Spring 5-1-2020

Cruise Ship Ports and Human Capital Development: The Case of Mexico

Jorge Herrera
charles177@hotmail.com

Cruise Ship Ports and Human Capital Development
The Case of Mexico

JEL Classifications: F16, J24, O24, O54, Z32

Jorge C. Herrera

Department of Economics
University of San Francisco
2130 Fulton St.
San Francisco, CA 94117

Thesis Submission for the Masters of Science Degree
in International and Development Economics

e-mail: jcherrera3@dons.usfca.edu

April 2020

Abstract: The cruise ship industry, the fastest-growing segment in the leisure travel market, has contributed significantly to the economic transformation of developing countries, particularly in the Caribbean Basin. This paper applies a difference-in-differences methodology to examine the causal impact of the introduction of cruise ship ports on human capital development in Mexico, as reflected by educational attainment. Using variations in school enrollment, segregated by gender and age across states and municipalities, I find that the economic consequences derived from this form of tourism do not translate into incremental, permanent improvements in all quality of life indicators considered, most saliently in schooling. These results are consistent with those obtained by recent studies to the effect that the creation of low-paying, low-skilled positions by export activities has a detrimental impact on school enrollment as the opportunity costs outweigh returns to education. They also corroborate other research postulating that in regions relatively more affected by international tourism the local expansion in services is offset by reduction in other forms of economic activity.

1. Introduction

Achieving a compounded annual growth rate of 8.5% over the last two decades, the growth of the cruise ship industry can justifiably be deemed remarkable. Its vessels transport more than 26 million passengers annually, compared to fewer than 18 million as recently as 2009.[1] Annual revenues exceed $117 billion; employment and payroll are one million and $38 billion, respectively.[2] While operations are dispersed globally, the Caribbean Basin accounts for a disproportionate 85% of its receipts. This concentration of business activities explains the significant impact exerted on the many developing countries in the region. Deprived of any other competitive economic advantage, they remain for the most part dependent on the exploitation of the natural endowments provided by their geographic location (e.g., climate, beaches), an endeavor that is facilitated by the establishment of cruise ship ports. As such, the study of the industry's impact on less affluent nations, the subject matter of this paper, is both an apposite topic of research in development economics and one that deserves heightened attention.

This study is circumscribed to an examination of the experience observed in Mexico. The rationale for this approach is based on five considerations. First, state and federal agencies and cruise industry entities compile the data necessary to measure the impact of the intervention under consideration. Second, its reliability, a concern often when dealing with developing countries, can be corroborated by examining various sources. Moreover, cruise ship ports have operated in the country for an extended period of time in geographically and demographically diverse sites thus ensuring the availability of a statistically meaningful volume of observations. In addition, climatic conditions and vagaries in customer preferences generate the fluctuations in parameters necessary to apply ordinary least squares estimation. Finally, the country's considerable population and landmass provide the sufficient demographic dispersion that permits comparisons across municipalities and states,

1 Source: Cruise Lines International Association (CLIA)
2 Ibid

a key consideration on which the methodology applied hinges. These conditions are seldom replicated in other places, notably in insular Caribbean ports.

The cruise ship industry in Mexico is a firmly established economic sector, a situation that results to a great extent from the federal government's decision to plan, promote, and finance generously the development of tourism at the national level. It is a remarkable achievement on many counts. Registering an annual growth rate of 7.4% in passenger visits between 2012 and 2019, Mexico accounts for 38% of all cruise ship stops on a global basis.[3] Foreign exchange earnings surpass $480 million annually, more than any other nation. The sector employs 16,000 workers.[4] The magnitude of the transformative impact is perhaps nowhere better observed than in Cozumel, a mostly arid, barren island which until recently counted on a few more than 25,000 inhabitants.[5] Its port receives more than four million tourists annually, the fourth most active in the world.[6] The story of the dramatic economic turnaround experienced by some of the country's traditionally poorest states, Quintana Roo, Yucatan, and Baja California, would certainly be incomplete without mentioning the repercussions of the cruise ship ports in Cabo San Lucas, Costa Maya, and Ensenada.

The study of the contribution of tourism, especially cruise ships, to the economic development of Mexico has been until recently the exclusive purview of industry groups and governmental agencies, entities not necessarily devoid of an unbiased point of view. The need to justify the continued existence of by now entrenched bureaucracies and diffuse local opposition to further encroachment in the natural habitat inherent in large infrastructure projects, particularly in light of the increasing scrutiny accorded to environmental mishaps, undermine the credibility of much past research and indicate the need for a more rigorous, impartial approach. Another perceived limitation is the scope of the analysis which can often be characterized as no more than an accounting exercise, a mere tally of revenues and expenses with apparently little concern for long-term spillover effects. Faber and Gaubert (2018) introduce much needed objectivity in research that finds tourism the

3 Source: Secretaria de Comunicaciones y Transportes
4 Source: Secretaria del Trabajo y Prevision Publica & Hacienda
5 Source: INEGI Encuesta Intercensal 2015
6 Source: WorldAtlas

source of large and significant local economic gains relative to less touristic regions. Their study however fails to segregate the impact of cruise ship ports and considers income gains as the sole impact on the affected population. Atkin (2015) looks beyond employment gains derived from international trade to show that human capital development is not necessarily a concomitant. Income per se may not suffice to achieve improvements in quality of life as Amartya Sen so eloquently argued in Development as Freedom (1999).

