enforcement policy has in driving undocumented immigrants to move to states with more welcoming policies (Papademetriou and Terrazas 2009). The report argues that increases in enforcement policies have not only influenced immigrants to move to different US states, but have also incentivized some migrants to return to sending countries. The number of migrants moving due to state-level laws is not made clear in the study, but the authors use cursory evidence to show that state-level policy may be influencing decisions made by migrants from nearby regions.

The analysis presented here sheds light on the policy question of whether state-level laws directed at undocumented immigrants do, in fact, influence migration decisions. More specifically, this study assesses the extent to which two types of state policies influence migration from Mexico and Central America. These two regions are the focuses of this analysis because they account for a large proportion of undocumented migration to the US. The two policy types include policies that are supportive of undocumented migrants and policies that are hostile to undocumented migrants. Supportive policies are defined as policies that extend benefits such as laws that allow migrants to apply for driver's licenses, receive tuition funding, or obtain health care. Policies that are hostile are defined as laws that direct local law enforcement and governments to remove protections for and actively seek out undocumented immigrants for deportation.

Domestic policy may influence migration decisions, but the most well-established determinants of migration patterns are known as the push and pull factors of migration. These factors include economic, political, and demographic characteristics, in the sending and receiving countries, that drive individuals to migrate (Davis, Karemera and Oguledo 2000). There have been numerous studies of the push and pull factors that influence immigration from Latin America to the United States. For example, Hanson and Spilimbergo in their 1996 paper examine illegal immigration from Mexico to the US by estimating the relationship between changes in economic conditions in Mexico, modifications in border patrol procedures, and changes in the number of apprehensions at the border (Hanson and Spilimbergo 1996). The authors find evidence of the importance of push and pull factors in influencing illegal migration to the US. For example, they find that major devaluations of the Mexican peso are associated with increases in apprehensions at the border, which suggests that the pull of economic opportunity and the push of economic crises are influential in driving migration.

In addition to the push and pull determinants of migration, there are other studies that examine the relationship between domestic policy and migration. One such study examines the role that the Deferred Action for Childhood Arrivals (DACA) policy plays in driving migration from Latin America. Amuedo-Dorantes and Puttitanun examine the impact that DACA, the Williams Wilberforce Trafficking Victims Protection Reauthorization Act, and traditional push and pull factors have on influencing unaccompanied minors to arrive and be apprehended at the US-Mexico border (Amuedo-Dorantes and Puttitanun 2016). The authors find that DACA does not have a significant relationship with changes in apprehensions, but that the level of violence in the sending country and economic conditions in both the sending and receiving countries do have a causal relationship with apprehensions. This, again, suggests the significance of the push and pull factors of migration.

This analysis expands on the literature of the connection between domestic policy and migration by assessing the role that laws that allow undocumented immigrants to apply for driver's licenses and laws that discourage local authorities from protecting undocumented immigrants from Immigration and Customs Enforcement (ICE) have in driving migration from Central America and Mexico. Unlike the papers previously discussed, this analysis looks at aggregate, state-level migration data from the American Community Survey (ACS) rather than apprehensions at the border or another measure of migration. This approach to investigating the connection between domestic policy and international migration aims to assess how policy influences aggregate changes in migration rather than specifically examining a measurement of illegal migrants such as apprehensions at the border.

In accordance with the theory of change, the analysis explores two hypotheses. The first hypothesis states that driver's license laws for undocumented immigrants increase migration flows and stocks from Central America and Mexico. The second hypothesis is in line with the first hypothesis and states that laws that mandate local law enforcement to cooperate with ICE reduce migration flows and stocks from Central America and Mexico. To test these two hypotheses, the study uses a reduced form two-way fixed effects model, controlling for state and year fixed effects. The analysis assumes and tests for parallel trends in treated and untreated states and examines the as-if random take-up of state-level migration laws. The exploration of the take-up of migration laws specifically targets the endogeneity of migration law adoption as a threat to the validity of the causal link between migration

laws and changes in migration. The remainder of the paper includes a section describing the data used in the analysis, a section on methodology, the results of the statistical exercise, several robustness checks, and a concluding discussion framing the results of the analysis.

DATA SELECTION

The data used in this study comes from the American Community Survey (ACS) and includes an annual 1% population sample of households from the years 2001 through 2015. The dataset only includes years 2001 through 2015, rather than earlier years, for several reasons. Firstly, the ACS 1% sample changes into ten-year increments prior to 2001 and does not provide the granularity of annual changes that are observed from 2001 to 2015. Additionally, after September 2001 the level of security along the border increased by a substantial amount (Grieco, Meyers and Newland 2003). Therefore, observing immigration data from after 2001 allows one to assume that border patrol and immigration procedures were equally stringent across the 15 years in this data set. To operationalize the ACS data, the 1% sample of households was downloaded from the Integrated Public Use Microdata Surveys (IPUMS) website with variables that included the household head's birthplace, whether they were a citizen, the person-level weight of each household, and the state and year of each observation (IPUMS 2017). This data was collapsed in Stata, weighting by the person-level weight of each household, into each state and year summing households that were not citizens and born in either Mexico or a country in Central America.

In addition to the ACS data, state-level population counts were downloaded from the Bureau of Labor Statistics (BLS) database for each year and merged with the collapsed ACS data. With the migration data collapsed into each state and year, there are 765 unique observations, 51 states including the District of Columbia, and 15 years. The population counts were downloaded to calculate the dependent variable that represents changes in the stock of migrants from the two regions. This first dependent variable is a measurement of the proportion of the total population represented by migrants from Mexico or Central America. This was calculated by dividing the migrant counts for each state-year by the population of Mexican or Central American migrants in each state. The proportion variable represents a normalized measurement of annual stocks of migrants from the two regions that can be compared across states. The second dependent variable measures changes in the percent change in migrant counts from Mexico and Central America. This variable is simply the percent change in migrants from one year to the next in each state. Summary statistics for the two regions and two dependent variables can be found in Table(A) of Appendix(A).

There are two treatment variables used to represent supportive and hostile migration laws. The first treatment variable is a binary variable equal to 1 in years where states have laws that allow undocumented immigrants to apply for driver's licenses and equal to 0 in years and states that do not have the law. This variable was coded manually in Stata and corresponds to information from the National Immigration Law Center and a report from the Roger Williams University School of Law (National Immigration Law Center 2016). The undocumented license law captures the impact that supportive migrant laws have on migration from the Americas. The hostile laws are represented by a second binary variable equal to 1 in years where states have laws that limit local and state authorities' abilities to support undocumented migrants and equal to 0 in states and years without these laws. This variable was also calculated manually in Stata and corresponds to a list of states with similar hostile laws published by the New York Times in 2009 and information from the National Conference on State Legislatures (The New York Times 2012). States on this list have laws that require state and local law enforcement to find the immigration standing of an individual if there is "reasonable suspicion of an individual's immigration status" (Morse 2011). These laws, such as Arizona's SB 1070, make it a misdemeanor for migrants to travel without immigration documents and for citizens to transport undocumented immigrants. For reference, by 2015 there were 12 states with undocumented license laws in effect and 6 states with hostile immigration laws in effect. Utah is the only state in the dataset with both the undocumented driver's license law as well as a hostile immigration law. A list of states and years where the two policies are in effect can be found in Table(B) of Appendix(A).

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The two policy treatment variables in this study were selected over other potential policies for several reasons. Firstly, examining state-level policy, as opposed to federal policy, allows for variation in the adoption of policy across states. For example, federal laws such as DACA do not allow for differential treatment adoption across states because all states were mandated to adopt DACA at the same point in time across the country. To detect a causal link in observational data, there must be differential adoption of treatment across individual units in the data. Therefore, state-level policies are the appropriate level of treatment rather than national level policies. Secondly, the implementation of the chosen supportive and hostile policies is comparable across states. In other words, the similarities in how each state has implemented and used the chosen policies allows one to assume that the way the laws are enacted on the ground is analogous between each state. Therefore, the simple binary coding of the treatment variable satisfactorily represents the two policies.

Although this analysis includes the data previously described, there are other variables that would be useful in an ideal setting. Firstly, looking at changes in apprehensions at the border as a means of measuring changes in undocumented migration rates is a preferable way to measure the impact of state-level migration policy, specifically, on unauthorized migrants. Obtaining the apprehension data was not possible without a public records request and, therefore, was infeasible for this study. Also, it is possible that measurement error in the 1% ACS sample could impact the accuracy of the estimation of the regression coefficients. This could lead to attenuation bias and thus would bias the significance levels of the coefficients towards zero. Finally, ACS data is calculated to be accurate at a certain point in time, but may not accurately represent the trend in changes over time. This also could result in attenuation bias in the analysis presented here.

METHODOLOGY

The study uses two models to test the impact of domestic policy on changes in migration stocks and flows from Central America and Mexico. The first model tests the impact of supportive and hostile policy on changes in the proportion of migrants that come from the region. The two policies are represented in the model as separate dummy variables and the main dependent variable is the proportion of migrants from the two regions. Each region is run as its own separate regression so that the difference in the impact of the state-level laws on migration stocks from the two regions can be observed. In addition to the two treatment variables, this model includes state and year fixed effects. The state fixed effects control for time invariant characteristics of each state and the year fixed effects control for cross-sectional invariant characteristics for the entire United States. Finally, this model includes clustered standard errors at the individual state level to control for any bias that could be caused by autocorrelation and to account for the fact that the adoption of supportive and hostile laws occurs at the state level. The estimating equation for this model is shown here:

$$\text{Proportion Migrants}_{it} = \alpha_i + \theta_t + \delta_1 T1_{it} + \delta_{it} T2_{it} + \varepsilon_{it}$$

where each subscript (i) refers to the specific US state, each subscript (t) refers to the given year, Proportion Migrants corresponds to the proportion of migrants from Central America or Mexico separately, alpha (α) denotes the state fixed effects, theta (θ) denotes the year fixed effects, delta (δ_1) is the marginal effect of the undocumented license law dummy (represented by T1), delta (δ_2) is the marginal effect of the hostile law dummy (represented by T2), and epsilon (ε) represents the error term. No additional controls are tested in the model due to the challenge of interpreting the "net treatment effect" when mechanism variables are included in regression models. Furthermore, this analysis is fundamentally interested in the whole treatment effect of supportive and hostile policies rather than the net effect. Controls such as the unemployment rate or state GDP per capita could easily be proximate outcomes of domestic policies and thus would add endogeneity to the relationships being tested in the model. Moreover, the state and year fixed effects control for baseline differences in time invariant characteristics of US states.

The second model explores the impact that supportive and hostile domestic policies have on changes in migration flows from Mexico and Central America. The dependent variable is the percent change in the count of migrants from either region. As described in the previous model, the dependent variables are regressed on the two policy dummies and state and year fixed effects. Like the first specification, this model includes clustered standard errors at the state level, but unlike the first model, this specification weights each regression by the baseline count of migrants from Mexico or Central America, depending on which region is being tested. The analysis uses a weighted regression to account for differences in the baseline number of migrants from Central America or Mexico and for the un-normalized dependent variable. In addition, this model tests for a change in the rate of change of migrants rather than simply a change in in the proportion of migrants in each state. Accordingly, the second specification estimates a "triple differences" estimator rather than a difference in differences estimator. This model estimates the potential "kink" in the slope of the rate of change in migration from Mexico or Central America caused by either policy variable. The "kink" in the slope is indicative of a change in the rate of change between years caused by state-level policy adoption. The estimating equation is shown here:

$$\text{Percent Change in Migrants}_{it} = \alpha_i + \theta_t + \delta_1 T1_{it} + \delta_{it} T2_{it} + \varepsilon_{it}$$

where each subscript (i) refers to the specific US state, each subscript (t) refers to the specific year, Percent Change in Migrants corresponds to the percent change of the count of migrants from Central America or Mexico separately, alpha (α) denotes the state fixed effects, theta (θ) denotes the year fixed effects, delta (δ_1) is the marginal effect of the undocumented license law dummy (represented by T1), delta (δ_2) is the marginal effect of the hostile law dummy (represented by T2), and epsilon (ε) represents the error term.

It is worth noting the shortcomings of this method of testing the relationship between the two policy variables and migration. Firstly, two -way fixed effects remove a significant amount of variation in the dependent variable. As discussed previously, the concern for attenuation bias plus the amount of variation accounted for by the two-way fixed effects estimator could wipe out all observable variation in the dependent variable, causing a null result. Also, the relationship between the outcome variables and the two treatment variables is endogenous and may be impacted by reverse causality. The results of a test of the endogenous relationship between the policy binaries and the migration variables does not show a statistically significant relationship, but endogeneity is still a relevant concern. This test of endogeneity is expanded upon in the robustness checks section.

