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# Organized Crime and Retail Activity along the Northern Border in Mexico

Adam G. Walke

*University of Texas at El Paso*, [agwalke@utep.edu](mailto:agwalke@utep.edu)

Thomas M. Fullerton

*University of Texas at El Paso*, [tomf@utep.edu](mailto:tomf@utep.edu)

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# Hispanic Economic Outlook

## Spring 2013

The Report of the Hispanic Economic Outlook Committee

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### **Hispanic Self-Employment and Poverty –**

Alberto Dávila and Marie T. Mora

*Page 2*

### **Organized Crime and Retail Activity along the Northern Border in Mexico –**

Thomas M. Fullerton, Jr. and Adam G. Walke

*Page 6*

### **An Insight into Academic Motivation –**

Sara Ray and Salvador Contreras

*Page 10*

### **About the HEO Committee –**

*Page 15*

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The American Society of Hispanic Economists (ASHE)—a member of the Allied Social Science Association—is a professional association of economists and other social scientists who are concerned with the under-representation of Hispanic Americans in the economics profession and with the lack of research generated on Hispanic American economic and policy issues. Our primary goals include:

1. Promoting the vitality of Hispanics in the economics profession through education, service, and excellence;
2. Promoting rigorous research on economic and policy issues affecting US Hispanic communities and the nation as a whole; and
3. Engaging more Hispanic Americans to effectively participate in the economics profession.

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## Hispanic Self-Employment and Poverty

Alberto Dávila and Marie T. Mora\*

Lyndon Johnson’s “War on Poverty” declaration is almost 50 years old. It is worth noting that since this declaration, various statistics released by the U.S. Census Bureau indicate that the incidence of poverty among Blacks has persistently exceeded that of Whites (although the gap has narrowed). Since the early 1970s, when Hispanics started being consistently identified in mainstream national datasets, Hispanic poverty rates have also remained above the national average. These reported poverty discrepancies across racial/ethnic groups have predictably led social scientists to analyze socioeconomic and demographic factors associated with the likelihood of impoverishment. As recent examples, Mary J. Lopez (2013) and Pia Orrenius, Madeline Zavodny, and Yingda Bi (2011) suggest the proximate causes for the relatively high Hispanic poverty rates include lower levels of human capital, family structure, employment patterns, and immigration. To these, Lopez adds labor-market and housing discrimination.

Entrepreneurship has been hailed by some in the economic development literature as a means to reduce poverty. For example, Deodat E. Adenutsi (2009) argues that entrepreneurship promotes job creation and income empowerment and lowers poverty rates. José Ernesto Amorós and Oscar Cristi (2011) also allude to the positive effects of self-employment to poverty reduction. Yet the irony is that the self-employed in America “attached” to the labor force are considerably more likely (twice as likely in 2011) to be poor as paid-employment workers.<sup>1</sup>

As seen in Table 1, 4.1 percent of workers between the ages of 25 and 64 were impoverished in 2011. The average self-employed/non-self-employed poverty gap for Hispanics is the same as for other workers between the ages of 25 and 64, but Hispanic poverty rates themselves are higher. Nearly one in ten (9.6 percent) of all Hispanic workers, and 18.1 percent of self-employed Hispanics, resided below the poverty line in 2011. Compared to both non-Hispanic Black and White attached workers, Hispanics had higher poverty rates, particularly compared to non-Hispanic Whites (who had a poverty rate of 2.5 percent). However, of all the groups shown in Table 1, non-Hispanic Whites had the highest self-employed/non-self-employed poverty-rate ratio (2.6). Controlling for a set of socioeconomic covariates suggests that the relatively high incidence of poverty among the self-employed is not simply explained by traditional factors associated with the likelihood of being impoverished, such as education or immigration.<sup>2</sup>

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\* Alberto Dávila is the V.F. “Doc” and Gertrude Neuhaus Professor for Entrepreneurship at the University of Texas - Pan American. Marie T. Mora is a Professor of Economics at the University of Texas – Pan American and a member of the Board of the American Society of Hispanic Economists.

<sup>1</sup> We define “attached” workers as those who worked at least 20 hours per week for 40 or more weeks in the previous 12 months. Our estimates are from the 2011 American Community Survey provided by the Integrated Public Use Microdata Series (IPUMS), made available by Ruggles, Steven, J., et al. 2013. *Integrated Public Use Microdata Series* [Machine-readable database]. Minneapolis: University of Minnesota, [www.ipums.org](http://www.ipums.org). The “poverty” variable IPUMS measures the family’s total income as a percentage of the poverty thresholds established by the federal government. See the U.S. Census Bureau at <http://www.census.gov/hhes/www/poverty/methods/definitions.html> for the official poverty thresholds. Because the IPUMS does not provide such information for residents of group quarters, we exclude this population from our analysis.