This paper addresses the question of whether the intervention associated with an infrastructure project designed to promote international trade increases human capital in the adjoining population. Its contribution to the field of development economics is fourfold. First, the study looks at a type of project, cruise ship ports, seldom or perfunctorily considered hereto. Second, the effects of the intervention are measured by considering not the customary gauges of variation in income and employment but by other benchmarks of human capital, namely educational attainment and crime. Moreover, this paper differentiates the impact by gender and age. Finally, the study aims to obtain more precise results by applying a methodology that eschews comparison between observations pertaining to large population units over extensive geographical areas (e.g., countries or continents). In lieu, measurements are based on spatial variations taking into account the physical proximity of the intervention.

The identification strategy in this paper exploits the idiosyncrasies of the economic activities linked to the intervention in order to identify its effect on human capital development. Namely, the cruise ships are seldom in any given port for more than a few hours, a considerable number of passengers do not disembark, and the location of the facilities themselves is usually in remote, relatively isolated sites. Furthermore, the skill set demanded by the positions created by tourism is generally low, the availability of labor is plentiful, and the government provides training as needed. As such, the impact of the exposure is assumed to be circumscribed to areas close to the ports. I apply the difference-in-differences method of impact evaluation to measure variations in educational attainment across municipalities and states based on the placement of the cruise ship ports. The validity of the necessary “parallel trend” assumption is justified for the reasons previously listed. Furthermore,

the location of the ports per se is taken as exogenously determined. That is, the reasons are limited to considerations pertaining to climate and proximity to beaches and historical sites. The proxy used for the effects of the intervention is the number of passengers arriving at each port since they, and not the cruise operators, are responsible for the payment of local taxes and facility fees. Also, consumption of food and purchase of merchandise by visitors are the main drivers for the creation of employment in services; the crew of the vessels is not sourced locally. Ordinary least squares regression with time and municipality fixed effects is then employed to test my theory of change which postulates that higher household income and public sector inflows translate into more participation in schooling. The main results however indicate that gains in educational attainment, regardless of gender and age, are not affected by the proximity of the cruise ship ports. A similar finding is observed regarding murder rates. Thus, income and employment gains derived from the intervention and the accompanying exponential growth in population and immigration observed appear to foster human capital development in a manner indistinguishable from that experienced by areas less affected by the infrastructure project enhancing the export of services.

The next section provides a survey of relevant literature and an overview of the main theoretical models deemed apposite for examining international trade and its impact on human capital. Section III introduces the identification strategy employed, the empirical model, its main assumptions, and the data base created to conduct the study. Section IV presents the results, evaluates the validity of the parallel trends assumption required to apply the impact evaluation method, and considers an instrumental variable to address endogenity concerns. Section V concludes the paper by summarizing empirical findings, limitations, and policy implications.

2. Literature Review

2.1 Introduction

Despite its emergence as the fastest-growing category in the leisure travel market and transformative impact on many Caribbean islands, the study of the cruise ship industry remains a mostly overlooked subject in development economics. A plausible explanation is the lack of consensus on the appropriate research framework to be applied, a source of obfuscation and incongruity. To partially address the oversight, this paper aims to investigate the effects of these activities on specific facets of human capital – educational attainment by age and gender. In this endeavor, the Heckscher-Ohlin and Mincer models furnish the theoretical foundations for the analysis to be performed hereto.

Academics, industry professionals, and public sector policymakers have favored the following three apparently conflicting approaches for considering cruise tourism:

- as a business enterprise in which the analysis performed is similar to an accounting exercise that tabulates income and expenses (e.g., Gabe (2009): "Economic Impact of Cruise Ships Passengers in Portland, Maine.")
- as an infrastructure intervention which creates economic shocks that affects populations in a specific space (e.g., Donaldson (2012): "Railroads of the Raj: Estimating the Impact of Transportation infrastructure.")
- as the export of services consonant with the theory of endowment factors advanced by the Heckscher-Ohlin model (e.g., Faber, B. and Gaubert, C., (2019): "Tourism and Economic Development.").

In attending to measure an effect on schooling at a national scale, this paper deems the latter a preferable approach on the basis of the literature consulted.

The Heckscher-Ohlin model is apposite to this paper by helping identify and explain the specific channels by which a manifestation of international trade, tourist activities in this case, influences a country's allocation and distribution of its factors of production, herein human capital. In particular, the Heckscher-Ohlin model elucidates

the manner in which cruise ship ports affect labor market conditions and demographics prevalent in specific geographical locations. The Mincer model, on the other hand, contributes to an understanding on how tourist activities can shape variations in school enrollment, patterns of migration, and population growth. Consequently, it is incumbent to investigate the antecedents responsible for the origin and evolution of these theoretical frameworks in order to comprehend the outcomes this study intends to measure.

2.2 International Trade Models

Some academics posit that the effects of tourism on a locality should be examined under the framework applied to international trade issues (Socher, 1986). That is to say, the nexus between commerce and economic development is apposite in explaining the manner in which leisure travel affects a country's allocation of its factors of endowment, including human capital. As such, our investigation justifiably commences by considering the best known postulation in this field: Ricardo's comparative advantage model.

In On the Principles of Political Economy and Taxation, David Ricardo asserted that international trade behavior derived from a country's comparative advantages. The term was used to describe activities in which a country was able to produce goods more efficiently relative to other goods. This in turn was carefully distinguished from soi-disant absolute advantages, or endeavors in which the country could produce a good more efficiently than any other country.

The Heckscher-Ohlin model builds on this insight by imputing the origin of these comparative advantages to a country's factor endowments; the latter is defined as comprising both physical and intangible assets. In essence, a country will export goods derived from the exploitation of those factors of endowment which are abundant and will import those goods which require the employment of resources which are endemically scarce. It is assumed that countries share identical technologies and taste preferences but differ in relative factor endowments and intensities in the production function.