RESULTS

The results of the two models, shown in Table(D) and Table(E) in the appendix, are organized by empirical specification. The results of model 1 are shown in Table(D) and first include only the driver's license law treatment and then only the hostile law treatment. The final set of results in Table(D) includes both treatment variables. For both Mexico and Central America, the driver's license law does not have a statistically significant correlation with changes in the proportion of migrants. This suggests that, in terms of the aggregate stock of migrants from the two regions, the law on its own does not have an impact on changes in the proportion of the population represented by migrants from either region. Like the driver's license law, the hostile law also does not impact changes in the proportion of migrants from either Central America and Mexico. The full model, tested in the final two regressions in Table(D), shows a statistically insignificant coefficient for both the driver's license law and the hostile law. Thus, there is no initial evidence that either policy has a measureable impact on changes in the proportion of the population coming from Mexico or Central America.

The regression results in Table(E) show the results of the impact of the driver's license law and hostile law, tested separately and combined, on the change in the percent change in migrants from both regions. For Mexico, this test yields significant results for both laws tested separately and combined. Additionally, the coefficient estimates change little when they are combined into one regression. This is because only Utah has both laws. For

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Mexico, when states adopt driver's license laws, there is an average 2.1% increase in the percent change in migrants coming across the border. For the hostile law, controlling for driver's license laws, there is approximately a 4.4% decrease in the percent change of migrants coming from Mexico. Although these results are significant for Mexico, the practical impact is small. For perspective, a 2% increase in the percent change would yield a 0.33% change in the flow of migrants from Mexico. This equates to an approximately 718 migrant change in the percent change. From the perspective of the hostile law, the law is associated with a decrease of 1,523 migrants from Mexico. The initial evidence from the results for Mexico supports the stated hypotheses of the study where hostile policies deter migrants and supportive policies attract migrants, thus impacting migration flows from Mexico to the United States.

As for Central America, only the driver's license law has a statistically significant relationship with changes in the percent change in migrants coming from the region (at the 90% CI). Per the regression results from Table(E), the driver's law is associated with a 6.4% increase in the rate of change of migrants from Central America. In terms of the change in the percent change, this equates to approximately an increase of 817 people migrating from Central America. Like the results for the Mexico model, this relationship shows a small change in the percent change of migrants, but does provide evidence of a link between policy implementation and changes in the rate of change of migrants coming from Central America. Further robustness checks clarify whether the associations shown in the regression results are indicative of a causal relationship between state-level policy choices and changes in migration flows.

ROBUSTNESS CHECKS

The parallel trends assumption is necessary to make any statements about causality between the two tested laws and changes in either migration stocks or migration flows. To test for parallel trends, I regress the first differences of both the percent change variable and the proportion variable on the year of adoption of the hostile law and driver's license law. The results of this test are shown in Table(F) and Table(G) where none of the years of adoption are significantly different from one another. This suggests that there are parallel trends between the staggered entry groups that adopted each of the laws.

With this said, there is still the endogenous relationship that exists between changes in migration from Latin America and adoption of either of the treatment policies. There is a reasonable argument to be made that adoption of laws that are directed towards immigrants is driven by changes in the flow of migrants to the US. This reverse causal relationship makes it difficult to say that policy causes changes in migration rather than the relationship going in the other direction. To test this, I use a logit regression with each of the laws regressed on the raw counts of migrants from Mexico and Central America variables, two leads of the raw counts, and three variables that capture specific characteristics of each state.

These include the unemployment rate of each state, the state GDP per capita, the state's population in each year, and a linear time trend. The unemployment rate, GDP per capita, population count, and linear time trend control for the impact that these variables have on adoption of supportive or hostile laws. In addition to the controls, the probability model includes clustered standard errors at the state level to account for autocorrelation. State-level unemployment data is from the Bureau of Labor statistics and GDP per capita data is from the Bureau of Economic Analysis (Bureau of Economic Analysis 2017) (Bureau of Labor Statistics 2017). These data were merged with the migration dataset to perform the endogeneity check. Summary statistics for the additional variables can be found in Table(A) of Appendix(A).

Table (H) shows the results of the probability analysis, with additional explanation of the estimating equation provided in the appendix as well. As seen in the table, none of the coefficients are statistically significant. This includes both the leads of the migrants counts from Central America and Mexico as well as the demographic variables in the regression. The analysis shows little connection between the number of migrants coming from Latin America and adoption of either of the state level laws. This result does not mean that there is no impact of

migration on law adoption, but it does show that, for this data set, there is no clear reversal causal link driving the results of the regression analysis.

The final robustness check tests for a discontinuous treatment effect of both policy variables on changes in migration flows from Central America and Mexico. This check explores the extent to which the adoption of either law may be causing a change in the percent change in migration from the two regions, rather than just being correlated with changes. The analysis uses a locally weighted regression (LOWESS) graph to illustrate the impact of the undocumented license law and the hostile law. Appendix B shows the average trend of changes for both Central America and Mexico. Overall, there was an upward trend in the change of percent changes in states that adopted driver's license laws prior to the initiation of the law. In case of Central America, the change in the rate of change decreased in periods after law adoption.

This implies that the license law did not have a clear impact on the flow of migrants from Central America. For Mexico, the upward trend became steeper after law adoption, which suggests that the adoption of the undocumented license law caused an increase in the rate of change of migrants. The regression results, along with the "kink" in the rate of change is evidence that supports the hypothesis posed in this study where supportive laws encourage migration from Mexico. As for the hostile license law, we see an Ashenfelter's dip in the relationship between the anti-illegal migrant laws and changes in the rate of change for both regions. This suggests that states that adopted hostile laws reverted to the average percent change in migration after law adoption. Specifically, migration rates declined as laws were adopted and then returned to the average by 4 periods after the take up of hostile policy. This result brings into question the deterrence effect of hostile laws on migration flows. Overall, the robustness check analysis supports the hypothesis of the deterrence and attraction effect for Mexico, but do not support this same effect for Central America.

CONCLUSION   33

This study uses a large panel of state level migration data for years 2001 through 2015 to test the impact of domestic state-level policy on migration stocks and flows from Mexico and Central America. The two models used in the analysis assess the impact of these laws on changes in the proportion of migrants and changes in the percent change of migrants from both regions. The study finds that supportive and hostile laws have no correlation with changes in the stock of migrants from either region, but the results do show evidence of a causal relationship between the two laws and changes in migration flows from Mexico. Adoption of the driver's license law causes a 2.1% increase in changes in migration flows from Mexico and is associated with a 6.4% increase in changes in migration flows from Central America. The hostile law has a significant relationship with changes in migration flows from Mexico, but not from Central America.

The results indicate that adoption of hostile laws causes a 4.4% decrease in the change in migration flows from Mexico. The analysis meets the parallel trend assumption necessary for causal identification, but only finds a causal link between adoption of the two laws and changes in migration from Mexico. The LOWESS plot in Appendix(B) shows that the driver's license laws were adopted during an already existing trend in changes in migration rates, but for Mexico the trend in changes steepened after law adoption. For Central America, the trend declined after law adoption, which suggests that the statistically significant relationship is not evidence of causation. The hostile law LOWESS plot does show an Ashenfelter's dip, indicating reversion to the average trend after law adoption, but for Mexico there is satisfactory evidence to support the attraction and deterrence hypotheses.

Considering the lack of a significant relationship between the two tested laws and changes in the proportion of migrants coming from either region, it may be the case that this study is too underpowered to observe a significant change. One can multiply 2 times the standard errors of the coefficient results for the proportion variables to estimate what the minimum detectable treatment effect (MDE) would be, given the sample size of states used in

this analysis. In the case of the proportion variable for Mexico, the standard errors for the driver's license coefficient estimate are 0.000314, which suggests that the MDE of the driver's license law on the proportion of migrants from Mexico is 0.000628. This equates to an observable change of approximately 15,000 people out of the total average Mexican population of each state. For Central America, the standard errors for the driver's license coefficient are 0.000204, which suggests an MDE of 0.000408 or a change of 9,700 people out of the total average Central American population of each state. In both cases, the minimum detectable effect is sizeable, which suggests that this analysis may be underpowered and that the null result is not a definitive zero.

This MDE analysis shows that too little statistical power may be a threat to the validity of this analysis. There are, however, several factors that also impact the strength of the study presented here. Firstly, the ACS data may contain substantial measurement error with regards to changes in migrants over time. This could cause attenuation bias in the estimation of the coefficients, especially for the proportion variables. Also, the way this study tests the treatment variables, as dummy variables that turn on in the year of law implementation, may not be a satisfactory way to test the impact of the two laws. A continuous treatment variable could better capture the impact of each of these laws and could give a more accurate estimation of the impact. An example is using changes in the number of ICE officials in each state as the hostile law treatment rather than the binary variable. Finally, the dependent variables in this analysis do not specifically measure changes in undocumented migrants, but look at aggregate migration. Examining a variable such as the number of apprehensions at the border could offer a more accurate means to measure the impact of each of these laws.

Looking ahead, there are several areas for future research. Firstly, it would be interesting to perform a similar analysis, but with apprehensions at the border as the principle dependent variable. Additionally, adding in country specific push and pull factors into the study would give a more robust picture of how the two tested laws influence migration flows from Latin America. Also, this study leaves little room to examine the heterogeneity of the treatment effect of supportive and hostile laws directed towards undocumented migrants. For example, a data set with observations at the city or county level would offer a means of exploring the differences in how domestic policy influences migration across cities and counties. This would also allow for the treatment effect to be compared across urban and rural areas as well as across states. Although there is room for deeper analysis, this study used available public data to perform a thorough analysis of the impact of state level policy on migration from Latin America.

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APPENDIX A: TABLES

	(1)	(2)	(3)	(4)	(5)
Table(A): Summary Statistics for Dependent and Independent Variables					
Region	**Variable**	**Mean**	**Standard Deviation**	**Min**	**Max**
Mexico	Proportion of Population	0.0053	0.0066	0	0.0306
Mexico	Percent Change in Migrant Count	0.1661	1.082	0	19.13
Central America	Proportion of Population	0.0015	0.0017	0	0.01
Central America	Percent Change in Migrant Count	0.2385	1.154	0	16.74
All	Unemployment Rate	6.51%	2.25%	2.68%	14.12%
All	GDP per Capita (Real USD)	$48,411.25	$18,128.24	$28,856	$170,687
All	Total State Population	23,800,000.00	26,600,000.00	1,978,628	156,000,000

Standard errors in parentheses
$^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table(B): Summary Statistics for Treatment Variables

Undocumented Driver's License Law

State	Year in Effect
Washington	1993
Utah	2005
California	2013
Colorado	2013
Connecticut	2013
District of Columbia	2013
Illinois	2013
Maryland	2013
Nevada	2013
Vermont	2013
Delaware	2015

Hostile Immigrant Law

State	Year in Effect
Arizona	2010
Alabama	2011
Georgia	2011
Indiana	2011
South Carolina	2011
Utah	2011

Table(D): Regression Results for Proportion Variables

VARIABLES	(1) Mexico Proportion	(2) Central America Proportion	(3) Mexico Proportion	(4) Central America Proportion	(5) Mexico Proportion	(6) Central America Proportion
Driver's Law	-0.000307	5.62E-05			-0.000324	5.44E-05
	(0.000291)	(0.000205)			(0.000314)	(0.000204)
Hostile Law			-0.000713	-7.85e-05	-0.000724	-7.67e-05
			(0.000814)	(0.000106)	(0.000818)	(0.000103)
Constant	0.00440***	0.00106***	0.00439***	0.00106***	0.00440***	0.00106***
	(0.000123)	(7.97e-05)	(0.000125)	(7.52e-05)	(0.000127)	(7.96e-05)
Observations	765	765	765	765	765	765
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
R-squared	0.991	0.957	0.991	0.957	0.991	0.957

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table(E): Regression Results for Rate of Change Variables

VARIABLES	(1) Mexico Proportion	(2) Central America Proportion	(3) Mexico Proportion	(4) Central America Proportion	(5) Mexico Proportion	(6) Central America Proportion
Driver's Law	0.0268***	0.0420**			0.0213**	0.0646*
	(0.00997)	(0.0194)			(0.00875)	(0.0324)
Hostile Law			-0.0496***	-0.149	-0.0440***	-0.0609
			(0.0150)	(0.0903)	(0.0149)	(0.0479)
Constant	0.0769***	0.160***	0.0775***	0.161***	0.0771***	0.215***
	(0.0115)	(0.0350)	(0.0118)	(0.0354)	(0.0113)	(0.0515)
Observations	708	696	708	696	708	701
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
R-squared	0.303	0.192	0.305	0.195	0.306	0.139