<sup>2</sup> In this analysis, we estimated the predicted poverty rate of self-employed Hispanics, given their observable characteristics, based on the likelihood of being impoverished observed for Hispanics in the paid-employment sector. Specifically, for the latter group we estimated a probit regression model for the likelihood of being impoverished as a function of birthplace (U.S. versus abroad), being a

**Table 1 – Poverty Rates of Workers in 2011, by Self-Employment Status and Selected Demographic Characteristics**

Race/Ethnicity	All Attached Workers	Self-Employed	Not Self-Employed	SE/Not SE Ratio
All workers	4.1%	7.5%	3.7%	2.1
<i>Race/ethnicity:</i>				
Hispanics	9.6%	18.1%	8.8%	2.1
Non-Hispanics	3.1%	6.0%	2.8%	2.1
Non-Hispanic Blacks	6.8%	12.5%	6.5%	1.9
Non-Hispanic Whites	2.5%	5.4%	2.1%	2.6
<i>Immigrants vs. natives:</i>				
Hispanic immigrants	12.9%	21.4%	12.0%	1.8
U.S.-born Hispanics	5.2%	10.3%	4.9%	2.1
<i>Gender:</i>				
Hispanic men	9.5%	17.0%	8.8%	1.9
Hispanic women	9.7%	20.0%	8.9%	2.2
<i>Ethnic Subgroup:</i>				
Mexican Americans	11.0%	21.0%	10.2%	2.1
Puerto Ricans	5.8%	10.3%	5.6%	1.8
Cubans	5.2%	10.2%	4.6%	2.2
Salvadorans	9.6%	16.6%	8.9%	1.9
Dominicans	10.3%	18.3%	9.6%	1.9

*Notes:* The sample includes non-group-quarter residents ages 25-64 who worked at least 20 hours per week for 40 or more weeks in the previous year. Hispanics can be of any race.

*Source:* Authors' estimates using the 2011 American Community Survey in the Integrated Public Use Microdata Series (see Note 1).

As immigration has been found to be an explanatory factor in the odds of living below the poverty line, Table 1 also reports the poverty rates separately for U.S. - and foreign-born Hispanics (those born outside of the 50 states, DC, and the U.S. territories). The 12.9-percent poverty rate of Hispanic immigrant workers in 2011 was 2.5 times greater than the 5.2-percent poverty rate of Hispanic U.S. natives. The self-employed Hispanic immigrants still fared better, in a relative sense, that year than their U.S.-native counterparts. Foreign-born self-employed Hispanics had a poverty rate that was 1.8 times higher than that of immigrants working for someone else (21.4 percent versus 12.0 percent). Among U.S.-born Hispanic workers, similar to the workforce in general, the self-employed poverty rate was 2.1 times higher than for workers employed by someone else (10.3 percent versus 4.9 percent).

recent immigrant (defined as migrating within the past five years), marital status, the number of children residing at home, gender, education, age, age-squared, limited-English fluency (defined as not being able to speak the English language well), geographic region, and whether or not the worker had a disability. Based on these regression results (available from the authors), given the characteristics of self-employed Hispanics, their poverty rate should have been 9.4 percent if their poverty-likelihood structure was the same as for other Hispanic workers. Because their actual poverty rate (18.1 percent) considerably exceeded this imputed rate, the relatively high incidence of poverty among the self-employed does not appear to merely stem from group's observable socioeconomic and demographic characteristics.

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When comparing Hispanic men and women, their poverty rates were similar (9.5 percent among men, and 9.7 percent among women) in 2011, which was also the case for those outside the self-employment sector (8.8 percent and 8.9 percent, respectively). Female Hispanic self-employed workers nonetheless had higher poverty rates than their male counterparts (20.0 percent versus 17.0 percent), and thus fared relatively worse vis-à-vis the paid-employment sector.

The likelihood of being impoverished also varies across the specific Hispanic sub-ethnic groups. Cuban workers in 2011 had the lowest poverty rate (5.2 percent), and Mexican Americans had the highest (11.0 percent) of the five largest Hispanic national-origin populations in the U.S. The poverty rates of the self-employed in each group hovered around twice the corresponding rates of workers in the paid-employment sector, although this difference was not identical across all groups. Self-employed Puerto Ricans fared the best in relative terms (as their poverty rate was 1.8 times higher than the rate among other Puerto Rican workers); despite having the lowest poverty rate among the five groups, self-employed Cuban workers placed the worst in relative terms (as their poverty rate was 2.2 times that of Cubans in the paid-employment sector).