The Heckscher-Ohlin model is deemed an advancement in economic theory primarily due to its relaxation of the constraint imposed by the specific-factor model, which at the time constituted the in vogue analytical framework for investigating international trade, of ignoring the ability of factors to move across productive sectors within countries. The implications of which are significant since researchers could then study not only the manner in which factors determine trade patterns but also how they impact specific economic players in a non symmetrical manner. That is to say, while concurring with previous models that find trade a contributor to aggregate welfare, the Heckscher-Ohlin model predicts an unequal distribution of these benefits; human capital, as evinced for example by educational attainment, and wealth distribution will be thus be shaped by the country's relative abundance of factors. This, consequently, implies that under certain conditions trade liberalization may increase income inequality between skilled and unskilled labor and distort the incentives and costs of schooling (this is to be addressed more extensively below in the discussion of Mincer's model). In conclusion, the Heckscher-Ohlin model helps explain volume and composition of trade flows across national borders, aggregate gains from trade accrued to its participants, and, most important, the beneficiaries and losers of those involved in these activities.

As originally postulated in 1922, the Heckscher-Ohlin model has been reconfigured frequently most notably by Bertil Ohlin in 1933 (relaxation of the previously fixed ratio of factor endowments and the extension to international trade of the interregional framework), Paul Samuelson in the 1950s (determination of real returns and wages), and Jaroslav Vanek (consideration of multiple factor and country scenarios). The most prominent challenge to the model is perhaps the research conducted by Wassily Leontief in 1953 which showed that the United States, perceived at the time as the most capital abundant country, exported goods that were more labor than capital intensive in content, thus, contradicting the predictions of the Heckscher-Ohlin model. Researchers are still arguing the merits of these findings and the consensus view is far from settled. While some aver that comparing the capital/labor intensity of exports to that of domestically-consumed production is a better test of revealed factor endowments than comparing exports to imports

(Leamer, 1980), others posit that modifying the model, and not the data, explains the so-called paradox (Trefler, 1993).

The emergence of a new economic order in which multinational firms, and not countries, are the primary determinants of international trade has necessitated the formulation of a new theoretical framework, one not shackled by the restrictive assumptions behind the Heckscher-Ohlin model. In this new framework, christened rather unimaginatively “New Trade Theory,” increasing returns to scale (derived from market control), distinct production functions (supported by intellectual property statutes), and heterogeneity in firms are now conditions deemed axiomatic. Of note, and recognizing the irrefutable reality of a market place populated by non-homogenous corporate entities, the emergence and prominence achieved by “heterogeneous firm” models evince perhaps that post Heckscher-Ohlin models are no longer deemed heterodox dogma.

Post Heckscher-Ohlin models differ from their predecessors by supplanting national actors and their relative differences in factors with heterogenous corporate entities embodied with idiosyncratic production functions. These are ascribed a transformative role on account of their ability to shape the composition and size of their markets (Bernard, 2007). Specifically, both the internal and external dynamics of corporate entities become the determinants of commerce. For example, within-sector productivity differences, and not a country’s endowments, explain the structure of international trade and investment patterns (Helpman et al., 2003). In essence, achievements driven by the former (e.g., production innovation) induce the latter, manifested in the extent of a firm’s participation in export markets. Inter-firm allocations allow the corporate entity to maximize comparative advantages, as evinced by its ability to expand overseas (Melitz, 2003). Less attractive activities suffer accordingly. As such, welfare gains are thus not derived from relative differences in national endowments but driven in lieu by corporate actions. Of more relevance to this paper, the impact on employment levels and wages, and thus human capital, is no longer circumscribed to specific economic sectors and occupations.

2.3 Educational Return Models

In Schooling, Earnings, and Experience, Jacob Mincer introduced a methodology for estimating the relationship between a worker's wage and years of schooling and experience that is deemed "the basis for economic studies of education in developing countries" (Heckman (2003), p.1).

$$\ln[w(s, x)] = \alpha_0 + \rho_s s + \beta_0 x + \beta_1 x^2 + \varepsilon$$

where w(s, x) is wage at schooling level s and work experience x, ρ_s is the rate of return to schooling (assumed to be the same for all schooling levels) and ε is a mean zero residual.

The main contribution of the model is to provide estimates of rate of return to education more consistent with empirical observations; until then, the standard procedure for accomplishing task entailed discounting differences in earnings between two groups differing with disparate education attainment (Mincer (1974), p.131). The estimation model is then applied to explain the observed inequality in the distribution of labor incomes and the intricate yet stable patterns (i.e., comparative sets of means, variances, and shapes of the component and aggregate distributions of earnings) of the earning structure (i.e., aggregate earnings distribution and its partition into schooling and age subgroups). The implications of the model on public policy and individuals are extensive. For instance, the amount invested by the state in school infrastructure can be decisive in tackling poverty and income inequality; greater access to education does translate into better employment opportunities and wages (Duflo, 2001). For the individual worker, an assessment of the costs and benefits attached to additional schooling is made possible. Namely, the return to education can be compared to its inherent opportunity costs (e.g., deferring employment and thus foregoing income while enrolled in school). Another insight contributed by Mincer's framework is the realization that the relation between education and wages is not necessarily linear. That is, an additional year of primary education may not have the same effect as more time in a tertiary school or post-school training (Mincer(1974), p.136). Again, this has profound policy implications in the manner state resources should be allocated and the individual's decision to seek more training. In conclusion, the usefulness of the Mincer's model derives from its

ability to establish a clear, quantifiable nexus between educational attainment and an individual's employment opportunities and compensation.