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table(F): Parallel Trends Test for Driver's License Law Variable

VARIABLES	(1) Difference Mexico Proportion	(2) Difference Central America Proportion	(3) Difference Mexico Rate	(4) Difference Central America Rate
Adopted 2001		1.34E-05	0.0458	-0.0982
		(3.49e-05)	(0.0718)	(0.107)
Adopted 2005	-9.06e-05	6.51e-05	0.0566	0.0779
	(0.000345)	(0.000107)	(0.0742)	(0.561)
Adopted 2013	-0.000304	-4.23e-05	0.649	-0.0903
	(0.000185)	(0.000132)	(0.671)	(1.051)
Adopted 2015	0.000285	0.000439	0.617*	-1.726
	(0.000223)	(0.000457)	(0.355)	(2.371)
Constant	0.000230	5.20e-05***	-0.0510	-0.0178
	(0.000143)	(1.42e-05)	(0.0512)	(0.0622)
Observations	56	714	657	645
R-squared	0.052	0.005	0.009	0.003

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table(G): Parallel Trends Test for Hostile Law Variable

VARIABLES	(1) Difference Mexico Proportion	(2) Difference Central America Proportion	(3) Difference Mexico Rate	(4) Difference Central America Rate
Adopted 2010		-6.65E-05	0.0278	0.0314
		(6.98e-05)	(0.0593)	(0.146)
Adopted 2011	0.000572	-2.38e-05	-0.00839	0.0163
	(0.000379)	(4.09e-05)	(0.0596)	(0.0970)
Constant	-0.000712*	5.46e-05***	-0.0232	-0.0287
	(0.000372)	(1.45e-05)	(0.0558)	(0.0736)
Observations	31	714	657	645
R-squared	0.169	0	0	0

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

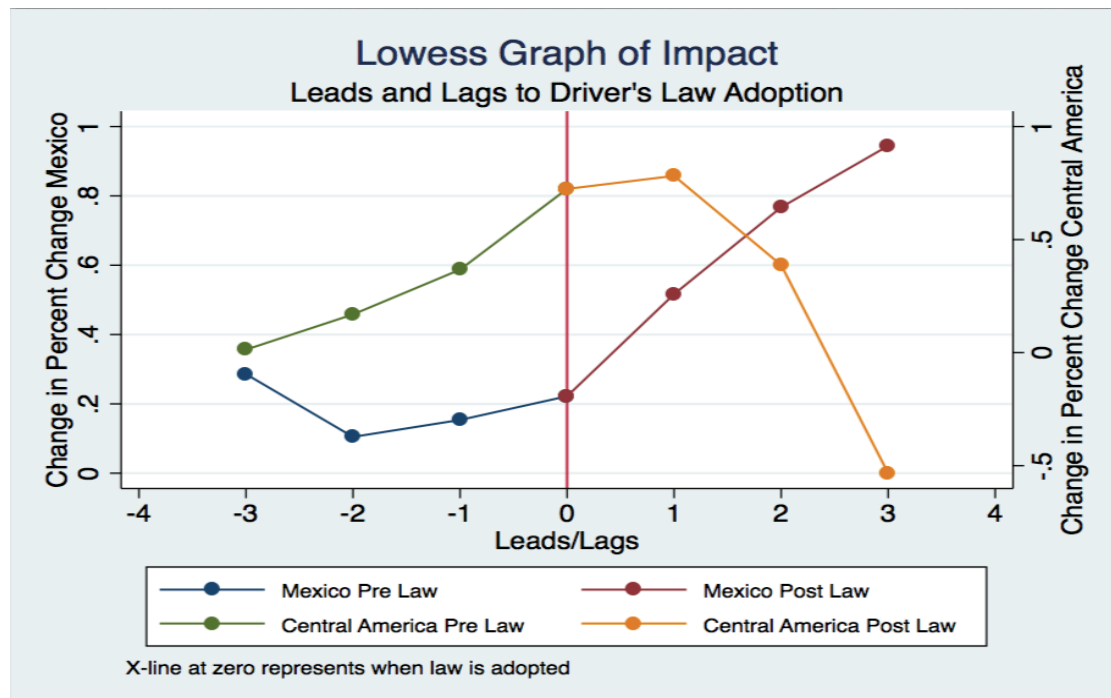Table(H): Probability Analysis for Adoption of Hostile and Supportive Laws

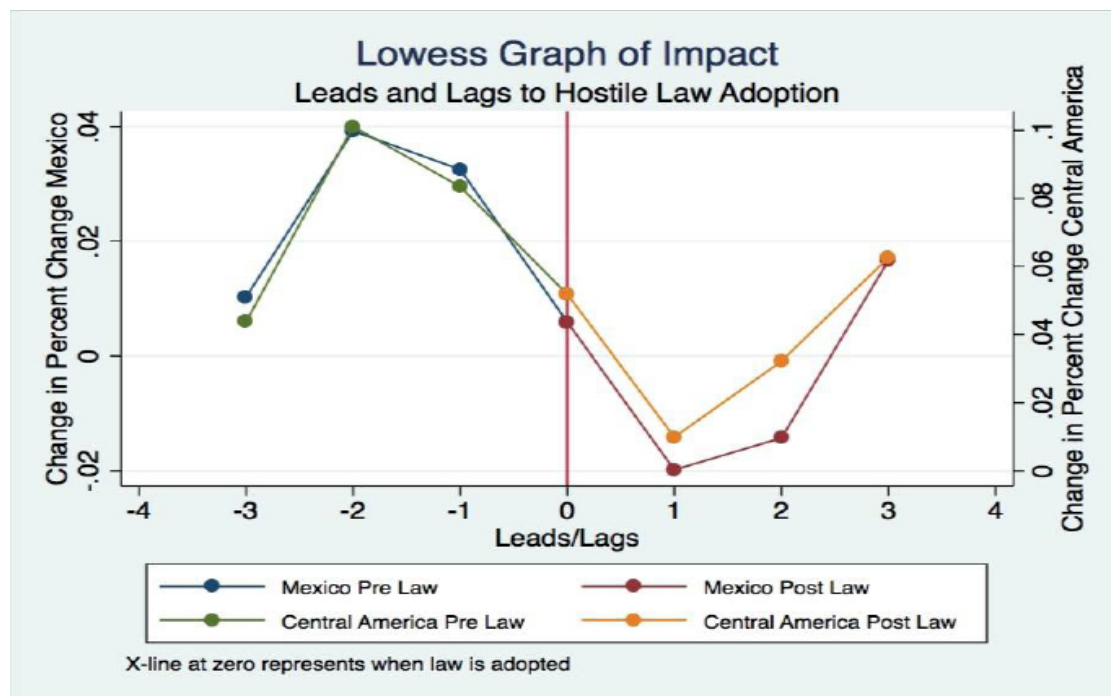| VARIABLES	(1) Driver's Law	(2) Hostile Law
Second Lead Mexico	1.45E-07	1.54E-10
	(4.86e-06)	(0.0000126)
First Lead Mexico	2.01E-07	-1.24E-09
	(4.10e-06)	(0.00000528)
Mexico	-3.08E-07	1.27E-09
	(2.91e-06)	(0.0000151)
Second Lead Central America	8.07E-08	3.65E-09
	(1.20e-05)	(0.0000194)
First Lead Central America	-2.41E-07	-6.68E-09
	(9.83e-06)	(0.0000305)
Central America	-1.24E-07	1.74E-09
	(1.62e-05)	(0.0000255)
Unemployment Rate	0.0023	0.00003
	(0.0071)	(0.00006)
Population Estimate	1.90E-10	1.55E-12
	(2.29e-08)	(0.0000000267)
GDP per Capita	3.34E-07	-1.09E-08
	(7.36e-06)	(0.0000415)
Year	0.0046	0.00008
	(0.0045)	(0.0017)
Constant	-203.25	-2127.28***
	(-222.86)	(536.25)
Observations	663	663

*** p<0.01, ** p<0.05, * p<0.1

*Standard errors clustered at State Level

*Coefficients are reported as marginal effects

APPENDIX B: GRAPH OF TREND OF IMPACT OF DRIVERS LICENCE LAW AND HOSTILE LAW ADOPTION

Parallel Trade in

Hong Kong

Policy Failure of Powdered Formula Restriction in Hong Kong

BY CATHERINE LI
GENEVA GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

INTRODUCTION

As the volume of parallel trade across the border of Hong Kong Special Administrative Region (SAR) and Mainland China has steadily increased, Hong Kong's government passed regulations aimed at restricting the number of times people could cross the border within a given time frame and the amount of items they were allowed to bring back with them, especially powdered infant formula. This paper analyzes the effect of the powdered formula restriction in Hong Kong using a simple game theory model. The effect becomes clear when we introduce a third player, normal travelers, who are incentivized to join the parallel trade business after the restriction was introduced. Participation of normal travelers in parallel trade makes it significantly harder for law enforcement agencies to distinguish between smugglers and travelers, increasing the costs of action and decreasing the incentives of inspection. As a result, the restriction encourages parallel traders to trade more often than ever before, while simultaneously discouraging law enforcement agencies from carrying out routine inspections. This restriction should be reconsidered. One possible solution would be to establish a government-run e-commerce platform to facilitate goods transportation and sales.

BACKGROUND

Parallel trade in Hong Kong refers to the phenomenon of Mainland Chinese, as well as local Hong Kong people, taking advantage of multiple-entry individual visit scheme endorsements, which gives individual visitors from Mainland China unlimited entry into Hong Kong for tourism purposes, to import goods from Hong Kong to Mainland China. Goods subjected to a high import tax in Mainland China are frequently smuggled by the organized parallel traders across the border into their underground sales network located in the border city Shenzhen. Organized parallel traders have established mature "supply chains" and have developed distribution systems to facilitate their trading activities.

Food safety issues in Mainland China have made powdered infant formula one of the most frequently traded goods. When news broke in 2008 that local companies were mixing melamine into their baby formulas, which led to an estimated 300,000 infants growing ill from consuming the tainted milk powder and leading to six infant deaths, domestic baby milk formula brands have become extremely unpopular and, in the years since the scandal, concerned parents in Mainland China have developed a strong preference for foreign brands of formula. A profitable business has emerged in Hong Kong where organized groups of parallel traders buy up all the powdered infant formula within Hong Kong's supermarkets and stores (at prices lower than those in Mainland China), hand-carry those cans across the border into Mainland China, and then re-sell them with a 15% mark-up. At peak operating capacity, organized parallel traders cross the border over 20 times a day by taking advantage of the multi-entry individual visit scheme.

The large volume of powdered formula brought from Hong Kong into Mainland China has resulted in a powdered formula shortage within Hong Kong, increasing the price of milk powder there and causing large-scale anti-parallel-trade demonstrations in Hong Kong. The South China Morning Post reported that up to 93% of pharmacies in 10 districts most popular among formula shoppers experienced insufficient supplies. In order to address the concerns of local citizens and stop the multi-entry individual visit scheme from being exploited by parallel traders, the Hong Kong government introduced amendments to its export regulations in 2013, which contains the following provisions :

"(The Regulation) prohibits the unlicensed export of powdered formula, for infants and children under 36 months. (The Regulation) does not apply to powdered formula that is exported in the accompanied personal baggage of a person aged 16 or above leaving Hong Kong, if (i) the formula does not exceed 1.8 kg in total net weight; and (ii) the person did not leave Hong Kong in the last 24 hours. Offenders are liable on conviction to a fine of HK$500,000 and to imprisonment for 2 years."

The Milk Powder Limit was passed to reduce the volume of powdered formula being sent to Mainland China by limiting the number of times individuals could enter Hong Kong and the amount of milk powder that could be taken outside of Hong Kong on any given visit (limit of two cans per person per visit). However, reports indicate that parallel trading in powdered infant formula is still as active as before—if not more active—with smugglers mobilizing larger numbers of travelers in reaction to the two-tin limit . An inspection at Lo Wu Border Checkpoint over a weekend found several dozen milk traders with trolleys full of milk powder. According to the South China Morning Post, these smugglers were collecting different brands of milk powder and handing out cash to travelers. The next sections are intended to show why restrictions were unlikely to be effective in curbing the parallel trade given the incentives they gave to normal citizens to carry powdered formula within the legal limit for parallel traders.