Based on these numbers, a seeming “disconnect” between promoting self-employment and reducing poverty exists. Wim Naudé in a special issue of *Small Business Economics* (January 2010) argues that it is of great practical importance to understand if and when entrepreneurship is a binding constraint on economic development and catching up in developing countries. This in turn requires a theoretical modeling of the entrepreneur in development economics focusing on impoverished areas in the U.S.

This is not to say that promoting self-employment has no effect on reducing poverty. To be sure, while the poverty rates of Hispanic entrepreneurs are approximately twice the magnitude of the rates of other workers, the self-employed have considerably lower rates of impoverishment than individuals with lower levels of attachment to the labor force. For example, the 18.1-percent poverty rate among self-employed Hispanics mentioned earlier was less than half of the 39.3-percent of Hispanics who resided below the poverty line among those unattached to the labor market in 2011. That said, the statistical fact that self-employed workers (Hispanic or otherwise) were approximately twice as likely to be impoverished as other workers is an issue of concern.

In policy discussions about promoting self-employment as a poverty-reduction mechanism, perhaps more attention should be placed on understanding why people choose self-employment. One often used concept in the entrepreneurship literature is the “push/pull” framework, as recently highlighted by Timothy Bates (2011). Self-employment that arises from growing entrepreneurial opportunities “pulls” workers into that sector. Self-employment that arises from a reduction in wage and salary jobs “pushes” worker into self-employment. Under the “push” phenomenon, we would expect that earnings would be relatively low in the self-employment sector, corresponding to relatively high poverty rates among the self-employed.

Another consideration is the role that hedonic factors play in self-employment decisions. David G. Blanchflower (2004), for example, argues that people likely have an “unrealistically rosy view” about self-employment in that entrepreneurs (across the world) work under relatively more duress than their counterparts in the paid-employment sector, but they are more likely to say they have control over (and are “highly satisfied” with) their lives. As such, an important question to ask is whether entrepreneurs receive non-pecuniary benefits from self-employment and if so, whether they are willing to accept a higher poverty risk. In the affirmative case, the relatively high poverty rates observed among the self-employed could exaggerate the loss in the overall well-being or satisfaction of workers in the sector.

Cost-of-living considerations should also be taken into account given that the poverty thresholds are set at the national level. However, our preliminary analysis of impoverishment in some of the poorest regions in the U.S.— areas along the Texas-Mexico border—indicates that self-employed Mexican Americans (who represent the vast majority of Hispanics in the region) also have significantly higher poverty rates than their counterparts in the paid-employment sector. To illustrate, in 2011, we estimate that the 37.7-percent poverty rate among self-employed Mexican Americans in our sample who lived in Texas public-use microdata areas located near Mexico tripled the 12.1-percent poverty rate among other Mexican American workers in the region.<sup>3</sup> As such, even within this narrow geographic region, self-employment appears to be associated with a higher incidence of impoverishment compared to other workers. It follows that the cost-of-living does not seem to be the primary explanation of the relatively high poverty rates of the self-employed (at least in that region).

As the 50th anniversary of the declaration of the war on poverty approaches, there have been renewed efforts by scholars and policymakers to assess where America stands on this issue. Examples can be found in the forthcoming volume edited by Sheldon Danziger and Martha Bailey (findings of which were presented in a National Economic Association session at the 2013 Allied Social Science Association meetings). Other examples exist in the scope of papers that will be presented in an upcoming conference hosted by the National Bureau of Economic Research on poverty and inequality in May 2013. These academic and policy discussions bode well for a better understanding of impoverishment and could yield more fruitful insight into the role of entrepreneurship as a poverty-reducing mechanism among Hispanics and other populations in the U.S.

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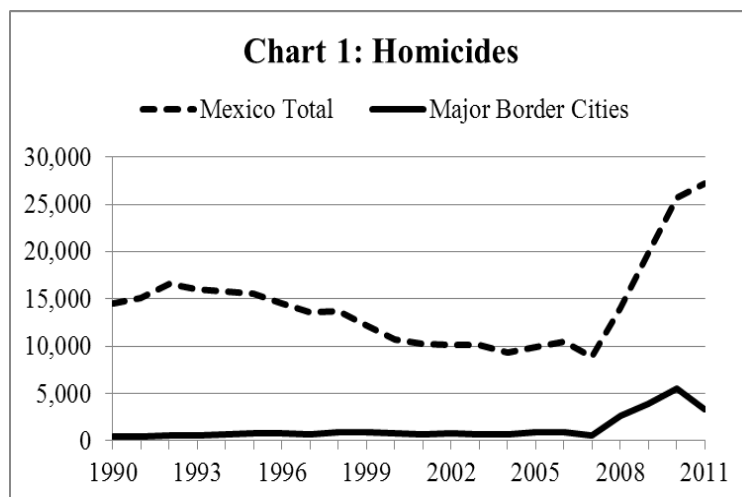
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<sup>3</sup> Contact the authors for more information on the public-use microdata areas (PUMAs) used to identify the Texas-Mexico border region.