Despite the improvements made to the original formulation, the Mincer model still suffers from three main drawbacks. First, correlation does not imply causality. The question of the extent to which returns to schooling are linked with other factors is yet to be satisfactorily answered. For example, upward bias in the returns to schooling could be the result of selection bias from educational institutions that prefer to accept easier to teach students or individuals who due to innate abilities are able to derive greater benefits from additional training. Second, the estimated average marginal rate of return fails to denote the wide fluctuations in earnings that could be observed over an individual's working life nor identify the manner in which the marginal benefit of schooling varies. Finally, and of critical importance for devising effective policies, the model only predicts individual effects and not those that accrue to the entire social organization. This results from solely considering the costs associated with foregone wages and ignoring public costs such as building infrastructure and providing training to required personnel. Also not taken into account are ancillary benefits such as social cohesion, improved health, and lower crime rates. In essence, the model fails to consider externalities and therefore its application may not yield a Pareto-optimal solution.

2.4 Simultaneous Application of Heckscher-Ohlin and Mincer Models

The first study involving the concurrent implementation of the two theoretical frameworks looks at human capital formation in a two-factor, two-good model of trade (Findlay and Kierkowski, 1983). Its importance derives from the introduction of endogeneity in the determination of wages and educational costs in the derivation of terms of trade and the pattern of comparative advantages. Another novel insight pertains to the differentiation needed to distinguish between skilled and unskilled workers when considering human capital. This is hence related to this paper's aim to assess differences in educational attainment and employment from the introduction of international trade. The type of employment generated and therefore skill set requirements associated with cruise ship ports are distinguishable from other economic activities. However, the study fails to consider distributional aspects of

human capital formation since it still deemed aggregate endowment to be equitable across countries, an assumption not consonant with the methodology applied in this study. Furthermore, Findlay and Kierkowski's model takes compensation and the level of human capital associated with skilled workers as a constant, a rather draconian constraint that clearly is incompatible with empirical evidence.

The applicability of the Heckscher-Ohlin framework was extended by incorporating externalities generated by human capital to examine the patterns of international trade and migration (Ishiwaka, 1996). Specifically, the study considered the manner in which individuals endowed with different levels of human capital choose to become either unskilled or skilled workers. Furthermore, the effects of migration as a source of comparative advantage was introduced into the Heckscher-Ohlin model along with the possibility that skilled and unskilled workers could migrate in the same direction. This is relevant to this research because high levels of domestic migration have been observed for decades in the areas where the effects of the intervention are to be measured. This inevitably affects both employment and educational attainment, particularly if the new inhabitants originated from less developed or affluent states or municipalities. The model however suffers from the unrealistic assumption that trade does not have an impact on human capital formation, a contradiction of Findlay's findings. Namely, human capital is exogenously determined.

More recent studies attend to make an explicit nexus between international trade, schooling, and employment, the main subject of this study. The most salient of these is a paper which examines the manner that a specific trade policy (tariffs) influences schooling and child labor in a low-income country (Edmonds, 2010). The findings, a decline in child labor and an increase in schooling is lessen in districts with employment concentrated in industries losing tariff protection, confirm the existence of the sort of impact this paper aspires to detect. The key insight is ascribing this behavior to the opportunity cost of education; attenuated trade protection translates into higher poverty rates and diminished ability to afford education. As such, the paper bring us to Mincer's model for estimating wages on the basis of experience and educational attainment. The primary limitation of the study is the failure to consider the massive migration patterns observed in India in response to changes in

regional employment opportunities and the extent that this may undermine the implicit assumption that factor mobility is limited.

A more nuanced approach to measure the impact of the forces of globalization, a manifestation or consequence of international trade, considered the manner in which traditional institutions determine economic mobility and the welfare of particular individuals (Munshi and Rosenzweig, 2006). The study considered not solely the aggregate effects associated with changes in international trade patterns but also strongly embedded social norms in the form of the caste system. Another contribution of this paper apposite to this research is the differentiation of effects between genders and inferences to be drawn from school enrollment data. Remarkably gender discrimination was found to be beneficial to women; lower-caste girls, who historically had low labor market participation rates and so did not benefit from a social network, were taking more advantage to new economic opportunities by switching rapidly to English schools. This could be akin to Mexican female workers achieving a higher labor participation rate as males shun the type of employment created by tourism on account of negative cultural perceptions.

Three recent studies concur in their assessment that the effect of international trade on educational attainment is not always predictable and linear; observed impacts on the affected populations can indeed be asymmetrical. In the case of a trade agreement negotiated by three sharply distinct countries (i.e., USA, Mexico, and Canada), Caliendo and Parro (2015) finds that welfare gains, including education, are not observed in all regions. Redding (2016) demonstrates that the extent of these benefits depends on the internal reallocation of resources across regions within countries. Namely, internal and external conditions do matter. Topalova (2010) avers that trade liberalization can produce detrimental effects, such as lower consumption and higher poverty, to specific population segments within a country despite aggregate gains at the national level. Like Duflo (2001), her methodology is applicable to our research by demonstrating an effective way of gauging variations in the geographical impact of an intervention of economic nature. Atkin (2015) and Munshi and Rosenzweig (2006) aver that the nature of a country's exports determines educational attainment.

