

# Interpopulation Competition and Cooperation: Mexican maquiladoras and local entrepreneurial opportunity

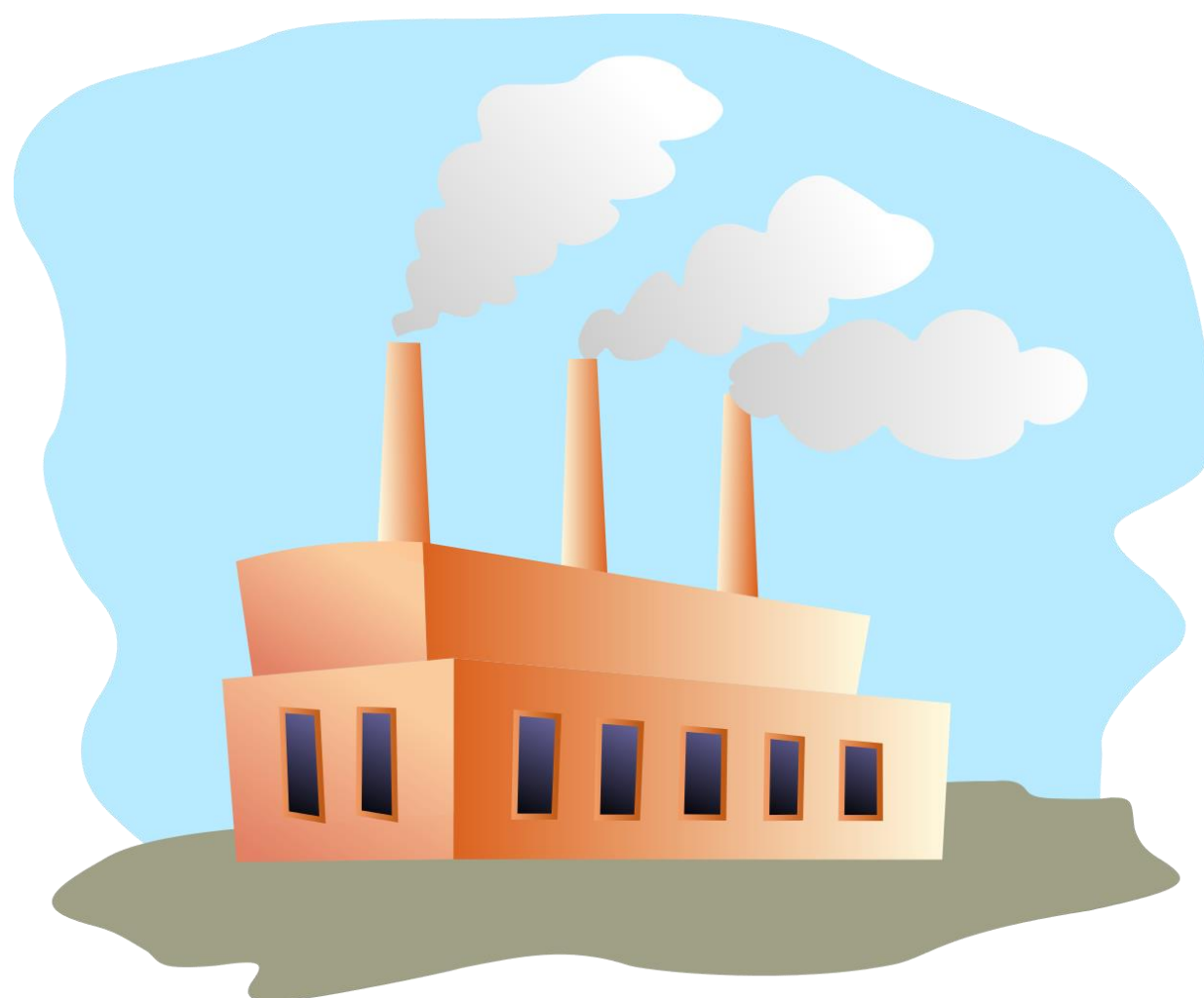
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## What are Maquiladoras?