## Organized Crime and Retail Activity along the Northern Border in Mexico

Thomas M. Fullerton, Jr. and Adam G. Walke \*

Beginning in 2008, Mexico experienced a major spike in homicide rates, primarily due to conflicts between rival drug trafficking organizations as well as to clashes between such groups and law enforcement units. Chart 1 shows that homicides in Mexico decreased from 1992 (16,594 homicides) to 2007 (8,867 homicides), before dramatically reversing course and rising to 27,213 by 2011. The northern border region of Mexico was deeply impacted by this violent crime wave. Chart 1 shows the aggregate number of homicides for the six largest border municipalities: Tijuana, Mexicali, Ciudad Juárez, Nuevo Laredo, Reynosa, and Matamoros. These border cities are the principal focus of this article. The numbers of homicides that occurred in these six municipalities increased nearly ten-fold from 2007 (568 homicides) to 2010 (5,474 homicides) before subsiding in 2011.



In addition to direct impacts in terms of injuries and losses of life, violent crime waves usually have other, indirect, negative repercussions for society. Surges in violent crime may divert government resources towards police protection and the criminal justice system, leaving fewer resources for other social and economic programs (Anderson, 1999). Another potential negative consequence of crime may be to deter foreign direct and/or domestic business investment (Daniele and Marani, 2011). Those consequences, of course, damage growth prospects for regions such as Mexico's northern border and worsen economic

performance. A recent study by BBVA Research (2010) of a panel of Latin American countries confirms that changes in homicide rates can exercise significantly negative effects on per capita GDP growth rates.

While violent crime may affect regional and metropolitan economies in a wide variety of ways, this article only addresses impacts on the retail sector. It is further restricted to the effects of homicides perpetrated by members of organized criminal groups. Organized crime may affect retailers both directly, through extortion, arson, and threatened or actual violence, and indirectly, by increasing the real and perceived risks to the safety of customers. There is anecdotal evidence from northern Mexico that pervasive extortion may take a particularly heavy toll on retailers, at least in part because these entities tend to be small businesses that handle relatively large amounts of cash and owners often work on-site. Small enterprises are frequently less able than large corporations to insulate themselves from extortion (Economist, 2011).

The indirect effect of organized crime on retail activity may be particularly acute in northern Mexico's border cities due to the opportunities for cross-border shopping. In general, it is not likely that the level of violent crime in a

\* Thomas M. Fullerton, Jr. is a Professor and Trade in the Americas Chair at the University of Texas at El Paso (UTEP). Adam Walke is an Associate Economist with the UTEP Border Region Modeling Project and Graduate Advisor for the UTEP M.S. Economics Program.



given city will have a strong effect on the overall level of retail activity. However, several studies document that increased levels of violence may affect retail activity at the neighborhood level by redirecting customer traffic to safer zones (Greenbaum and Tita, 2004; Rosenthal and Ross, 2010). Similarly, high crime in a border city may encourage cross-border shopping by local residents while simultaneously discouraging cross-border shopping by residents of neighboring cities on the other side of the international line of demarcation. If that is true, then violent crime may have citywide effects on border commerce that exceed what is normally observed in other urban areas.

The number of homicides committed in Mexican municipalities by members of organized criminal groups is only available from official sources for the period from December 2006 to September 2011.<sup>4</sup> The data are compiled by the Mexican government using characteristics of the murders committed to determine whether they are likely to have been perpetrated by members of organized criminal groups. Characteristics that are considered to be consistent with involvement by criminal syndicates include the beheading, dismemberment, or mutilation of



victims. Deaths resulting from attacks on government authorities and firefights between criminal groups are also included in the dataset. Violence in public spaces and widely reported 'execution-style' killings may discourage commercial activity by deterring potential customers from shopping in areas perceived as dangerous. Furthermore, organized criminal groups responsible for homicides are often simultaneously involved in activities such as extortion or racketeering (Reveles, 2011) that are likely to impose additional adverse effects on businesses. Chart 2 shows the annual average retail sales index and average monthly homicides related to organized crime for Ciudad Juárez. The negative correlation between crime and commerce is easy to discern (Coronado, 2012a).