Heckscher-Ohlin models have been also modified to examine endogenous skill acquisition and export manufacturing (Atkin, 2015). This investigation is particularly relevant to the study as it considers Mexico, school enrollment, and export activities. By quantifying the impact of a specific international trade activity on educational attainment, it applies the theories behind the latest forms of the Heckscher-Ohlin and Mincer models to deliver a coherent interpretation of empirical results with clear policy implications. Specifically, the promotion of less-skilled manufacturing jobs could raise the opportunity cost of schooling. The main drawback of the analytical framework is the difficulty of accounting for reverse causation (i.e., local skill levels may themselves determine firm employment decisions). Another rather obvious problem is the failure to take into consideration transportation costs and geographical location. Maquiladoras are almost exclusively situated in the north because the main importer is the United States, a factor that is not apparently related to the skill level of the local population.

New Trade Theory is the most recent theoretical framework that attends to connect international trade with variations in employment and schooling. Firms are differentiated not only by heterogeneity in the production function but also by personnel practices. While the Heckscher-Ohlin model ascribes wage dispersion to differences in endowment factors, Helpman et al. (2017) find instead that it arises from considerations intrinsic to the corporate entity. For example, exporters are larger and more efficient therefore are able to provide higher compensation than non-exporters. Interestingly, the authors measure the between-firm component of compensation inequality by applying a Mincer regression, thus including educational returns as an additional consideration in the analysis.

2.5 Conclusion

This literature review identifies the Heckscher-Ohlin and Mincer models as the pertinent theoretical frameworks to guide this research's formulation. It also reveals their many inherent limiting features, including assumptions glaringly contradicted by empirical evidence, thus cautioning the researcher against either uncritical reliance or far-fetched extrapolations. While the heterogeneous firm models may yield more accurate estimates of the impact of cruise ship ports on human capital, available data

and the time allotted for completing this paper preclude adoption of such segmented approach.

The literature research also reveals the many angles in which the effects of tourism can be examined. Accordingly, it is not surprising to encounter a plethora of methodologies for assessing interventions associated with this type of economic activity. Recent studies in development economics tend to prefer a more nuanced, limited spatial approach that eschews the previously favored general equilibrium models that relied mostly on aggregate data. More accurate measurements and meaningful inferences appear to be possible by observing within limited space variations (e.g., Duflo, 2001, Dell, 2012). The successful application of this technique to examine a large transportation infrastructure project, an intervention somewhat akin to the cruise ship ports considered in the study, supports convincingly the appropriateness of gauging inter-regional welfare differences in this manner (Donaldson, 2012). The insight provided by these studies constitutes the basis for adopting this approach in order to detect the effect of economic activity associated with cruise ship ports on heterogeneity in educational and employment achievement.

3. Methodology

3.1 Identification Strategy

This paper adopts a methodology that is increasingly deemed appropriate for measuring welfare consequences of aggregate or local shocks, particularly when involving trade and factor mobility between regions within countries (e.g., Caliendo and Parro (2015)). The identification strategy relies on the observation that not all municipalities in a given state host cruise ship ports and that their establishment varies over time. As such, the benefits derived from the economic activities associated with the intervention (e.g., taxes and employment) are not uniformly distributed. For example, the significantly higher labor participation by women achieved in Cozumel after the opening of the cruise ship port should be expected to translate into improved school enrollment; the inability of prospective students to cover unreimbursed out-of-pocket expenses is often an impediment to attendance. I use a difference-in-differences estimator that controls for systematic variations in

school enrollment and crime rates across municipalities and time. This is an appropriate approach given that the timing of each intervention is well identified.

As mentioned above, this identification strategy is predicated on two key assumptions. First, the effects of the intervention are primarily circumscribed to the municipality in which the cruise ship port is located thus they drive the observed variations in human capital indicators. This is a reasonable premise because the cruise ships are seldom in any given port for more than a few hours, a considerable number of passengers do not disembark, and the location of the facilities themselves is usually in remote, relatively isolated sites. The concentration of cruise tourism in one municipality within the state is depicted below:

STATE	CRUISE PORT	% PASSENGERS /STATE
Quintana Roo	Cozumel	78%
Baja California Sur	Cabo San Lucas	97%
Baja California	Ensenada	100%

Source: Secretaria de Comunicaciones y Transportes

Furthermore, the population of the locations where the ports are located is generally small compared to the state's total inhabitants thus the effect on the treated group should be both concentrated and notable. For example, Cozumel with fewer that 90,000 inhabitants receives annually over 4 million visitors transported by cruise ships.

STATE	CRUISE PORT	% STATE POPULATION
Quintana Roo	Cozumel	6%
Baja California Sur	Cabo San Lucas	11%
Baja California	Ensenada	16%

Source: INEGI Encuesta Intercensal 2015

Second, application of the difference-in-differences evaluation method hinges on the validity of the "parallel paths" assumption. Namely, in the absence of cruise ship ports, the average change in the response variable would have been the same for both the municipalities with and without the intervention. This premise is tested by the

disappearance and emergence of port facilities at various time points during the period examined.

3.2 Data Set

The database is derived from a compilation of various sources, including both governmental and private sector entities. Lack of segregation of school enrollment figures by municipality limits the period under consideration to 2009 until 2018.