THE THIRD PLAYER AND THE NEW GAME: UNKNOWN COUNTERPARTY FOR LAW ENFORCEMENT AGENCIES

The game has changed with the presence of a third player. With the participation of normal travelers in parallel trading activities, the homogeneity within organized parallel trading groups has broken down. Before the policy was passed, organized parallel trading groups consisted almost entirely of full-time professional carriers; now, however, the number of full-time professional carriers is relatively small compared to the large population of normal citizens incentivized and urgently needed to conduct part-time parallel trading activities. These two types of parallel traders have distinct characteristics and react very differently to the moves of the law enforcement agencies. We therefore divide the organized parallel traders into two types: smugglers and travelers. 43

Smugglers are professional parallel traders who have been organizing parallel trading activities across borders long before the powdered milk formula restriction was implemented. Most smugglers have criminal records related to tax evasion (they don't pay import taxes on goods smuggled into Mainland China). Being caught crossing the border at a suspicious frequency would get them into trouble, even if they were carrying amounts of goods within the legal limits. Faced with the risk of heavy punishment on suspected recidivism, given their previous criminal records, and the risk of being accused of illegal employment, smugglers would like to avoid being caught by law enforcement agencies.

On the other hand, travelers are normal citizens who are incentivized to join parallel trading activities casually after the powdered milk formula restriction was passed. They carry powered milk formula part-time for smugglers as they commute between Hong Kong and the Mainland. There is no legal risk faced by travelers. They prefer to conduct trade regardless of what law enforcement agencies do, to earn the profit from selling it back.

In this new game, law enforcement agencies don't know for certain with whom they are playing against. When they decide to act, they have no idea whether the person inspected is a smuggler or a traveler. Similarly, when they decide not to act, they don't know whether they just let a smuggler, or a traveler, go free. Law enforcement does, however, have a set of beliefs about whether the trader is a smuggler or a traveler. They attach probability p to the trader being a traveler, so (1-p) is the probability that the trader is a smuggler.

INCENTIVIZED TRAVELERS AND DISPERSION OF PARALLEL TRADE ACTIVITIES

Before the restriction, organized parallel traders were able to choose between conducting parallel trade activities or not conducting parallel trade activities. On the other hand, law enforcement agencies could choose

between action (for example, inspection of hand luggage) or inaction. The law enforcement agencies believed that the probability that organized parallel traders would conduct trade activities is q — the key variable we would like to study. In evaluating the effect of powered formula restriction, we are essentially looking at the probability of parallel trade activities happening before and after the restriction was imposed. If q decreases after the milk powder policy was implemented, the policy is considered successful in the sense that it reduces parallel trading activities; if, however, q increases after the milk powder policy was implemented, the policy should be considered a failure because it, instead, resulted in a higher frequency of parallel trade.
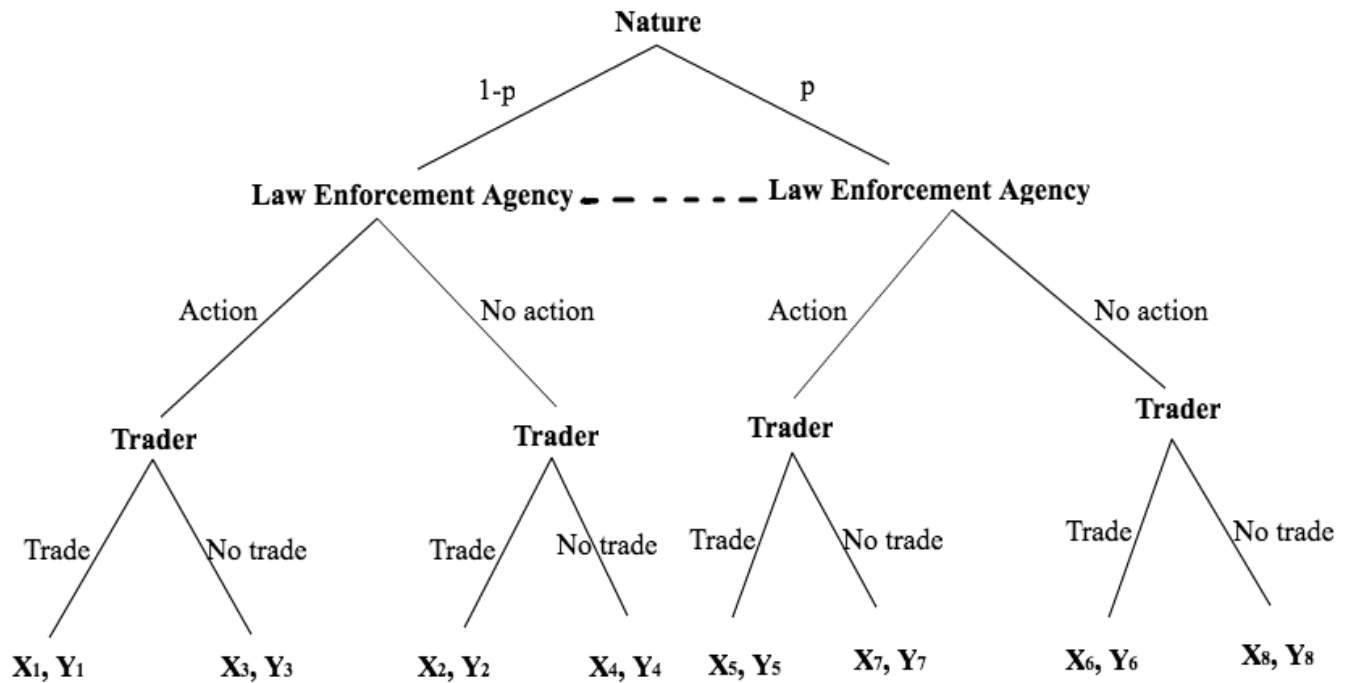
After the powdered formula regulation was implemented, organized parallel traders could no longer travel across the Hong Kong-Mainland China border multiple times a day carrying milk powder to sell on the mainland. Intended as a crackdown on parallel traders, exports of milk powder from Hong Kong were restricted to no more than two cans of milk powder per person and per day. However, the organized parallel trading groups would not be so easily thwarted and were far more resourceful than the government initially though.

The solution that the parallel traders came up with was to simply recruit more people (mostly normal daily commuters) to carry milk powder across the border for them. While simple, the incentives for these daily commuters to engage in the parallel trade were high: large numbers of Hong Kong and Mainland Chinese residents travel across the border weekly or even daily for studies, work, shopping, vacation, or family visits, and a small "favor"—taking two cans of milk powder from the organized parallel traders waiting on the Hong Kong side, carrying the milk powder through the customs inspections, and then handing them over to the parallel trade organization on the Mainland China side—could earn them as much as HK$60. As the entire process took very little time (around two minutes), with zero-risk or liability to the daily travelers even if pulled aside for inspection by law enforcement authorities, there simply were no reasons for these ordinary travelers to not participate in the parallel trade. We should thus expect more normal travelers who haven't engaged in parallel trade before now joining the "supply chain" as part-time carriers working for the organized parallel traders.

Indeed, normal travelers have a strong incentive to participate in the parallel trade as the third player. Recall that the action of normal travelers carrying two cans of milk powder across exposes them to no legal risk, so that, even if law enforcement agencies decide to inspect, individuals carrying within the limit will not get into any trouble. For normal travelers who have not been involved in parallel trade activities before, if the organized parallel traders choose to conduct trading, then they would prefer to carry two cans of milk powder across the border to earn easy pocket money from organized parallel traders; if organized parallel traders choose not to conduct trading and do not show up, travelers are indifferent between carrying or not. Therefore, most would carry for organized parallel traders.

Consequently, we would expect to observe a sharp increase in the number of part-time carriers carrying two cans of milk powder each across the border, instead of the previous situation where the same groups of full-time carriers were making round trips. As a result, the parallel trader groups would grow both in size and number and the wide-spread transport of milk powder makes it harder to distinguish between real smugglers and normal travelers. The rising difficulty and cost of inspection would discourage the law enforcement agencies to act against parallel trade activities. Knowing that, parallel traders would conduct trade more frequently than ever before. The restriction thus would result in a higher probability of parallel trade happening than before. This result is proved in Appendix 1.

INSPECT OR NOT: WHAT AFFECTS THE DECISION OF LAW ENFORCEMENT AGENCIES?

where $x_1, x_2 \ldots x_8$ are payoffs for law enforcement agencies,

and $y_1, y_2 \ldots y_8$ are payoffs for traders

In this section, we try to distinguish the effect the key variable on the decision of inspect or not—subjective probability of the trader being a traveler (p), through backward reasoning. Recall that normal travelers are incentivized to carry two cans of milk powder for the smugglers, and smugglers have an urgent need for additional part-time carriers to continue carrying the same amount of goods as before the restriction. Many individual travelers will be attracted to the business, and these travelers will outnumber the smugglers. Thus the subjective probability of a trader being traveler p should not be smaller than 1/2. In fact, it is closer to 1, since the number of travelers should be significantly larger than that of smugglers.

The behavior of traders is rather easy to understand. As indicated by the arrows above, smugglers prefer not to trade when there is inspections, and prefer to trade when there are none; travelers prefer to trade and earn their pocket money either way. To understand the behavior of law enforcement agencies, we have to take two situations into account: (1) when they are playing against smugglers, and (2) when they are instead dealing with travelers. If law enforcement agencies knew that they were dealing with a traveler (point B), they would prefer not to act because it would just be a waste of time and resources; if they know that they are dealing with a smuggler (point A), they have make their choice between taking action but coming away empty-handed (prefer x_3) and let the smuggler go by not taking any action (prefer x_2).

CONCLUSION: STRONG AND STILL GROWING RELUCTANCE TO INSPECT

Proofs in Appendix 2 shows firstly that law enforcement agencies are less likely to inspect, and secondly, the likelihood of inspection will further decrease with the rising proportion of travelers among all the traders.

Previous discussion in Appendix 1 already showed that the Powered Formula Restriction gave incentive for normal travelers to flood into the business. With the number of travelers continuing to grow under the Restriction, law enforcement agencies will be more reluctant to inspect.

POLICY RECOMMENDATIONS

Instead of cutting the flow of goods from Hong Kong into Mainland China, the Hong Kong SAR government should invest more resources into building an official trading channel. The Powered Formula Restriction not only increases the volume of parallel trade, but also makes the law enforcement agencies more reluctant in acting against smuggling.

The problem of massive parallel traders buying in Hong Kong and selling in China originates from the fundamental differences in market systems. The lack of formal trading channel between Hong Kong and China leaves organized parallel traders with arbitrary opportunities to take advantage of differing prices for the same goods. As long as the market in Mainland China is not self-clearing, there is profit to be earned by buying low and selling high till the point where supply meets demand.

The Milk Powder Restriction was designed to discourage organized parallel traders by increasing the difficulty for them to transport goods across the border. But policies of this kind would never reduce parallel trade and smuggling activities. In this sense, the restriction only served to disperse the distribution of payoffs slightly from organized parallel traders to normal travelers—individuals that became the new and growing army of parallel traders. The Milk Powder Restriction makes little sense because the profit from parallel trade will continuously attract new players, new carriers and new traders into this business.

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The differences between the two market systems provide the best chance to boost the retail business in Hong Kong. Hong Kong government should take advantage of its being a free port and aim at establishing agreement with the Mainland on exported goods. Through connecting supplies from the free port to the booming demand for foreign goods in Mainland China by an e-commence network, goods exported from Hong Kong can be easily supervised and cheaply transported.

The problems of local market distortion and tax evasion can also be avoided through prior-planning and well-recorded sales through such an official online platform, which is expected to reach a wider range of customers in Mainland China and retailers in Hong Kong, and provide more tax revenue for the Hong Kong SAR government. By splitting profits earned by organized traders to retailers, the online platform appears to be attractive for the retail businesses. The government could provide value-added services and further integrate joint retailers so that the whole industry benefits from economies of scale.

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APPENDIX 1. GAME THEORETICAL SOLUTION TO THE INCREASED PROBABILITY OF PARALLEL TRADE

As the previous discussion suggests, powdered formula restriction is likely to result in increased parallel trade activities, because law enforcement agencies are likely to become reluctant. Appendix 1 demonstrates the same result by showing how the probability of parallel trade changes in response to the restriction and the inclusion of normal travelers in parallel trade.

	Organized Parallel Traders		
Law		Parallel trade (q)	No parallel trade (1-q)
Enforcement Agen-	Action (p)	x_1, y_1	x_3, y_3
cies	No action (1-p)	x_2, y_2	x_4, y_4

where x_1, x_2, x_3, x_4 are payoffs for law enforcement agencies;
and y_1, y_2, y_3, y_4 are payoffs for organized parallel traders.