**Maquiladoras are factories run by foreign companies that take raw materials and process them into finished products.** These products are then exported to the country of that company. Maquiladoras are found throughout Latin America primarily in Mexico, Paraguay, Nicaragua, and El Salvador. They provide the benefit of allowing the factories to operate largely duty-free and tariff-free.

Mexico implemented the maquiladora in 1965 to assist in the industrialization of northern Mexico and over the last few decades it has become a vital part of the Mexican economy. Maquiladoras provide over 500,000 jobs for Mexican workers, of which 50 percent are women.

Some companies that have operated maquiladoras:



## Potential Benefits of Maquiladoras

**Benefits of maquiladoras for companies:**

- Lower labor costs.
- Nearshoring allows companies to set up operations in a foreign country that's closer to visit, in the same time zone, and incur lower shipping costs.
- Mexico exempts maquiladoras from the 16% VAT on imports.
- Maquiladoras can potentially circumvent duties on imported raw materials.

**Benefits of maquiladoras for Mexican citizens:**

- New employment opportunities.
- Increased foreign exchange in Mexico.
- According to some studies:
  - Manufacturing and managerial tasks are transferred to local companies.
  - Technical and managerial skills flow to other businesses.

## Hypothesis and Introduction

**Hypothesis:** The introduction of maquiladoras into Mexico spurs entrepreneurship, marked by the formation of new businesses.

We have a formal agreement with INEGI, Mexico's National Institute of Statistics and Geography, and Solunet, an industrial listing publisher, to use their datasets to analyze the effect that maquiladoras have on their surrounding communities.

**Solunet dataset:**

- Data points for each maquiladora by year (2005, 2006, 2007, 2008, 2009, 2011).
- Includes factory information such as:
  - Plant type
  - Product being manufactured
  - Parent company name
  - Parent company location
  - Plant address, plant city, plant state

**INEGI datasets:**

- Data points for each municipality per year.
- Population information such as:
  - Average income
  - Total population
  - Number of new business foundations
  - Drug rate
  - Homicide rate
  - Foreign direct investment
  - Number of people self employed
  - Whether a municipality is next to the border or not



## Methodology

**Data cleaning:** I used Python and Jupyter Notebook to clean the datasets.

Cleaning involved restructuring Solunet data to INEGI specifications, fixing geographic information using the Google GeoCoding API, and verifying accuracy of a subset of data using Google Maps satellite view. After the datasets were cleaned, they were combined into a dataset that described the maquiladora information at the municipal/year level.

**Analyses:** Analyses were performed using Python and Stata. The statistical methods used are negative binomial regression, Poisson models, and coarsened exact matching.

## Exploratory Analyses

**Data per municipality per year:**

Mean number of maquiladoras: 1.044

Median number of maquiladoras: 0.000

Tijuana had the maximum number of maquiladoras (523) in 2005.