Intervention

As proxy for the intervention, this study uses the number of cruise ship passengers arriving at each site; port fees and local taxes are paid by individual clients and not operators. The data is obtained from the Mexican Secretariat for Tourism (Sectur), national censuses (Censos Economicos Comerciales y de Servicios), and Fondo Nacional de Fomento al Turismo (FONATUR), the federal agency for the promotion of tourism. Its accuracy is verified by consulting information supplied by the Cruise Lines International Association and Business Research and Economic Advisors. Observations are taken on an annual basis for the entire country and three states which together account for 86% of arrivals, Quintana Roo, Baja California, and Baja California.[7] Observations are assigned to the specific municipalities hosting cruise ship facilities in order to detect variations within each state.[8] For 2018, the number of passengers exceeds five million.[9]

Treatment Effects

The indicator of human capital considered is educational attainment as measured by school enrollment at public facilities. The sources of the data are the Ministry for Public Education (Secretaria de Educacion Publica), Instituto de Servicios Educativos y Pedagógicos del Estado de Baja California, Servicios Educativos de Quintana Roo, and Secretaria de Educacion Publica del Estado de Baja California Sur.[10]

7 See Figure 1
8 See Figures 2, 3, and 4
9 See Table 1
10 See Table 2

Under the provisions of the Mexican Constitution, the federal government is required to provide free education to all children until the age of 15[11]. The country has the largest proportion of students enrolled in public institutions, at nearly all levels of education, compared with other Latin American countries.[12] The primary educational system is divided into three levels:

- preschool: not mandatory; may start as early as age three
- primary: mandatory for all children aged 6 to 12; consists of grades one to six
- secondary: mandatory for all children aged 12 to 15; consists of grades seven to nine

The student's family is responsible for uniforms, school supplies, transportation, and other items (e.g., some textbooks) to attend school. The inability to cover these expenses could be a detriment to enrollment, particularly if the household is poor and it contains more than one school-age child.[13]

School enrollment is measured at the municipal level in order to match with passenger arrivals at each port. As such, I collect data from eleven localities in Quintana Roo, five localities in Baja California, and five localities in Baja California Sur. For 2018, the number of students exceeds one million.

A sample collected from Quintana Roo in 2019 is shown below:

LEVEL	TOTAL STUDENTS	% MALE	% FEMALE
Pre school	59,455	50.2	49.8
Primary	191,268	50.9	49.1
Secondary	85,261	50.6	49.4

Source: Servicios Educativos de Quintana Roo

The limitations of the data set are several. First, the figures report total number of children enrolled and not participation rate. Given the significant immigration experienced in all three states, growth should be expected regardless of the impact of the intervention. Participation can be argued to be a better measure as gains in household income and public sector inflows bolster the decision to enroll and remain in school. Second, geographical coverage shifted over the period under consideration

11 Source: Mexican Government: Plan Educativo Nacional
12 Source: Education at a Glance 2014: OECD Indicators
13 Source: International Community Foundation

as municipal boundaries were adjusted. Fortunately, the areas affected did not involve the ports and the magnitude of school enrollment was relatively small. Finally, the data excludes private schools (which account for around 17% of aggregate enrollment); therefore, the students who invest in more expensive services are not considered, as such, the results may understate the effect of the intervention.

3.3 Empirical Model

The relationship between cruise ship passengers visiting a municipality and school enrollment is examined using an ordinary least squares regression. The simple model is as follows:

$$H_{mt} = \alpha + \beta * \log(passengers_{mpt-1}) + \Upsilon_t + \theta_m + \varepsilon_{mpt}$$

where m indexes municipalities, t indexes survey years, p indexes municipalities with or without cruise ship ports, H_{mt} is municipality-level school enrollment, $passengers_{mpt-1}$ is number of cruise passengers arriving at the municipality at time t-1, Υ_t is a vector of time fixed effects and θ_m is a vector of municipality fixed effects. To address concerns about auto-correlated error terms for the same municipality over time, I cluster standard errors at the municipality level.

3.4 Hypotheses

I apply the empirical model to test the following primary hypothesis:

- School enrollment in the municipalities where the cruise ship ports are located is not different from that achieved in other parts of the state.

Following estimates of overall impact, I then consider gender effect. Women in Mexico have one of the lowest rate of labor participation in Latin America.[14] The gender gap widens inversely with educational attainment: 44% of Mexican women with below upper secondary education are employed compared with 88% of men with the same level of education; 56% of women compared with 91% of men with upper secondary education are employed; and 72% of women compared with 88% of men with tertiary education.[15] Only behind health services and education, tourism is the

14 Source: Panorama Laboral 2018 para América Latina y el Caribe de la Organización Internacional del Trabajo (OIT)

15 Source: Education at a Glance 2014: OECD Indicators

economic sector in which women hold the largest share of positions (i.e., 57.4%).[16] I therefore test for the following secondary hypothesis:

- Female school enrollment in the municipalities where the cruise ship ports are located is not different from that achieved in other parts of the state.

Finally, I consider the effect of age of the student on the impact of the intervention. Among OECD countries, Mexico has one of the lowest rates of school enrollment among 15 to 19-year-olds, possibly because poverty drives them to find jobs rather than complete their education.[17] Furthermore, young workers (i.e., age 16-24) employed in tourism represent 21% of the workforce, a larger share than in any other sector.[18] I therefore test for the following final hypothesis:

- Secondary school enrollment in the municipalities where the cruise ship ports are located is not different from that achieved in other parts of the state.