To gauge the impact of organized crime-related violence on retail activity, transfer function ARIMA equations are estimated for each of the six Mexican border economies mentioned above. The dependent variables in these regressions are real retail sales indices. Homicides related to organized crime are included to measure the deterrent effect of violence on commercial activity. Other variables included in the specifications are Mexico's industrial production index and wages in the export-oriented manufacturing sector. To account for cross-border influences on retail sales, the equations also include pedestrian and personal vehicle border crossings, a real peso/dollar exchange rate index, and unemployment rates from the United States counties located immediately adjacent to the cities of interest.<sup>5</sup>

<sup>4</sup> The data through December 2010 were originally made available on the website of the Presidencia de la República. The data from January to September 2011 are available from the Procuraduría General de la República: <http://www.pgr.gob.mx/temas%20relevantes/estadistica/estadisticas.asp>. The Mexican government stopped compiling data on organized crime-related killings after September 2011 because such crimes do not fit within the classification system defined by Mexican law and are therefore difficult to identify (see Molzahn et al., 2013).

<sup>5</sup> Border crossings are from the U.S. Bureau of Transportation Statistics; unemployment rates are from the U.S. Bureau of Labor Statistics; retail sales indices, wages, and Mexico's industrial production index are from INEGI.



The estimated equations are used to assess the possible impacts on retail sales of a decline in the levels of violence observed in northern Mexico's border cities. Most sources estimate that, on a nationwide basis, homicides related to organized crime peaked in 2010 or 2011 in Mexico. Such murders also decreased in many border municipalities during the same period. While the decline in homicides was most pronounced in the western border region after 2010, the homicide rate also appears to have leveled off or even fallen in Tamaulipas, as well. According to figures from the Secretaría Nacional de Seguridad Pública, the total number of homicides in Ciudad Juárez fell by 47 percent from 2010 to 2011 and by 55 percent from 2011 to 2012, (Molzahn et al. 2013). The total number of murders committed in the six border cities included in the sample by suspected members of organized criminal groups follows a similar pattern through September 2011 when that dataset ends.

To examine the effects of organized crime-related homicides on retail activity, two scenarios are considered. In the first scenario, murders are assumed to stagnate at the levels observed in 2011 (data for 2012 are not yet available). In the second scenario, such homicides are assumed to fall by 50 percent each year from 2011 to 2013 in all cities. The average retail sales indices for 2013 under each scenario are presented in Table 1 for the six border cities considered. As can be seen, the simulations indicate that the decreases in homicides (scenario 2) are likely to yield higher levels of retail activity.

The differences between scenarios 1 and 2 are relatively small in percentage terms. While INEGI does not make the monetary value of monthly retail sales public, it is possible to obtain an approximate idea of the monetary magnitudes of these differences using data from the most recent Economic Census, which was released in 2009 using data from the previous year. Total 2008 levels of income derived from the sale of goods and services in the retail sectors of each city are adjusted to 2003 price levels to approximate real retail sales in 2008. These values can then be compared with the real retail sales indices from 2008 and the two alternative forecasts for 2013 in order to estimate the monetary differences between the constant-homicide and reduced-homicide scenarios. Under scenario 2, in which homicides are reduced by 50 percent each year, real retail sales are estimated to exceed the base case (scenario 1) by an average of 80 million 2003 pesos for each of the six cities. That translates into an average increase of about 9 million 2012 dollars due to fewer organized crime-related murders.

**Table 1: Average Predicted Real Retail Sales Indices for 2013**

	Cd. Juárez	Matamoros	Mexicali	N. Laredo	Reynosa	Tijuana
Scenario 1	119.39	106.30	155.35	123.51	172.11	158.49
Scenario 2	119.69	106.43	156.41	124.37	173.07	158.66
Difference	0.26%	0.13%	0.68%	0.70%	0.55%	0.11%

The wave of violent crime that began in 2008 has generated a range of negative social consequences beyond the suffering of those individuals who are immediately affected by violence. High levels of criminal activity may encourage individuals to change social habits, for instance by staying home after dark or limiting the amount of cash on hand, with probable effects on commercial activity (Martínez, 2011). In border cities, the effects of violence on retail sectors may be amplified if shopping venues on the other side of the international divide are perceived as being safer than those nearby. Organized criminal groups often seek to extort money from shopkeepers using the threat of violence as an enforcement mechanism. In Ciudad Juárez, the period of

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intensified violence, not surprisingly, corresponds to a decline in the number of registered businesses and higher commercial real estate vacancy rates (Coronado, 2012b).

The results of simulations that are summarized in Table 1 indicate that the retail sectors of Mexico's northern border cities will benefit from further reductions in homicides related to organized crime. Although this is only one among many benefits of reduced violence, it is evidence that the potential consequences of improved public safety are multifaceted. A comprehensive analysis of the costs and benefits of measures designed to promote public safety should also take into account potential impacts on commerce.