Total number of new firm foundations: 568,388

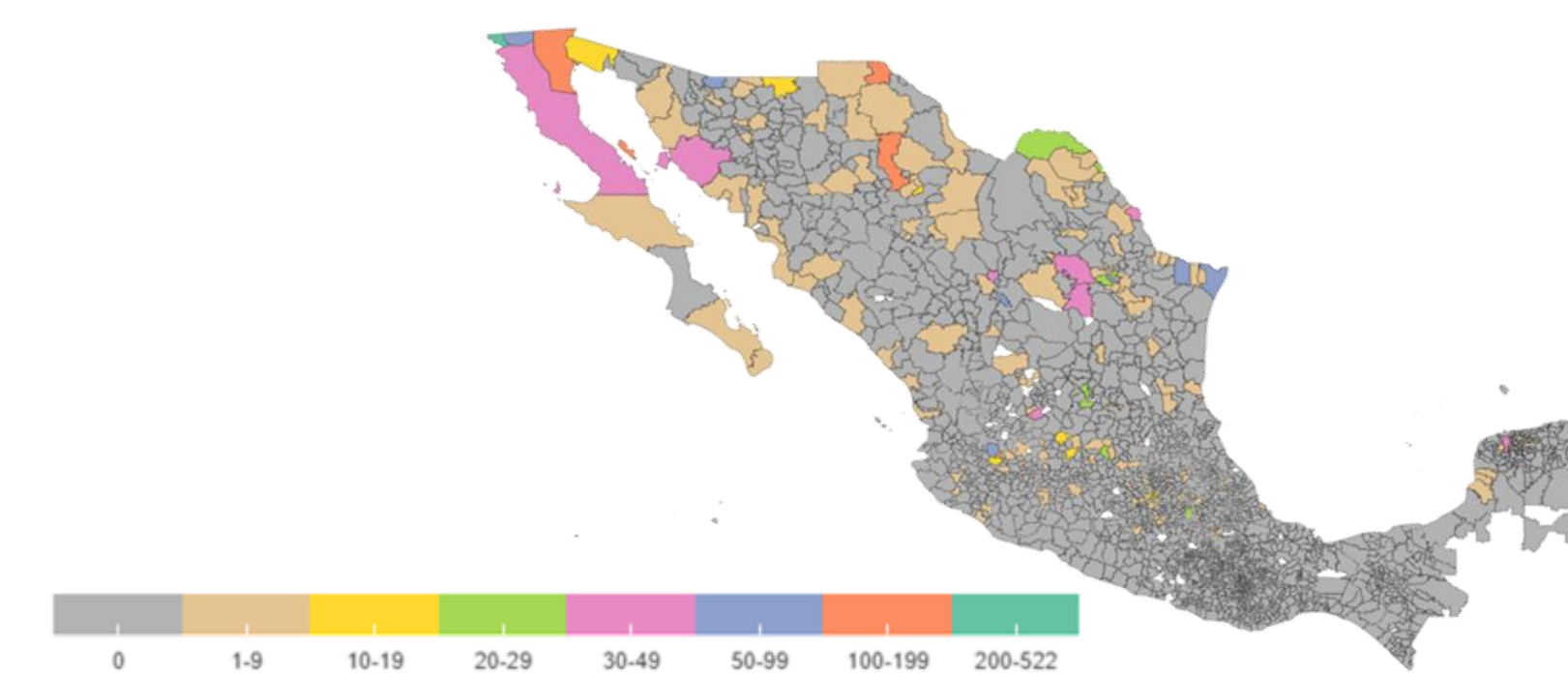
Mean number of new firm foundations: 39.937