For organized parallel traders, if they know there will be inspection at customs, they prefer not to conduct trading activities; and if they know there won't be any inspection, they then would prefer to conduct trading activities. Thus $y_3 > y_1, y_2 > y_4$. Similarly, for the law enforcement agencies, if they know organized parallel traders will show up, they prefer to take action than not; and if they know organized parallel traders won't show up, they prefer not to take action. Thus $x_1 > x_2, x_4 > x_4$.

As indicated in bold, there is no pure strategy Nash Equilibrium in this game. Players will want to randomize between the two strategies. For law enforcement agencies to be indifferent between two options, we should have to

$x_1 q + x_3(1-q) = x_2 q + x_4(1-q)$

$q = (x_4 - x_3)/((x_1 - x_3) - (x_2 - x_4))$

Consider the possible changes in the payoffs of law enforcement agencies to take action and not to take action. For example, when there is a strong wave of protests calling for strengthening law enforcement against parallel trade, the payoffs for the authority to take action x_1, x_3 generally increase. Here we assume that payoffs increase (or decrease) at same amount. It means that when faced with public pressure in strengthening law enforcement, the increase in payoff to take action when there is parallel trade equals to the increase in payoff to take action when there is no parallel trade. That is, $(x_1 - x_3), (x_2 - x_4)$ are constants.

After the third player is incentivized in joining the trade business, it would be harder for law enforcement agencies to distinguish between normal travelers and organized parallel traders. That is, the payoff of action for law enforcement agencies (x_1 and x_3) decreases, and the payoff for them to not take action (x_2 and x_4) increases. Recall that in the above equation of q, $(x_1 - x_3)$ and $(x_2 - x_4)$ are constants. Thus when x_4 increases and x_4 decreases,

(x_4-x_3) would increases, and so does the probability of parallel trade happening. Game theory proves our narrative that the milk powder restriction is considered to be a policy failure. Reversely, it results in dispersed growth of parallel trading groups and increased probability of trade activities.

APPENDIX 2: GAME THEORETICAL SOLUTION TO THE BEST RESPONSE OF LAW ENFORCEMENT AGENCIES

This section provides theoretical proof that (1) the possibility for law enforcement agencies to take action is less likely than for them to not take action, and (2) the higher subjective probability of the trader being a traveler, the less likely law enforcement agencies will take action. The best response by law enforcement agencies depends on:

Expected Utility (Action)=$(1-p)$ x_3+px_5,
Expected Utility (No action)=$(1-p)$ x_2+px_6.

Law enforcement agencies' best response is to play Action,
if $(1-p)$ $x_3+px_5>(1-p)$ x_2+px_6, or $(1-p)(x_3-x_2)>p(x_6-x_6)$,
as $(1-p)>0,(x_6-x_5)>0$, divide by $(1-p)(x_6-x_5)$,
$(x_3-x_2)/(x_6-x_5)>p/(1-p)$

and their best response is to play No action,
if $(1-p)$ $x_3+px_5>(1-p)$ x_2+px_6, or $(1-p)(x_3-x_2)>p(x_6-x_6)$,
as $(1-p)>0,(x_6-x_5)>0$, divide by $(1-p)(x_6-x_5)$,
$(x_3-x_2)/(x_6-x_5)<p/(1-p)$

Bolsa Família in

Brazil

How the Distance to Urban Centers can Affect Access to the Conditional Cash Transfer Program

BY CAMILA GOMES
UC SAN DIEGO SCHOOL OF GLOBAL POLICY AND STRATEGY

INTRODUCTION

Bolsa Família is one of the largest conditional cash transfer programs (CCT) in the world, benefiting around 14 million families in Brazil. The program was based on a previous CCT policy launched in the nation's capital in 2001: the Bolsa Escola. With a focus on improving educational outcomes, Bolsa Escola provided cash transfers to poor families with school-age children, conditional on their enrollment in school. In 2003, the program was merged with three other conditional and unconditional cash transfer measures, and relaunched with the Bolsa Família name.

In contrast with a similar Mexican CCT, Progresa (now rebranded as Prospera), Bolsa Família was not implemented as a randomized controlled trial. Hence, studies that measure the Brazilian program's impact were not as numerous or accurate in measuring its benefits. A few studies, however, indicate that Bolsa Família has significantly increased enrollment, lowered school dropouts and raised grade promotion rates (Glewwe & Kassouf 2011). Additionally, many authors stress how Bolsa Família has contributed to important decreases in inequality and poverty. For instance, Soares(2006) found that between 1995 and 2004, the Gini index in Brazil fell almost 5% and that Bolsa Familia was responsible for 21% of the variation. Zepeda (2006) indicates that after the implementation of Bolsa Família, the incidence of poverty declined by 5% while the severity of poverty was reduced by 19%.

13 years after its inception, Brazilian society considers Bolsa Família a public policy success and the political costs involved in cutting the program are high enough to guarantee that Bolsa Família will enjoy a long life. Efforts in the last few years have focused on extending its coverage and benefits. In 2015, the average proportion of low-income families in Brazil receiving Bolsa Família benefits was around 70%. While this high percentage suggests a successful targeting and coverage approach, the disparities across Brazilian territory are striking.

Figure 1 shows the proportion of low-income families (identified by the 2010 census) who received benefits from Bolsa Família in 2015. This scenario seems to confirm scholars' claim that there is a trade-off between extending coverage and effectively targeting potential CCT beneficiaries (Soares, Ribas & Osório 2010). Although the CCT program is able to serve 70% of low-income Brazilian families on a national level, the proportion of low income families receiving Bolsa Família in many municipalities is less than 40%, while in others the number is greater than 140%, which exceeds the national census estimate of the number of low income families.

Although percentages above 100% can be explained by an increase in the number of low-income families between 2010-2015, the magnitude of this discrepancy also points to targeting income verification problems. Although there is cross-checking of income data, the process is not perfect and can involve inclusion errors from wrong or fraudulent self-reported income. Additionally, income volatility may explain discrepancies if families are not necessarily poor but have an unusual low income at the time of applying to the program.

This paper indicates that a spatial analysis of the distribution of Bolsa Família benefits can help explain the geographical disparities regarding CCT coverage and indicate how spatial approaches can provide insights to improve both coverage and targeting
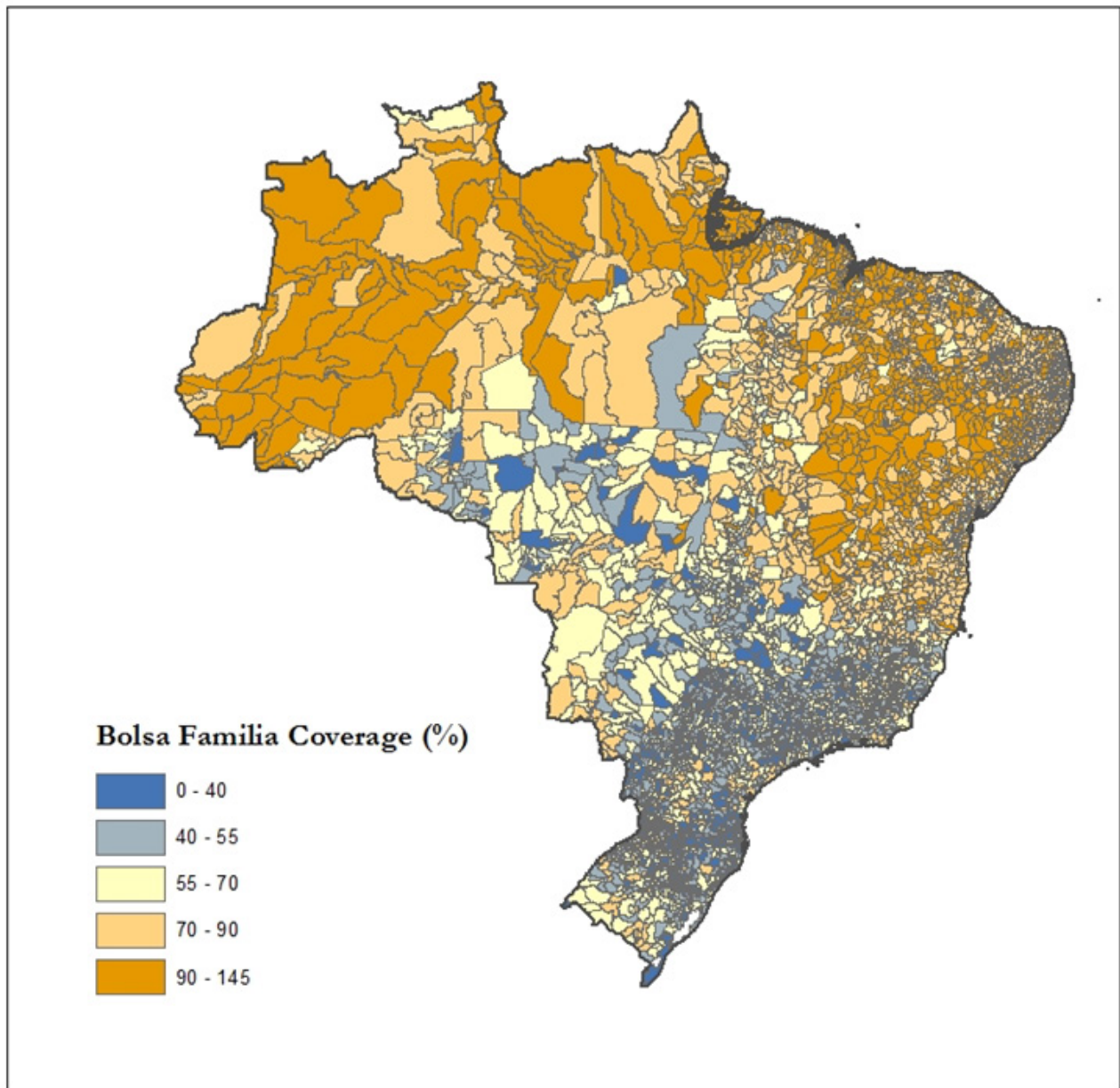
Figure 1. Bolsa Família Coverage in 2015

THE TARGETING OF BOLSA FAMÍLIA

Bolsa Família was designed to benefit families from two income levels in Brazil: poor and low-income. Families are considered poor when their monthly per capita income is less than 85 Reais (roughly 25 US$). To be considered as low-income, families must have a monthly per capita income below 170 Reais (approximately 50 US$).

Poor families receive 85 Reais per month from Bolsa Familia, even if they have no children, or no breastfeeding or pregnant women. Poor and low-income families with children (ages 0-16) and pregnant or breastfeeding women can receive 39 Reais per member of this group up to a total of 195 Reais, which accounts approximately for 27 USD and 59 USD correspondingly. Families with teenagers can receive 46 Reais per teen, up to a total of 92 Reais, which is the same as 14 USD until a maximum of 28 USD.

In order to receive Bolsa Família benefits, a household member needs to register in the Cadastro Único, a national data system that gathers information for almost all social programs. Through a semi verified selection, the Ministry of Social Development chooses the families that will receive the Bolsa Familia benefit based on their self-reported income, the size of the family and government budget constraints.

HYPOTHESIS AND CONCEPTUAL FRAMEWORK

Given the centralized nature of Bolsa Família's targeting strategy which practically does not involve state and municipal governments, it seems that CTT coverage is likely negatively related to the distance to urban areas. The hypothesis for this research is that the farther a municipality is from an urban center, the smaller the number of low-income families who receive Bolsa Família benefits.

The main reason that would explain this relationship would be the distance to government registration agencies. However, there is also reason to believe that information about Bolsa Família may not reach low-income families in rural areas (Torres 2005). With an area of more than 3 million square miles and a limited provision of infrastructure for energy and transportation, there are isolated populations with constrained access to information on government services.

DATA SOURCES

In order to analyze how the distance of a municipality from an urban area can affect Bolsa Família coverage, multiple spatial data sources were employed. To define our unit of analysis, the municipalities of Brazil, I used maps of municipal and state boundaries in Brazil (shapefile provided by the Brazilian Spatial Data National Infrastructure - Infraestrutura Nacional de Dados Espaciais, INDE). A map with South American countries (provided by INDE) was used to create a shapefile of Brazil limits.

To define urban areas, I used a map of urban and rural extents in Brazil (raster provided by NASA Socioeconomic Data and Applications Center, SEDAC). Finally, to obtain the Bolsa Familia coverage by municipality, I used a table with Bolsa Família and census data by municipality (provided by the Brazilian Ministry of Social Development, MDS) and a table with GDP by municipality (provided by the Brazilian Institute of Geography and Statistics, IBGE).