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## **An Insight into Academic Motivation**

**Sara Ray and Salvador Contreras\***

A great amount of educational research has focused on identifying key factors that explain educational outcomes (such as grades, persistence in school, college attendance and completion, lifetime earnings among others). Much of this research examines the effects of altering the educational environment or an educational input on student performance. What is currently missing in the literature is a fuller understanding of the process that turns modified school environment inputs into improved academic performance. We conduct a multi-wave field experiment at a primarily Hispanic-serving public university to explore possible factors that influence student performance. We start with the hypothesis that student academic motivation is susceptible to framing effects. With this proposition at hand, we create a number of treatment instruments to evaluate if academic framing/cueing leads to students (1) spending more effective time studying and (2) improving performance on exam scores.

The field experiment was conducted in four waves during the spring 2012 semester and employed students from numerous sections of Principles of Macro- and Microeconomics courses. As a measure of control, one of these sections did not receive our treatment instruments. For this report we analyze the non-treated section and compare student outcomes to a treated section taught by the same instructor.

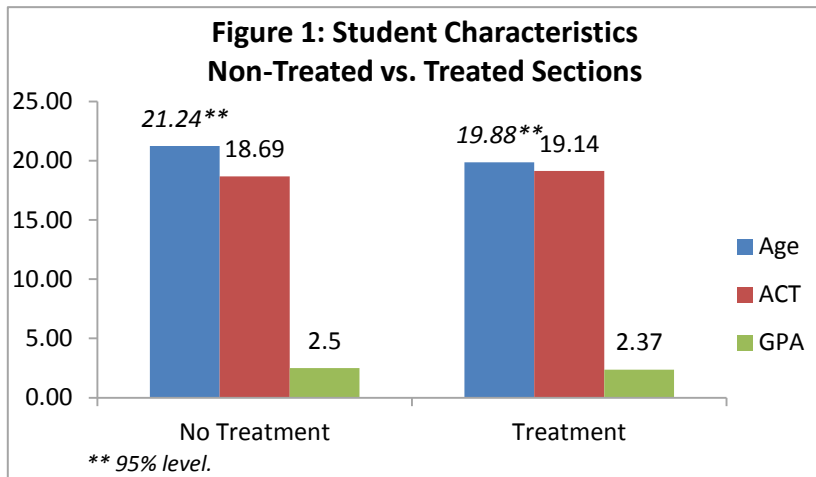
### **The Experiment**

We conducted a four-wave field experiment over the course of the spring 2012 semester. Wave 1 was conducted in early February of 2012 after the official enrollment census date; during this wave we distributed a questionnaire to participating students to gather control variables for our experiment.

Wave 2 was used as a tool to calibrate our instrument and delivery methods. As part of Wave 2, we visited the classroom one week prior to each course's first midterm exam and randomly delivered two different handouts. One handout contained descriptions of furniture (our control instrument), and the other handout was our treatment instrument. The treatment instrument consisted of a number of social context stories. After reading through each story students were asked to answer a question. On the day of the exam, and one week after being exposed to the readings, each student filled out a survey that asked them about their study behavior. After completing this trial run, we made adjustments to our delivery methods, adapted several of our exam-day survey questions, and added two additional treatments in preparation for Wave 3. Wave 3 and Wave 4 are the center of our analysis.

For Wave 3, we visited the treatment sections one week prior to the second midterm exam. We randomly distributed the following four experimental instruments to students:

1. Furniture Descriptions (Control Instrument): This instrument consisted of furniture descriptions. After reading each description, students were asked to identify the furniture by name. We claim that these readings do not trigger any emotional response that could influence a student's academic performance.
2. Social Context Stories (Treatment 1): The main treatment instrument consisted of stories that portray a character or characters achieving a greater amount of a socially recognized award or achievement



compared to others. After reading each story, students were asked to answer a multiple-choice question about the reading. The stories were meant to prime areas of the subconscious about social rank and achievement.

3. Social Context Stories + Pictures (Treatment 2): After conducting Wave 2, we became concerned that some may find our social context stories were a disguised form of telling students to just “try harder.” To mitigate this concern, we presented some students with sets of

pictures that showed students in various academic environments, and asked students

*“In your opinion, which picture shows the group of student more likely to perform better on the next exam?”*

This instrument combined one social context story with two sets of pictures for students to evaluate.

4. Furniture Descriptions + Pictures (Treatment 3): This instrument consisted of one furniture description with two sets of pictures for students to evaluate.

On the day of the second midterm exam students were asked to complete a study behavior survey. Students in all sections completed this survey. The final wave, Wave 4, was conducted during the final exam. No treatments were administered during this wave. During this time students were asked to complete our study behavior survey.