Median number of new firm foundations: 0.0

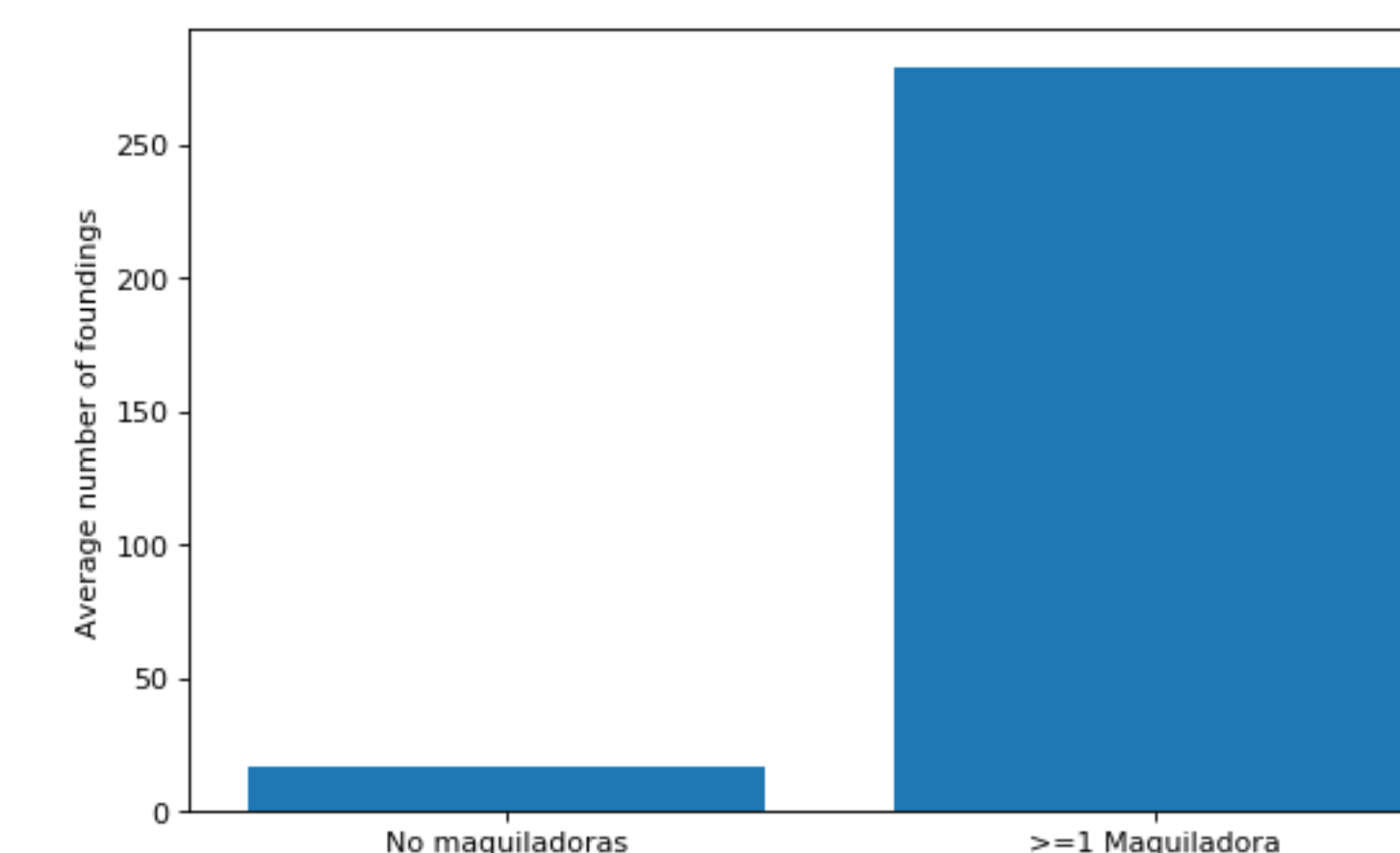
Guadalajara had the maximum number of new firm foundations (8524) in 2005

In 2005, Guadalajara had 38 maquiladoras.