The main variable, the proportion of low-income families receiving Bolsa Família, was given by MDS as the number of families that received benefits in 2015 over the number of low-income families reported by the 2010 census provided by IBGE. Data for poverty rates and transfer from the federal government to municipalities were also obtained from IBGE.

DATA MANAGEMENT

Georeferenced files contained different projections and most of them were expressed in degrees. At the beginning, every input was projected using the coordinate system SIRGAS 2000 Brazil Polyconic (with a linear unit of one meter). The raster file containing information on the urban extent in Brazil was reclassified to reflect a value of 1 for urban areas and a value of 0 for rural areas (before values were 2 and 1, respectively). Using the Euclidean Distance tool, I was able to assign to each cell of the Brazilian extension raster a distance to the closest urban center. Results can be seen on Figure 2. Urban areas are concentrated on the east cost of Brazil and there are important urban centers in the north.

Since our unit of analysis is municipalities, I obtained an average of the Euclidean distance of every cell inside a municipality. This average distance to the closest urban center was then extracted to the geometric center (point) of every municipality. Distance was given in meters but calculated as kilometers in order to be able to better interpret results.
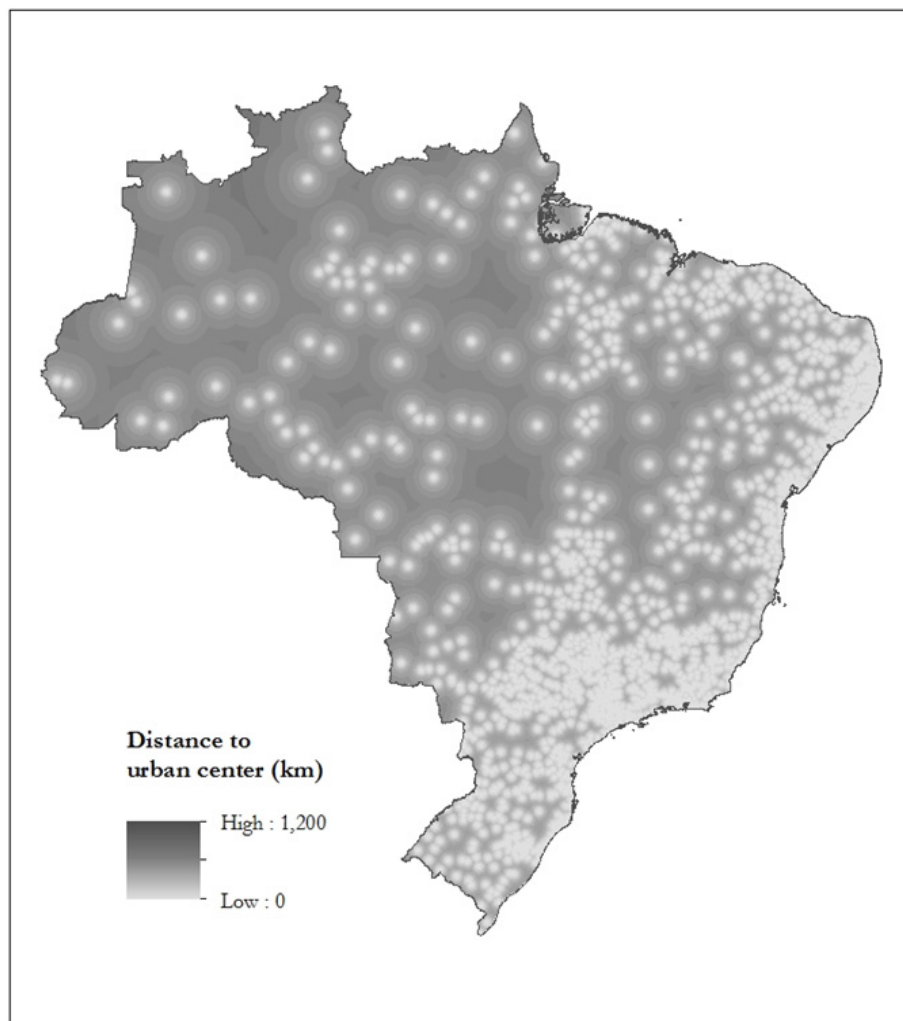
Figure 2. Distance from municipalities with large urban areas

MODEL SPECIFICATION AND ESTIMATION RESULTS

In order to analyze the relationship between the distance to urban areas and Bolsa Família beneficiaries, I applied a few statistic estimation techniques to explore how much distance impacts coverage. At first, I used a global ordinary least squares (OLS) relating the two main variables and some important control variables that are likely to impact Bolsa Familia coverage and also likely to be correlated with distance to urban centers. This OLS model is shown below:

$$cBf_i = \beta_0 + \beta_1\, dist_i + \beta_2 GDP_i + \beta_3 transf_i + \beta_4 pov_i + u_i$$

Where cBF is the Bolsa Família coverage, representing the number of families with Bolsa Família who received benefits in 2015 over the number of estimated low-income families in the municipality in 2010 (times 100); dist is the average distance from a municipality to the center of the closest urban area in kilometers. GDP is municipal GDP in 2013 (the latest available data) and it was included to control for the fact that municipalities with higher incomes may be able to better reach out to low-income residents interested in the CCT program. Transfers from the central government to municipalities (transf) were also introduced as a measure of municipal efficiency in targeting its low-income families for social programs. The estimated numbers of low-income families, pov, was included because municipalities with high absolute numbers of low-income families may disseminate a greater amount of information about the Bolsa Família registration process.

Before running the complete model, I used a simple OLS model with my dependent and main independent variables. Results showed a statistically significant coefficient for distance at a 5% significance level. They indicated that an increase of 10km in the distance to an urban municipality decreased the coverage of Bolsa Familia by 1.7%. Running the full model with the controls described above did not change significantly the coefficient for distance. Coefficients of government transfers, municipal GDP and number of poor families were all significant but practically zero. This means these variables were not main drivers of the Bolsa Família coverage in a given municipality.

The global model has an intrinsic problem - the assumption that the variables were randomly distributed, what cannot be assumed for the Brazilian municipalities, GDP, transfers, number of poor families and even distance to urban center. The violation of the Gauss-Markov theorem may result in important biases in the coefficients. Considering the high possibility of spatial autocorrelation, I calculated the Moran's Spatial Autocorrelation Index. Its high values for the two regressions confirm that the clustered pattern of standard errors is most likely not a result of random chance. Clustering OLS estimations by state produced the same conclusions. Although the distance coefficient is still significant at a 10% confidence level, standard errors increased greatly.

These results led us to our second model, a Geographically Weighted Regression (GWR) local model described by the following equation:

$$cBf_i = \beta_{0i} + \beta_{1i} dist_i + \beta_{2i} GDP_i + \beta_{3i} transf_i + \beta 4i pov_i + u_i$$

By using a local model, I hope to take advantage of the fact that GWR accounts for spatial nonstationarity and enables us to identify where in space the relationship between distance and coverage is more significant. Additionally, GWR residuals tend to be smaller, which gives us a better model fit, while also decreasing the spatial autocorrelation among standard errors.

The model was calculated with a fixed kernel and an Akaike Information Criterion bandwidth. First, I ran a simple model of Bolsa Família coverage on distance to urban areas, then we ran our complete model as described above. Critical values were calculated using the Fotheringham Adjustment in order to take into account the fact that I was doing thousands of simultaneous t-tests (t>|3.4133). The results from my two models can be found on Table 1.

Table 1: Regression Coefficient Estimates					
	(1)	(2)	(3)	(4)	(5)
VARIABLES	OLS	OLS	OLS	GWR range	GWR range
Average Distance to Urban Centers (Km)	0.174***	0.163***	0.163**	-0.15 to 0.45	-0.13 to 0.42
	(0.0116)	(0.0114)	(0.0630)		
Monetary transfers from central government		-8.84E-08***	-8.84E-08***		0
		(1.61E-08)	(2.58E-08)		
Municipal GDP		-1.27E-06***	-1.27E-06***		0
					-0.004 to 0.008
		(2.05E-07)	(1.83E-07)		
Number of poor families		0.0014***	0.0014***		
Constant	62.96***	63.25***	63.25***		
	(0.451)	(0.583)	(5.29)		
Observations	5,570	5,570	5,570	5,570	5,570
R-squared	0.059	0.117	0.117	0.68	0.678
Clustered SE	NO	NO	YES	NO	NO
AICc	-	-	-	43,743.6	43,794.47
Moran's I	0.69	0.61	-	0.05	0.05

Standard errors in parentheses

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

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Results from GWR provide a range of coefficients that better illustrate the variability of Bolsa Família benefits, even when accounting for distance to urban areas. The models indicate that an increase of 10km in distance to urban municipalities can decrease Bolsa Família coverage by 1.3% or increase it by 4.2% depending on the geographical location. Figure 3 shows the distance coefficients for every municipality and it also maps the statistically significant coefficients by municipality - indicating Brazilian state limits and names.
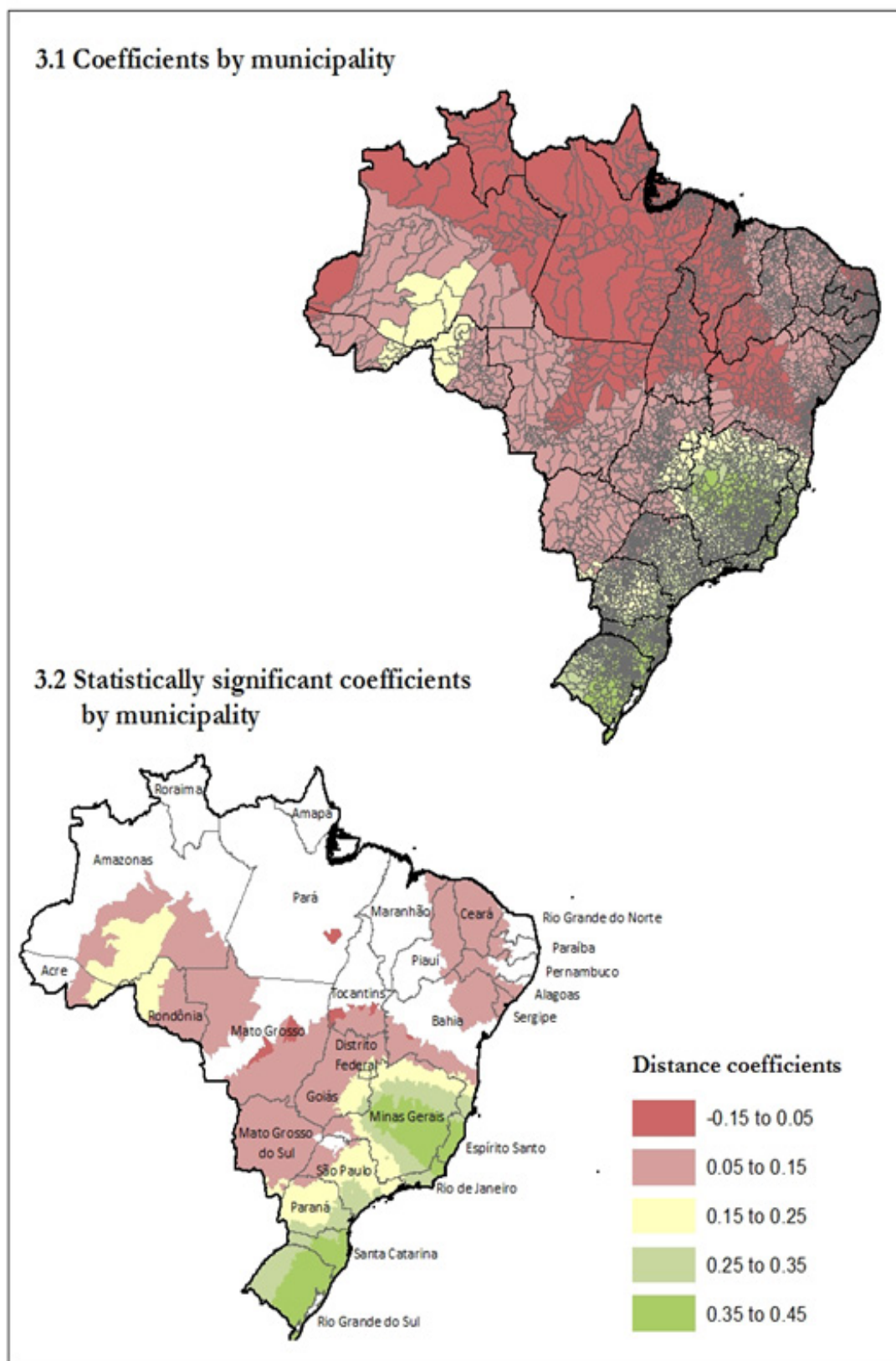
Figure 3. GWR coefficients and statistical significance

As we can see in Figure 3, results are statistically significant at a 5% significance level for a large portion of the country. The results from all these models, nonetheless, were unexpected. Given the initial hypothesis that municipalities farther from urban areas would get less Bolsa Família coverage required the distance coefficient to be negative and statistically significant. However, both OLS and GWR estimated models produced positive and statistically significant coefficients. This means that the data shows that municipalities farther from urban centers are likely to have greater coverage from the CCT program than closer municipalities.

