

# Effects of MNC Presence on College Major Choice

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# Agenda

- Motivation
- Research Question
- Empirical Results

- Economic growth is pushed forward by the accumulation of physical and **human capital**
- Previous literature has shown evidence on the extensive margin of educational attainment levels (Atkin 2016; Blanchard and Olney 2017)
- My project focuses on the choice of human capital specialization conditional on attending university

## Does the Presence of MNCs Influence Major Choice?

- Estimate a Multinomial Logit model of field-of-study as a discrete choice
- Leveraging variation of MNC at the district-year level
- I use individual level application data from the two largest Costa Rican public universities and firms operating under the Free Trade Zone regime
- Heterogenous effects across fields of study by industry

## Education

- Preferred Major Choice
- Age and Sex
- Entry Score
- High School Type
- District-Canton of Residence

## Firms


- 68 unique ISIC4 Economic Activity Codes
- 348 firms
- Year-of-Entry
- District-Canton of Operation

- 379,316 observations from 2007 to 2020

# Motivation

- Human capital accumulation is a central strategy for promoting economic growth and development
- How people make these decisions is shaped by complex mix of individual incentives, constraints, and possibly policy choices
- Developing nations are of particular interest as they try to both increase FDI entering the nation and grow their human capital levels

# Admissions Process

- Decentralized admissions process
- Each university has an entry exam which produces an entry score for the applicant
- They require applicants to list their 2 preferred majors, in order, at the time of applying 
- Applicants are then ordered by major-entry score and admitted until all seats are full

# Free Trade Zone Regime

- Firms are located inside an industrial park
- Exclusive use for firms under the regime and supervised by government institution Foreign Trade Promoter
- The FTZ Regime has become a significant proportion (>60% in the last 5 years) of all FDI entering Costa Rica [▶ Graph](#)



- As of 2022, there are 580 firms operating under the FTZ regime in Costa Rica
- Firms have ISIC4 economic activity codes attached to them
- I link firms using their unique corporate identity number to identify their earliest date of registry with the Costa Rican gov't

$$Y_{idmt} = \alpha_c + \alpha_t + \sum_j \beta_{mj} \Gamma_{djt} + X_i + \varepsilon_{idmt} \quad (1)$$

- $Y_{idmt}$ : Most preferred field-of-study  $m$  by individual  $i$ , residing in district  $d$ , in year  $t$
- $\beta_{mj}$ : Industry-specific  $j$  change on probability of choosing field-of-study  $m$
- $\Gamma_{djt}$ : Presence of Industry  $j$  index by district  $d$  in year  $t$
- $X_i$ : Vector of individual characteristics
- $\alpha_c$ : Canton FE
- $\alpha_t$ : Year FE

$$\Gamma_{djt} = \sum_{d'} \frac{S_{d'jt}}{\tau_{dd'}} \quad (2)$$

- $S_{d'jt}$ : Stock of firms in district  $d'$  of industry  $j$  in year  $t$
- $\tau_{dd'}$ : Distance (in km) between district  $d$  (residence of applicant) to district  $d'$  (residence of firm)

# Results

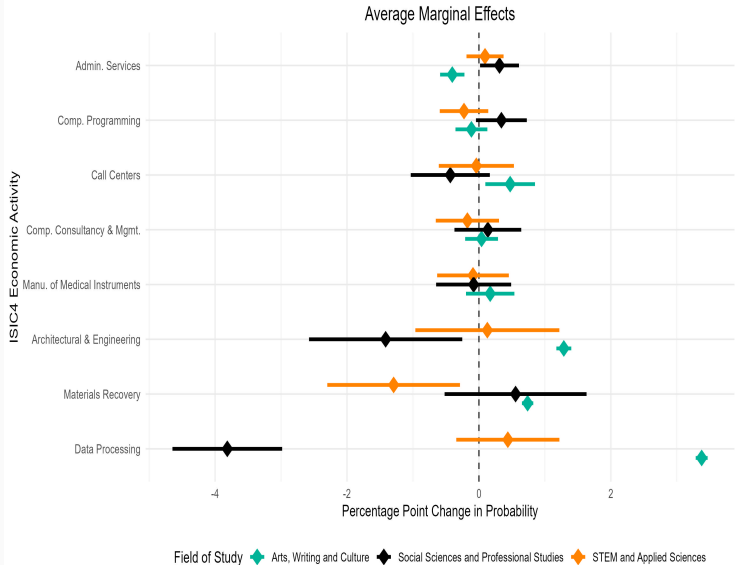
I estimate this regression using a Multinomial Logit estimator and then estimate the Average Marginal Effects (AMEs)