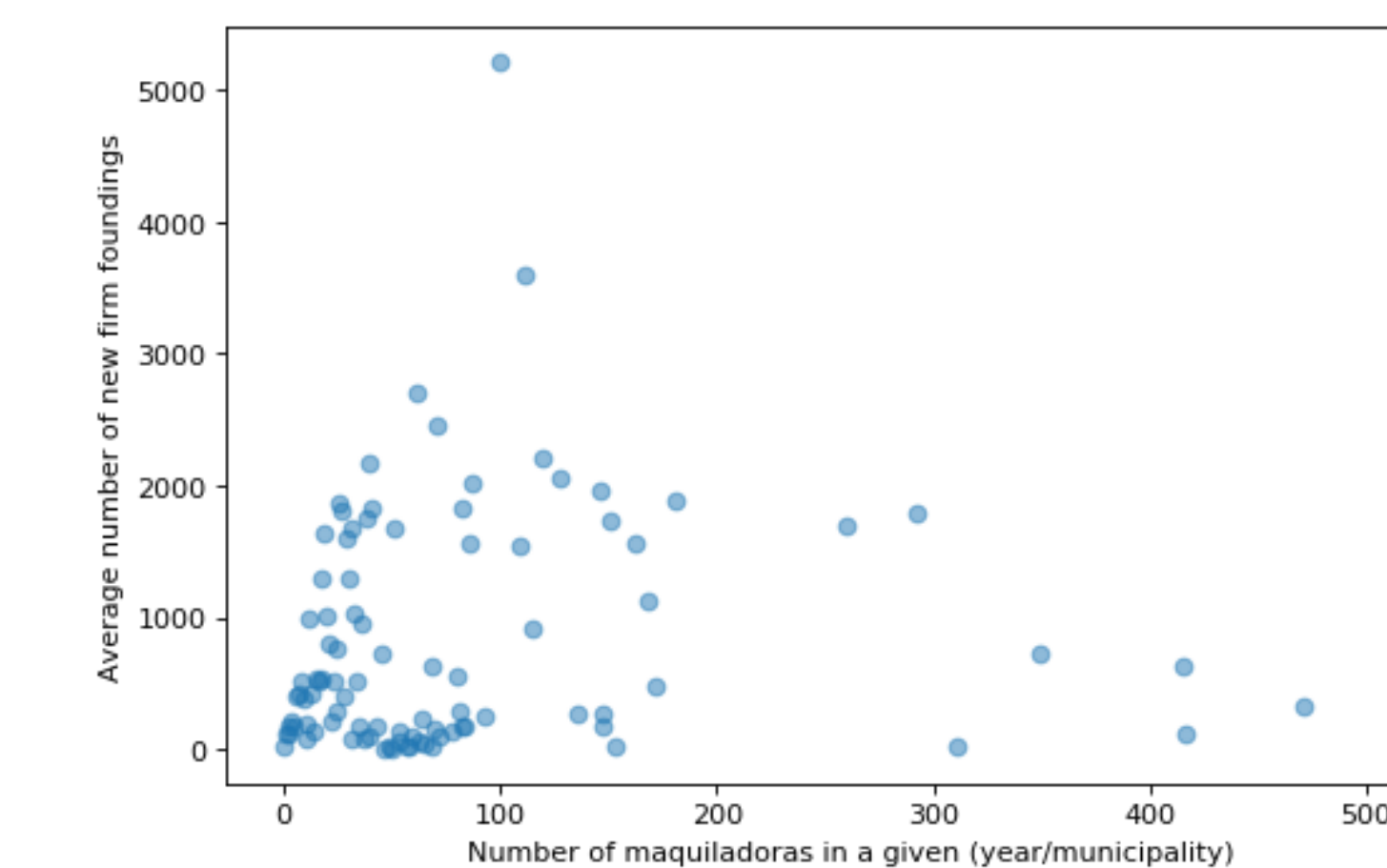
**Maquiladora count per municipality, 2011:**



**Average number of founding for municipalities with and without maquiladoras:**



**Number of maquiladoras vs. average number of new firm foundations:**



## Results and Conclusion

Accounting for population, Gini coefficient, drug rate, average income, whether the municipality is next to the border, foreign direct investment, homicide rate, and year-over-year changes...

**Negative binomial regression:**

For every additional maquiladora, there is a **2.03% increase** in the number of new business foundations on average.

For every additional maquiladora in the previous year, there is a **2.58% increase** in the number of new business foundations on average.

**Population averaged Poisson model:**

For every additional maquiladora 2 years previously, there is a **0.63% increase** in the number of business foundations.

**Coarsened exact matching:**

The **mean difference** in new firm foundations between the untreated group (no maquiladoras) and treated group (>1 maquiladora) is **8.096**.

**Conclusion:** The results suggest that there is a statically significant positive relationship between the number of maquiladoras in a municipality and the number of new firm foundations.

The next steps are to continue to explore this trend and identify if there are specific ranges of the number of maquiladoras that benefit the community the most. Then, we will work with the Mexican Government to develop policies that capture the largest beneficial impact of the maquiladoras.

## References

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