3.5 Econometric Concerns

The applied identification strategy could be undermined by several issues. First, omitted variables may affect school enrollment and correlate with passenger arrivals. Since the intervention is driven by considerations pertaining to climate and proximity to certain sites (e.g., beaches and historical ruins) determined by foreign preferences and not local demand, this does not appear to be a significant impediment. Second, reverse causality introduces endogeneity thus violating the conditions necessary for applying a least squares estimator. Again, the decision to locate a cruise ship port at a given location is unlikely to be driven by the educational attainment of the local population, particularly since the skill set demanded by the positions created is generally low. Finally, the presence of measurement error affects the estimated coefficients by introducing bias. The concern is mitigated by compulsory laws regarding school attendance, the nature of the tally process, and the ability to corroborate the figures pertaining to passenger arrivals with several other sources. Of note, all standard errors at the municipality level are clustered to deal with potential serial correlation in the error terms across years within a municipality.

16 Source: Secretaria Nacional de Empleo
17 Source: Education at a Glance 2014: OECD Indicators. See Figure 7.
18 Source: Observatorio Laboral

4. Results

This section presents the estimated impact of the introduction of cruise ship ports on schooling. The effects are segregated according to total school enrollment, gender, and age. The validity of the parallel trends assumption is then tested. This is followed by consideration of mechanical changes in population and income on the dependent variable. The possibility of employing passenger arrivals as an instrumental variable for income to overcome the issue of endogeneity is discussed. Finally, I use the data set to test for the correlation between cruise ship activities and murder rates, an alternative indicator of human capital development.

4.1 Response to Intervention

Table 3 presents the estimates obtained at the national level segregated by total enrollment, gender, and secondary school enrollment. Consolidated and female coefficients coincide in direction, lack of statistical significance, and magnitude. Coefficients for secondary school denote opposite signs, differ in statistically significance once, and exhibit generally higher magnitude. For the most part, the predictive power of the model, as denoted by the R square statistic, is limited. As such, the results appear to adduce a weak or inverse causal relationship between the intervention and schooling. Since the majority of cruise ship ports are located in isolated, scarcely inhabited sites, it should be expected that the impact of cruise tourism at the national level be modest.

Table 4 presents the statistical estimates of the impact of cruise ship passengers arrivals on school enrollment at the state level. The primary specification uses the entire sample for all municipalities within a state and controls for municipal and year fixed effects. The results are mostly consistent for Quintana Roo and Baja California Sur. Namely, the coefficients are numerically small, negative, and not statistically significant with a sole exception. The estimates for Baja California differ on account of their signs. In contrast to the results obtained at the national level, the predictive power of the model is now significant, a development primarily driven by the constant term. The patterns evince weak and negative elasticity of schooling.

The exercise is then repeated by considering solely the municipalities where the cruise ship ports are located. The results depicted in Table 5 present several differences. The coefficients are not statistically meaningful for Baja California and Baja California Sur but the signs oscillate. The observations for Quintana Roo yield p-value under 5% for two out of three municipalities and the signs turn positive twice. The numerical value for the coefficient representing Cozumel is relative large compared to all other results. This indicates that the impact of the intervention is not consistent for all sites and therefore local idiosyncrasies may affect the outcome. Once again, the predictive value of the model is elevated but this time the coefficient corresponding to the number of passengers may be a contributing factor.

Table 6 presents the statistical estimates of the impact of cruise ship passengers arrivals on female school enrollment. The primary specification uses the entire sample for all municipalities within a state and controls for municipal and year fixed effects. The results are mostly consistent for all three states. Namely, the coefficients are numerically small and not statistically significant. The data for Baja California is the sole anomaly observed. I then repeat the exercise but instead consider separately the municipalities where the cruise ship ports are located. The results present several differences. The coefficients are not statistically meaningful for Baja California and Baja California Sur but the signs oscillate. The observations for Quintana Roo yield p-value under 5% for two out of three municipalities and the signs turn positive twice. The numerical value for the coefficient representing Cozumel is relative large compared to all other results. Table 3 considers consolidated national data. The results are entirely consistent with those estimated at the state level. The findings are not surprising since the share of school enrollment represented by women remains fairly constant over the period of observation.

Table 7 presents the statistical estimates of the impact of cruise ship passengers arrivals on secondary school enrollment. The primary specification uses the entire sample for all municipalities within a state and controls for municipal and year fixed effects. The results are mostly consistent for all three states. Namely, the coefficients are numerically small and not statistically significant. The data for Baja California is the sole anomaly observed. I then repeat the exercise but instead consider separately the municipalities where the cruise ship ports are located. The

results present several differences. The coefficients are not statistically meaningful for Baja California and Baja California Sur but the signs oscillate. The observations for Quintana Roo yield p-value under 5% for two out of three municipalities and the signs turn positive twice. The numerical value for the coefficient representing Cozumel is relative large compared to all other results. Table 3 considers consolidated national data. The results are different from those estimated at the state level. The numerical value of the coefficients is much larger and the signs turn positive. However, the estimates are not statistically significant except for the first specification; the p-value for the latter however still exceeds 5%.

The findings discussed above fail to corroborate the claim that there is a strong connection between the intervention and school enrollment; however, it would appear that the causality is slightly negative for most of the controls considered and that conditions prevalent at each site may be a strong determinant of the impact. Of note, consolidated national and state results do not yield the statistically significant coefficients observed for municipalities that host cruise ship ports. This could be driven by a classical market integration effect; an increase in economic activities associated with the intervention are negated by reductions in other less touristic regions.[19]

4.2 Testing Validity of Parallel Trends Assumption

The validity of the estimates derived from the impact evaluation method applied (i.e., difference-in-differences) hinges on the assumption regarding pre-trends in school enrollment. That is, in the absence of the intervention, the difference in the trend in school enrollment observed in the municipalities with cruise ship ports and those without is constant over time. This a critical consideration because in its absence an accurate measurement of the effects of the intervention could not be obtained. Clearly, corroborating such postulation is a formidable, if not, implausible task. Many factors could affect differently the conditions prevalent in each locality thus undermining the ability to isolate and gauge the effect of the intervention. Even though the results do not find a statistically significant impact, I test for the validity of the assumption by both visual inspection and application of the Quandt-Andrews test