- AMEs provide percentage point changes in the probability of a category being chosen as a increase in the regressor occurs
- These are direct predictions on change in probabilities, so there is no reference category

For tractability, I aggregate majors into 3 larger field-of-study categories using their ISCED aggregated categories: [► Make-up](#)

- Arts, Writing, & Culture
- STEM & Applied Sciences
- Social Science & Professional Studies

# Empirical Results [▶ Table](#)



# Conclusion

- Large heterogeneity across fields of study by industry
- Conditional on going into university, evidence suggests that primarily manufacturing industries are not attractive to this population
- Possibly large University effect as concentrations of fields are different across institutions
- Possible occupational mismatch as employment opportunities include managerial or administrative roles rather than technical production

## 6a

### Opción 1

3	1	0	1	0	1
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Código de carrera

***Bachillerato y Licenciatura en Derecho***

Nombre de la carrera

1	1
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Código del recinto

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Código del recinto

***Sede Rodrigo Facio***

Nombre del recinto

Nombre del recinto

### Opción 2

2	1	0	1	0	1
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Código de carrera

***Bachillerato y Licenciatura en Biología***

Nombre de la carrera

1	1
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Código del recinto

***Sede Rodrigo Facio***

Nombre del recinto

	Grouping of Broad Fields		
	Arts, Writing & Culture	STEM & Applied Sciences	Social Science & Prof. Studies
Admin. Services	-0.404*** (0.094)	0.092 (0.143)	0.312** (0.150)
CPU Programming	-0.114 (0.123)	-0.226 (0.188)	0.340* (0.196)
Call Centers	0.473** (0.192)	-0.039 (0.291)	-0.434 (0.305)
CPU Consultation & Mgmt.	0.039 (0.127)	-0.175 (0.244)	0.135 (0.258)
Manu. Medical Insts.	0.170 (0.187)	-0.090 (0.277)	-0.081 (0.290)
Architect & Engineering	1.286*** (0.058)	0.127 (0.557)	-1.414** (0.593)
Materials Recovery	0.737*** (0.043)	-1.293** (0.513)	0.555 (0.549)
Data Processing	3.376*** (0.046)	0.438 (0.399)	-3.814*** (0.424)



# Arts, Writing and Culture Sub-Fields

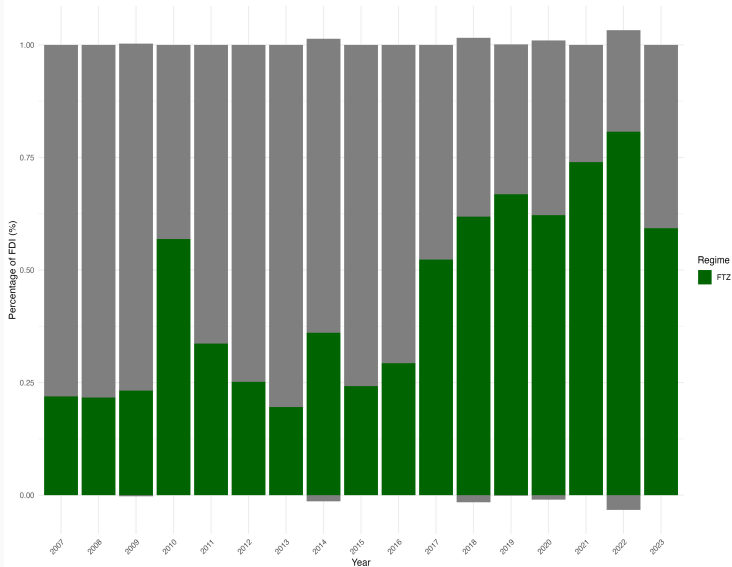
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Table 2: Aggregation of ISCED Broad Categories

<b>STEM &amp; Applied Sciences:</b> Natural Sciences, Engineering, Information Tech., Agriculture, Health
<b>Social Sciences &amp; Professional Studies:</b> Business Admin., Social Sciences, Education
<b>Arts, Writing, &amp; Culture:</b> Arts & Humanities, Tourism <sup>a</sup>

<sup>a</sup> Tourism is not the official category, but rather "Services". It is renamed due to the only majors in this category are some related to tourism activities.