Interestingly, the non-significant coefficients were mainly the ones closer to the original hypothesis. Among the statistically significant coefficients produced by the model, the ones with the highest value are geographically concentrated in the southeast of Brazil, the most economically dynamic region of the country where many municipalities are close to urban centers.

DISCUSSION OF THE MODEL

In the beginning of the paper, I claimed that the objective was to explain the geographical disparities regarding the CCT coverage and indicate how spatial approaches could provide insights to improve both coverage and targeting of Bolsa Família. Although our models did not behave as expected, confirming our hypothesis that municipalities farther from urban areas get less Bolsa Familia benefits, it can still provide us with many insights regarding geographical approaches to social benefits.

There are limitations of the model that could have affected the results. First, and most importantly, the data was aggregated on the municipal level, which means that in large municipalities, locations very close to urban centers were assigned the same distance as locations farther away. Differences within municipalities, hence, may actually hide the dynamics expressed in the hypothesis. Additionally, areas marked in green on Figure 3 and with high statistically significant coefficients seem concentrated in highly urbanized areas, meaning the distance between these municipalities may be too small and spatially concentrated, which could lead to a bias in results.

Another limitation is the fact that standard residuals from the GWR regressions still show signs of spatial autocorrelation. That can be seen in Table 1. For the complete GWR regression, Moran's Index is 0.05, still far from the expected index of -0.000180. This could also potentially undermine our results and contribute to the unexpected positive coefficients in the outcomes.

Aside from limitations of the econometric model, there are some policy considerations that may explain the positive and statistically significant coefficients for distance to urban areas. First, the very decentralized targeting strategy of Bolsa Família may be key to explain why people living in municipalities farther from urban areas are getting more CCT benefits. The fact that families can register at an agency and receive the money on a credit card without having to resort to municipal or state governments can increase the access to Bolsa Família in localities farther away from urban areas.

That would explain an insignificant distance coefficient but it is not enough to suggest a large positive number. Another factor may be the conscious effort on the part of the central government to reach people living farther from urban cities. In line with the original hypothesis, it is possible that after more than a decade of the program, the government carried out actions to reach those low-income families living in remote areas. Joint efforts to register people for Bolsa Família in rural communities are common in Brazil and an evidence-based government intervention may lead to the results, like in Figure 3.

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CONCLUSIONS AND NEXT STEPS

This paper used econometric and geographic tools to explore the spatial distribution of one of the biggest conditional cash transfers in the world, Brazil's Bolsa Família. In a first attempt to understand the determinants of benefit distribution and its policy impact, I attempted to show that low-income families that live in areas farther from urban municipalities would be less likely to receive CCT benefits.

The results revealed that for a large part of the country, distance was positively related to Bolsa Família coverage. Outcomes may be driven by government actions to extend CCT coverage to low-income families and facilitated by the decentralized targeting strategy adopted by the Brazilian government. Outcomes also may be a result of data limitations. Aggregating distance to urban areas may have led to a loss of important data. Additionally, since municipalities with large urban areas were categorized as urban municipalities instead of based on specific metropolitan areas, there may be a smaller variation in distance to urban areas.

For this reason, the first next step in a study of Bolsa Família should focus on collecting data based on a smaller geographical unit of analysis. This could be done by using existing data on Brazilian beneficiaries by the family's address. We attempted to use this data for this project, but it could not be downloaded in bulk or using algorithms in R to scrape information. Additionally, addresses are not geocoded and sometimes are vague, making it difficult to obtain micro data.

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Security in

Pakistan

Karachi: An Environmental and Security Perspective

MARIYA ILYAS
THE TUFTS FLETCHER SCHOOL OF LAW AND DIPLOMACY   EDITED BY BRENNA MCKEE

INTRODUCTION

Karachi is the largest and most metropolitan city in the sixth most populous country in the world, Pakistan. Located on the Arabian Sea, this capital city of the Sindh province is known as the "City of Lights" and "The Bride of the Cities." Much like New York City, Karachi earned these nicknames for its role as the country's financial hub, its dense population (63,000 people per square mile), and its enormous seaport – the country's largest. At times, the city experiences violence and instability as a result of this expansive trade and diverse population. What's more, Pakistan's involvement in the War on Terror has also made Karachi vulnerable to jihadist attacks and religious extremism, calling the city's security into question.

As Karachi's population continues to grow and its geographic location becomes more important for the West's strategic aims, it is necessary to investigate whether the city can sustain its growth patterns in the long term, while facing both environmental and security threats. This paper explores the environmental factors contributing to Karachi's long-term viability, specifically the effects of population density, Karachi's port infrastructure management, and climate change. The city's success in both population and prosperity growth has also contributed to its mounting economic inequality and vulnerability to terrorist attacks. Therefore, this paper also analyzes the threats to Karachi security from domestic sectarian violence and international terrorism. Lastly, the paper concludes with policy recommendations for the government of Pakistan and local governments for how to tackle these issues.

ENVIRONMENTAL CHALLENGES

Population & Slum Culture

In 2015, the Asian Development Bank (ADB) forecasted a 50 percent increase in Karachi's population (to 24.8 million) by the year 2030, making it the seventh most populous city in the world (Shahbaz). In 2016, World Bank estimates put the megacity at 16.62 million people, and present-day estimations remain around 20 million, nearly one-tenth of Pakistan's entire population (Hassan).

There are many factors that account for Karachi's booming population. Firstly, thousands of refugees migrated to Karachi from East Pakistan after the 1971 war of independence. Secondly, the city is home to large markets for goods and services, attracting people of all backgrounds for employment opportunities. If it is true, as some scholars suggest, that "innovation occurs in dense clusters, where there is intense competition" (Shahbaz), Karachi is understandably appealing to elites who flock there to build social capital and contribute to interactivity, innovation and entrepreneurship. Thirdly, large cities like Karachi draw low-income people from rural areas, offering jobs and self-employment opportunities. Lastly, being a port city makes Karachi a lucrative place to live and work, with the shipping industry employing thousands of people. The city, however, is unable to keep up with its unsustainable growth; as more and more people continue to call Karachi home, a strain on resources is contributing to poor living conditions.

Karachi's growing population is creating a snowball effect of challenges facing the local government, but its most conspicuous challenge is the city's lack of housing. The megacity is divided into three core groups of people: the poor, who live in katchi abadis, or slums, on the city's edge; middle-income workers, who have some ability to demand change from the local government and live in city dwellings; and the high-income elites, who are self-sufficient professionals and often build their own infrastructure in the suburbs. Thus, the social inequality in Karachi is starkly noticeable: about 60 percent of the city's 17 million people live in katchi abadis, which

literally translates to "ramshackle neighborhoods," but colloquially means "slums" (Inter Press Service News Agency, 2012). In fact, Orangi Town of Karachi is infamously known as Asia's largest slum and one of the largest slums in the world, with 2.4 million people dwelling in dilapidated homes (News Desk).

Overpopulation of Karachi has undoubtedly created a housing crisis, leading to the development of slums and the destruction of natural bushland on the city's outskirts to create more space for newcomers. Unfortunately, the poorest of Karachi's population, those living in slums, are vulnerable to the vicious cycle of poverty: poor living conditions and sanitation cause public health problems, and a lack of proper education infrastructure leaves future workers with little occupational skills. Given that Karachi alone makes up almost 10 percent of Pakistan's population, the city is contributing more than its fair share to general poverty rates in the country. If Karachi's population growth and slum development continue, it will become much more difficult to recover its tracks as a thriving and competitive urban megacity.

The highly decentralized governments of the Sindh Province and the city of Karachi have made little effort to combat these challenges because neither government generates tax revenue from slums. As a result, the poorest sectors of Karachi's population have given up on waiting for reform to trickle down from the city and provincial governments. Instead, they have organized grassroots initiatives to lead the way in improving slum conditions and making Karachi a more livable city.

Unsurprisingly, women have been in the forefront of leading efforts to bring sustainable change to their communities. With their governments lagging, local women have taken it upon themselves to shape the future of Karachi's urban planning. In 2015, for example, The Express Tribune reported that a young woman named Benazir Chandino visited every home in her tiny village of Allan Chandio to convince her neighbors of the importance of family planning (Zahidi). She encouraged parents to delay the weddings of their very young daughters by at least two years, and further advised them to have less than the average 8-12 children. This public health initiative, along with others like it, directly targets population control as well as safer and healthier family planning.

Sultana Javed is another role example worthy of study. After her toddler daughter "fell into the soak pit where the family disposed of their waste" and her son caught dengue fever from mosquitoes near the pit, she decided to address Orangi Town's lack of sewage system on her own (Saeed). The 45-year-old Javed single-handedly motivated her entire village to build—by hand—a sewer pipeline on her street. She delegated a young man to collect contributions from residents and she herself served as the liaison between the village and specialists from an organization called the "Orangi Pilot Project". This public health initiative circumvented the government's power and filled a need in the community, but more projects like it are needed.

Without policies addressing the needs of the katchi abadis residents in a substantial way, slums will continue to balloon into public real estate, creating serious social, economic, and environmental challenges for the city. The World Bank has continuously underscored the urgency for making strategies to manage resources and build infrastructure for transforming the country's commercial hub into an engine of growth.

Karachi Port Infrastructure Management
In addition to being a major population center, Karachi is also a major port. The City of Lights is home to two major ports: the Karachi Port and Mohammad bin Qasim Port (smaller of the two). Together, these ports account for 95 percent of Pakistan's foreign trade and contribute 30 percent of the national industrial production (World Bank). Karachi Port in particular handles about 75 percent of the entire national trade due to its capacity to handle tankers, modern container vessels, bulk carriers, and general cargo ships through its 30-plus berths (World Bank, Pakistan Resources). The ports' proximity to dense populations as well as their poor infrastructure management contribute to environmental concerns facing the city.

The loading and unloading of bulk cargo, for example, is problematic, because no proper care is given to prevent

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contamination of food items by dirty cargoes, like coal. According to Pakistan & Gulf Economist Tariq Ahmed Saeedi, old and life-threatening methods of loading, unloading and discharging through cranes are common practice at Karachi Port, spreading harmful particles in the atmosphere and water. "When it comes to coal, potential threats to human, marine, and avian lives become rather serious as a result of its non-mechanized handling," says Saeedi.

In 2010, of the 4.5 million tons of coal imported to Pakistan, Karachi accounted for 3 million, or 66 percent (Saeedi). Because sometimes the berths become so occupied that bulk cargoes — regardless of whether they are coal, oil seeds, or wheats — are loaded, unloaded, and discharged at the same berths or two different berths at a dangerously close distance. Consequences of such negligence are deadly: if coal dust penetrates into dry wheat or edible oil seeds, for example, product consumers and local residents alike can be put at a serious health risk. Research shows that contamination of edible oilseeds by coal dust is a primary cause of cancer (Ferber). Environmental protection NGOs and other organizations worried about the coal have brought their concerns to the Karachi Port Trust (KPT), the authority that manages the port (Saeedi). In response, however, KPT has adopted a defensive stance, repeatedly denying the allegations, and little seems to be done to change these dangerous processes.

The Karachi Harbor is known for its heavy load of pollution (chemical and biological) due to constant dumping in the sea. The main cause of the Harbor's pollution is Lyari River, which conduits enormous volumes of heavy loads of treated and untreated industrial and domestic wastewater. A March 2017 study found that Karachi's coastal area, especially the harbor waters, is highly polluted with fecal pathogens that become part of the food web through bioaccumulation in the marine ecosystem, putting aquatic fauna and flora at high risk (Jabeen et el, 2017). Currently, there is no policy in discussion that demands the cleanliness or monitoring of the Karachi Harbor waters. Ineffective port management and the dirty waters of the Karachi Harbor are two key ingredients in the recipe for the City of Lights' disaster.