### Comparison of Treated and Non-Treated Sections

For this summary report we present a select subset of student outcomes. In particular, we evaluate the outcomes of two sections taught by the same instructor. One section received our treatment instruments while the second group did not. Differences in academic performance between the two groups are taken to suggest an effect from our treatments. We present differences in means between the non-treated section and one treated section. The non-treated class was a morning class and the treated class was an afternoon class. It is possible that the two time slots attracted students with different characteristics. However, figure 1 shows that the characteristics of the two groups are quite similar. The average age, ACT score, and institutional GPA for our non-treated and treated sections are statistically the same. A two-tailed t-test reveals that of these characteristics, only age is significantly different between the two groups. Our non-treated class appeared to be significantly older than our treated section with mean ages of 21.24 and 19.88, respectively. Mean ACT scores and GPA are not shown to be significantly different between the two groups. 56% of our non-treated class was male while 65% of our treated class was male; the difference in gender composition between these two sections is not shown to be statistically significant. In addition to these measures, we administered a locus of control test during our initial survey to gauge students’ sense of intrinsic control. Both the non-treated and treated sections scored very similarly with average scores of 72.93 and 72.5.

Our experimental hypothesis states that we should see significant differences between our non-treated class and our treated class on measures of effort and academic performance. In Tables 1 and 2 we present mean values for four of these measures for the second midterm and final exams. Our study behavior survey asked students to report the number of hours they studied in the seven days leading up to the exam and whether or not they had studied with someone else. Additionally, we constructed a study effort weighted index that takes values between 0 and 1 for each student based on these and other responses to questions on our study behavior survey. Finally, we report the average exam score for each class.

Table 1 shows that, as a whole, our non-treated and treated classes showed relatively similar study patterns in preparation for the second midterm exam. There is no statistically significant difference in the average number of hours studied between the non-treated section and the treated section at 5.4 and 5.1 hours. Likewise, we see no significant difference in mean study effort index scores. Interestingly, we do see a significant difference in the proportion of students in the treated class who studied with at least one other person versus the non-treated class. 44% of students in the treated class reported studying with someone else compared to just 26% of students in the non-treated class. For the second midterm exam, we find no statistically significant difference in the mean exam scores between the non-treated and treated classes.

**Table 1: Midterm Exam - Comparison of Non-Treated & Treated Section**

	Non-Treated Class	Treated Class
How many hours did you study?	5.4	5.1
Did you study with someone else?	0.26	0.44**
Effort Index	0.34	0.36
Exam Score	0.68	0.67

\* indicates significance at 90%, \*\* indicates significance at 95%, and \*\*\* indicates significance at 99%

For the final exam, we find that there are marked differences between the two courses as shown in Table 2. We again find no significant difference in the average number of hours studied in the seven days leading up to the exam. However, 28% of students in the treated class report studying with at least one other person versus only 16% in the non-treated class. Most importantly, the differences in mean study effort index scores and mean final exam scores between the two classes are significant at the 90% level. We find that our treated class, on average, scored 0.02 higher than our non-treated class on our study effort index and 4% higher on the final exam.

**Table 2: Final Exam - Comparison of Non-Treated & Treated Section**

	Non-Treated Class	Treated Class
How many hours did you study?	6.19	7.35
Did you study with someone else?	0.16	0.28*
Effort Index	0.34	0.38*
Exam Score	0.65	0.69*

\* indicates significance at 90%, \*\* indicates significance at 95%, and \*\*\* indicates significance at 99%

We further analyze our treatment section by comparing the mean values of academic effort and performance of the non-treated section compared to the control group, social context stories group, social context story plus

pictures group, and control plus pictures group within the treatment section. Table 3 shows academic outcome differences for the second midterm exam and Table 4 for the final exam. For the second midterm exam, the only group to display significantly different average study behavior characteristics is the social context plus pictures group; 47% of students in this group report studying with someone else in preparation for the exam as compared to 26% in the non-treated class and this group averaged a score of 0.43 on the study effort index compared to a 0.34 in the non-treated class. However, we do not find the mean midterm exam score in the social context plus pictures group to be statistically higher than the midterm exam score of the non-treated section. The social context group did on average score significantly higher on the second midterm exam with a grade of 74% compared to the non-treated section's average score of 68%.