Climate Change

In addition to overpopulation and mismanagement of the country's largest port, Karachi is facing environmental threats from climate change. The development of ports for naval and commercial ships across the world has increasingly become contentious from an environmental protection perspective. With sea levels rising and a lack of infrastructure reform, Karachi has set itself up for huge economic and ecological losses. An Inter Press Service report found that Karachi is prone to flooding, thanks to overflowing rivers, rainwater and choked sewers. Except for a 12-mile embankment along Malir River, most of the city remains defenseless against inundation (Ebrahim). This coastal erosion has raised alarm among some government officials. In 2014, the threat of economic and ecological loss motivated the Climate Change Division of the Government of Pakistan to collaborate with International Union for Conservation of Nature (IUCN) Pakistan and the United Nations Environment Programme to collect data and monitor the coastal erosion of the Karachi Harbor waters (Daily Times).

Farhan Anwar, an engineer and urban planner, argues that the recently created Climate Change Policy for Pakistan directs attention mostly to agriculture, forestry and water resources and glosses over the special needs of urban settlements. According to experts like Anwar, climate change preparedness for Karachi starts with an understanding of its political economy, its vulnerable and threatened communities, its assets, and its biodiversity. Such an understanding requires a detailed and comprehensive mapping of land use and ownership, utilities, and transport networks and constructions, on which the Karachi city or the Sindh provincial government have not been able to show progress. At the national level, on the other hand, the Pakistan Navy is leading by example in coastal protection and raising awareness of the need to do more. They are conducting projects to preserve the marine environment and to protect and rehabilitate mangroves along the coastal areas of Pakistan (McKay).

Climate change also raises concerns such as emergency response preparedness – not just for natural disasters like flooding, but also frequent energy crises. As the city's population increases, demands for services, such as electricity, will increase in tandem. When faced with competition for resources – in the case of a natural disaster,

for example – wealthier residents will be able to protect their assets while the poor will suffer disproportionately. Because wealth and power are disproportionally distributed across social and ethnic lines, the probability for sectarian violence significantly rises if climate change remains unaddressed.

SECURITY THREATS

Sectarian Violence

Karachi is a migrant city. It has been the destination for millions of economic migrants and refugees from within and outside Pakistan for decades. Consequently, migration has played an important role in shaping Karachi's urban development trends and its socioeconomic and political character. Of the estimated 3.4 million 'illegal' immigrants in Pakistan, 75 percent (or 2.5 million) are settled in more than 100 migrant-concentrated residential areas in Karachi (Hasan). Living conditions in these settlements are cramped, and services such as clean drinking water, sanitation, and solid waste disposal, are hard to come by.

Karachi is home to diverse racial, ethnic, and religious peoples, including Afghan and Iranian refugees, Urdu-speaking Pakistanis who were repatriated from East Pakistan (called 'Biharis'), as well as numerous religious minorities (Malik). Clashes among these populations are inevitable, especially since the power structure often privileges one group over the other, and local governments struggle with corruption. This challenge poses serious domestic security concerns for Karachi.

This sectarian conflict has led to street protest and strikes, but civil nonviolent resistance has proven to be ineffective in the city, as protests are quickly suppressed through violent means. What's more, a vast body of openly sectarian literature is available to radicalize the unsuspecting, and hate-filled books, pamphlets, audio and video cassettes are readily available in all the markets of Karachi (Abdullah). Sectarian violence and targeted killings, such as the 2013 killing of a prominent Sunni Muslim cleric, have become common. Shiites are also increasingly targets of hate crimes, stemming from sectarian violence that makes Karachi unstable and its growth unsustainable.

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With the advent of mobile technology, accessing hate material is more convenient than ever before. From video-sharing sites, such as YouTube and Dailymotion, to social networking websites like Facebook, there is plenty of material containing aggressive sectarian propaganda. Law-enforcement agencies in the city have tried to take some action to curtail the issue by targeting specific groups who commit the most crimes. However, with hate propaganda accessible to a wider audience through modern technology, it is becoming more difficult to identify networked groups. Yet, domestically networked groups are not the only violence-inducing organizations that Karachi has to worry about; internationally networked terrorist organizations have repeatedly targeted Karachi.

INTERNATIONAL TERRORISM REACHES KARACHI

Since the September 11, 2001 terrorist attacks on major American cities, Pakistan has served as a strategically important ally to the United States in fighting the War on Terror, due to its proximity to Afghanistan. In particular, the Pakistan government has facilitated the transit of military supplies across its territory to U.S. forces in landlocked Afghanistan. However, some argue that Pakistan purposefully provides a safe haven not just for radical Islamist movements targeting its archrival India, but also for the Afghan Taliban (Katz). The captures of Al-Qaeda leader Osama bin Laden and 2015 discovery of Taliban leader Mullah Akhtar Mansoor, both in Pakistan, seemed to confirm these allegations for many in the West. Due to its involvement in the War on Terror, Pakistan has become implicated with international terrorism on its soil, and Karachi has suffered as a result.

The War on Terror has made Karachi a routine target for international terrorists. The Jinnah International Airport, Shiite mosques, and streets have all been targets of orchestrated attacks. Perhaps the biggest blow to Karachi was the 2011 shootings by Tehrik-i-Taliban Pakistan and Al-Qaeda at the Pakistan Naval Station Mehran, which

killed 18 military personnel and drew considerable attention from the Pakistani Government. Together, these events obliged Karachi's city police chief in 2015 to propose forming a counter-terrorism branch comprising 500 officers specially trained to deal with terrorists (Right Vision News). This is a positive step in the right direction, but Karachi remains uniquely vulnerable to international terror networks who are able to take advantage of the growing sectarian conflict and population boom in the city.

POLICY RECOMMENDATIONS

Through this research, it is clear that Karachi is at great risk as a result of its population growth, its poor infrastructure and mismanagement of its major port, and climate change. In addition, Karachi is at harm's way due to domestic turmoil stemming from domestic sectarian violence, as well as international terrorism, because of Pakistan's involvement in the War on Terror. To address these challenges, I propose the following policy recommendations to the Government of Pakistan, and to the Government of Sindh Province, in collaboration with the Karachi city government.

Environmental Recommendations

Population growth in Karachi continues to pose housing issues, especially for the millions that live in katchi abadis. Because no tax revenue is generated from these poor neighborhoods, there has been little incentive by government officials to invest in public services. As a result, slum dwellers, especially women, have risen to the challenge to resolve issues themselves. The Governments of Sindh and Pakistan should acknowledge these efforts and use them as a foundation to target these problems:

a. Draw inspiration from the active local leaders and work with them to scale their efforts up and provide additional services. This can be done by providing resources (financial, capital, human) and taking advantage of local partnerships, connections, and ecosystems of communities.

b. Allocate funds to devise and undertake a comprehensive sewage development strategy to minimize health hazards and improve healthy urban living. The fruits of this investment will be seen in the long term: healthy living conditions will produce sharp, well-educated students with employable skills, make the city sustainable and attractive for tourists.

c. Work with community leaders to promote family planning efforts and empower young people to wait longer before marriage and birth. Set up family health clinics so young women can have access to contraceptives, such as birth control, as well education about the ovulation cycle and safe sex.

d. Explore options for land-titling in the slums, to make tax revenue collection possible, changing the incentive structures of local government officials.

Port Infrastructure Management

There is a lack of regulation surrounding the management and cargo handling processes of the Karachi Port. Moreover, as one of the biggest and most bustling warm seawater ports in the world, the dirty waters in the Karachi Harbor are not only adversely affecting marine life but also making the port an unhealthy and unsustainable ecosystem for local human residents:

a. The Karachi Port Trust should implement policies that strengthen port facilities, develop port equipment, improve cargo handling procedures, and chart transportation routes to account for public safety. This will allow the KPT to increase competitiveness of Karachi's port and plan ahead for long-term sustainability.

b. The KPT must reevaluate the process of cargo handling, especially for food items which can be exposed to toxins carried in other cargoes. The Karachi City Government should commission third party consultants to investigate how imports are handled and distributed once ships reach the shores of the Karachi Harbor; then assess the needs to address hazards associated with all processes; conduct a cost-benefit analysis to make an informed and practical decision; and finally, invest appropriately based on the research outcomes and recommendations.

c. One potential solution to the transportation of dirty bulks is to shift some of the cargo to peer ports within the country as a mitigation measure to cope with the environmental concerns. This will mean utilizing the nearby

Qasim Port and sharing the burden of imports by sea.

    d. Infrastructure management reform is also needed to keep the port waters clean. Policies to implement proper sewage systems that do not dump into the Lyari River and harbor, for instance, will protect marine and human life in the city. This must also include regular monitoring and evaluation of the Karachi Harbor waters.

Climate Change

    Rising sea levels are making Karachi increasingly prone to flooding and coastal erosion, and damaging aquatic life. Climate change also raises concerns about emergency response preparedness to energy crises:

    a. Implement the policy proposals made by Farhan Anwar, a leading figure in the discipline of urban and regional planning in Pakistan. Among other things, Anwar pushes for a much-needed roadmap for developing a more "comprehensive" climate change adaptation strategy.

    b. Bolster all district-level emergency response preparedness teams to handle natural disasters such as flooding, and man-made crises such as power outages.

    c. Commission a team of scientists and experts to assess the Karachi Harbor's sea levels and threats to marine life.

    d. Identify energy demands of residents and commercial entities and devote resources towards the development of national energy production infrastructure, to meet those needs and its growth in the coming years.

SECURITY RECOMMENDATIONS

Sectarian Violence

    Karachi is a melting pot with diverse racial, ethnic, and religious peoples, which has historically been both an asset and a source of conflict. Disproportionate allocation of resources and the growing income inequality gap have sometimes pitted minority groups against one another. Sectarian violence has included street protest and strikes, vandalism on public property, as well as violent attacks including mob killings:

    a. Continue with the efforts to organize, monitor, and successfully complete a nationwide census of the population to collect demographic data, improving on Pakistan's census data from 19 years ago. The Karachi and Sindh governments in particular are in dire need of understanding their diverse populations. Once census data is collected, Karachi urban planning experts and policymakers will have a better snapshot of the city's demographics and will therefore be able to allocate resources in a more equitable manner. For the illiterate populations, the government should send translators door to door. Accommodating diverse peoples cannot be achieved without proper planning of resources and building infrastructure.

    b. Assess the energy grid to understand which neighborhoods and groups of people are benefiting more from limited energy generation. Reallocate resources as needed.

    c. Control patron-client relationships in the government to ensure that one minority group or religious sect is not favored over the other.

International Terrorism

    Since joining the U.S. War on Terror, Pakistan has made Karachi more vulnerable to militant attacks, suicide bombings and shootings. These attacks have occurred in airports, streets, and on a military naval base:

    a. Develop a comprehensive counterterrorism strategy that identifies areas prone to terrorist attacks.

    b. Train Karachi law-enforcement officers to prevent terrorist attacks and equip them with the proper equipment to detect and respond to crisis situations. Evaluate the performance of the 2015 counter-terrorism branch comprising of 500 officers specifically trained to deal with terrorists, as proposed by the city police chief.

    c. Educate local populations on how to respond in crisis and terrorist situations. Draw from best practices of other countries, such as the United States, Great Britain, and France that have successfully implemented counterterrorism measures.

    d. Continue to collaborate with allies like the United States to combat domestic and international terrorism using modern and more effective technology.

CONCLUSION

Karachi is a bustling city with rich history and culture. People of all backgrounds flock to the immense opportunities it promises through its financial, transportation, and seaport hubs. Like all thriving cities, Karachi is home to both the elites and the poor. However, unlike other megacities, Karachi is facing a rapidly-increasing urbanization crisis, with its 17 million-strong population expected to increase by 50% in the next 15 years (Rana, 2015). A growing population, the majority of which is living in slums, poses unique environmental and security challenges for the megacity. From an environmental perspective, by investing in urban development projects such as sewage systems and sustainable housing complexes, Karachi can better serve those who live on the margins. Tightening up its port infrastructure processes will mitigate public health hazards and attract more business. Responding to climate change challenges, such as flooding, will allow Karachi to prepare for and combat natural disaster crises. From a security perspective, Karachi's leaders should combat sectarian violence through education, laws, and enforcement. Taking a census to better understand the demographics will help with this effort as it will shed light on the needs of different ethnic and religious groups. Lastly, Karachi has become a hotbed for international terrorism since Pakistan joined the War on Terror in 2001. To better prepare for such attacks, it should develop a comprehensive counterterrorism strategy. By implementing the policy recommendations outlined in this analysis, Karachi can remain a City of Lights.

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