**Table 3: Midterm Exam - Comparison of Non-Treated Section with Treated Section Experimental Groups**

	Non-Treated Class	Control	Social Context	Social Context + Pic	Control + Pic
How many hours did you study?	5.4	5.89	4.5	6.68	5.3
Did you study with someone else?	0.26	0.44	0.45	0.47*	0.38
Effort Index	0.34	0.34	0.37	0.43**	0.33
Exam Score	0.68	0.67	0.74**	0.65	0.68

\* Indicates significance at 90%, \*\* indicates significance at 95%, and \*\*\* indicates significance at 99%

We find similar results for the final exam. The social context plus pictures group again shows significantly different mean values for our measure of study behavior when compared to the non-treated group. However, there is no significant difference in exam scores. In fact, the social context story plus pictures group reported studying an average of 11.4 hours in the seven days leading up to the final exam compared to 6.2 hours for the non-treated class, but the social context story plus pictures group scored a mean grade of 67% which is not statistically different from the non-treated class's average score of 65%. The only group that shows a significant difference in exam scores for the final exam from non-treated class is the social context stories group with an average score of 72% compared to 65%. We take this difference between the non-treated class and social context stories group as evidence that our social context treatment did indeed influence student performance.

**Table 4: Final Exam - Comparison of Non-Treated Section with Treated Section Experimental Groups**

	Non-Treated Class	Control	Social Context	Social Context + Pic	Control + Pic
How many hours did you study?	6.2	5.3	6.6	11.4**	4.9
Did you study with someone else?	0.16	0.32	0.31	0.37**	0.18
Effort Index	0.34	0.37	0.45**	0.43**	0.34
Exam Score	0.65	0.68	0.72**	0.67	0.71

\* indicates significance at 90%, \*\* indicates significance at 95%, and \*\*\* indicates significance at 99%

## **Implications & Conclusions**

We conducted a four-wave field experiment with randomized treatments in Principles of Economics courses to evaluate the influence that social priming in an academic setting has on academic effort and performance. By comparing a section that received no treatments to a section that received our randomly allocated instruments, we found evidence that our social context stories did have an effect on second midterm and final exams scores. Our social context stories plus pictures group also display higher levels of preparation for the exam when compared to the non-treatment class, but this did not translate into higher exam scores.

The main takeaway from these results is that an academic environment can be designed to influence students' academic effort and performance. It is possible that self-reporting measures such as time studying may suffer from reporting bias. However, the exam scores provide a non-bias assessment. We found in both the second midterm and final exam that those who got the social context stories on average performed better on the exams than the non-treatment group. This is a strong indicator that an academic environment that is framed in a way that cues a student to recall/think/reference own efforts to payoffs will on average transfer the induced motivation to classroom tasks.



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***About the Hispanic Economic Outlook Committee of the American Society of Hispanic Economists –***

Formed in early 2009, this Committee was designed to monitor and report on a host of Hispanic economic issues on a quarterly basis. Contributions from other ASHE members are also contained in these reports. The views expressed in these reports are those of the authors, and do not necessarily represent the views of their respective employers or of ASHE. All errors in fact or interpretation belong to the authors.

**2012-2013 Hispanic Economic Outlook Committee Members**

***Luisa Blanco***

Assistant Professor  
School of Public Policy  
Pepperdine University  
24255 Pacific Coast Hwy.  
Malibu, CA 90263  
(310) 562-2364; fax (575) 562-2252  
[lblanco@pepperdine.edu](mailto:lblanco@pepperdine.edu)  
*Areas of specialty:* Economic Development;  
International Economics, Latin America

***Alberto Dávila***

Professor of Economics and V.F. “Doc” and  
Gertrude Neuhaus Chair for Entrepreneurship  
Department of Economics and Finance  
The University of Texas - Pan American  
Edinburg, TX 78539  
(956) 316-7136; fax (956) 384-5020  
[adavila@utpa.edu](mailto:adavila@utpa.edu)  
*Areas of specialty:* Hispanic entrepreneurship;  
Hispanic labor markets

***Mark Hugo López***

Second Vice President of ASHE and  
Associate Director  
Pew Hispanic Center  
1615 L Street NW, Suite 700  
Washington, DC 20036  
(202) 419-3617  
[mlopez@pewhispanic.org](mailto:mlopez@pewhispanic.org)  
*Areas of specialty:* Civic engagement; Hispanic  
youth; Economics of education

***Marie T. Mora***

Professor of Economics  
Department of Economics and Finance  
The University of Texas - Pan American  
Edinburg, TX 78539  
(956) 316-7913; fax (956) 384-5020  
[mtmora@utpa.edu](mailto:mtmora@utpa.edu)  
*Areas of specialty:* Hispanic labor markets; Hispanic  
Self-employment

***Isabel Ruiz***

Official Fellow in Economics  
Harris Manchester College  
University of Oxford  
Oxford, OX1 1HY  
United Kingdom  
+44(0)1865 271026  
[Isabel.ruiz@economics.ox.ac.uk](mailto:Isabel.ruiz@economics.ox.ac.uk)  
*Areas of specialty:* International  
Economics/Development; Capital Flows; Migration  
Issues; Latin America

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