19 See Fabert and Gaubert (2018)

for structural break. This task is accomplished by examining the behavior in school enrollment five years prior to the time period hitherto considered. Figure 5 clearly depicts wide fluctuations in growth rates for both the three states considered and the country as a whole, a minatory indication that the claim of parallel trends is potentially untenable. Similarly, observations for municipalities, states, and country are used to identify any potential discontinuity in the trends by applying the Quandt-Andrews test. The results reveal statistically significant breaks with respect to the data collected from Quintana Roo; most concerning is the number of different years in which the statistic reaches its maximum value and statistically significant p-values obtained. As such, the statistically significant coefficients observed in that state are suspect.

Quandt-Andrews Test Results

Municipal Observations

Location	Statistic	P-value	Estimated Break Year
Cozumel	16.2747	0.0064	2011
Felipe Carrillo	8.9758	0.1417	2015
Isla Mujeres	169.2556	0.0000	2012
Othón P. Blanco	193.1604	0.0000	2011
Benito Juárez	12.6134	0.0321	2009
José María Morelos	52.7002	0.0000	2014
Lázaro Cárdenas	10.3552	0.0824	2010
Solidaridad	5.2608	0.5181	2010

State and National Observations

Location	Statistic	P-value	Estimated Break Year
National	10.9898	0.0633	2016
Baja California	3.4928	0.8122	2011
Baja California Sur	4.8018	0.5912	2009
Quintana Roo	26.4764	0.0001	2013

4.3 Exploring Alternative Mechanisms: Growth in Population and Wages

I now consider the manner in which mechanical changes in population and income may drive the results.

Average Growth Rates

2004-2018

Location	School Enrollment	Daily Wage (M$)	Population
National	0.35%	5.18%	1.41%
Baja California	1.11%	5.56%	2.53%
Baja California Sur	2.52%	4.67%	4.09%
Quintana Roo	2.44%	4.70%	3.01%
Cozumel	0.66%	NA	2.96%

Sources: Secretaria de Educacion Publica, Secretaria del Trabajo y Prevision Soclal, INEGI

To accomplish the latter, several estimates of the income elasticity of school enrollment combined with actual income gains are used to forecast the impact on school enrollment. Table 9 presents the results obtained. Essentially, the vast improvement in enrollment can be explained by wage changes. Of note, if wages improved in the island at the same rate as in the mainland, the pattern observed in Cozumel, the site of the largest cruise ship port, constitutes an aberration. That is, income gains do not translate into school enrollment of similar magnitude or within the expected range. This would appear to give credence to the view that the availability of low-paying, low-skilled positions is deleterious to schooling. A similar observation could be made regarding population. Absence of data pertaining to school participation or household demographics demand exercising utmost caution in drawing entrenched inferences from these results.

4.4 Using Cruise Passenger Arrivals as an Instrumental Variable for Income

Having achieved no success in implementing the difference-in-differences methodology, I proceed to consider an alternative which incorporates variations in population and wages. Unfortunately, the latter potentially introduces undesirable consequences related to endogeneity which could severely undermine the accuracy

of the estimated coefficients.[20] To overcome this impediment, I attend to apply an instrumental variable methodology to detect the effect of the intervention. This requires meeting three conditions. First, the instrument must have a causal effect on income. This is established by running regressions of average daily wages on number of cruise passenger arrivals which evince a statistically significant relationship. Second, the instrument only affects school enrollment through wages and not directly, the soi-disant exclusion restriction. The results discussed in Section 4.1 lend credence to the belief that the condition is satisfied in the present case. The establishment of the cruise ship ports is determined by their proximity to desirable tourist attractions (e.g., beaches, historical sites) and not the educational attainmentof the population.[21] Finally, there is no confounding for the effect of the instrument on the dependent variable. Existence of this condition is assumed on the basis of the previous claim regarding the exclusion restriction. The availability of data for wages limits the analysis to state and national populations thus excluding comparisons at the municipal level. However, for curiosity, the impact in Cozumel is estimated assuming the wages prevent at the municipality are comparable to those observed for Quintana Roo. Finally, the baseline specification is expanded to include population controls.

Table 10 presents the statistical estimates of the impact of wages and population on school enrollment. The primary specification uses the entire sample for all municipalities and states that comprise Quintana Roo and the country, respectively. The first column depicts the coefficients derived using the instrumental variable estimation. The signs of the coefficients for Quintana Roo and the country coincide while they reverse for the island municipality. Since the results are not statistically significant even at the 10% level, meaningful inferences can not be drawn. I apply the Durbin-Wu-Hausman Robust Regression test for endogeneity. There is sufficient evidence to reject the null hypothesis (i.e., the condition is not present) at the 5% level for Cozumel and national data and at the 10% for state observations.[22] The second column shows the results for the baseline specification

20 See Atkin (2015)

21 Faber and Gaubert (2019) aver convincingly that the presence of islands (e.g., Cozumel), the fraction of coastline covered by white sand or the presence of archaeological ruins do not affect local economic outcomes relative to other coastal locations except through their effect on tourism activity.

22 See Table 12

with no instrumental variable. The coefficient for salary is always positive and statistically significant for Quintana Roo thus supporting the view that higher income aids enrollment. Similarly, all coefficients for passenger arrivals is negative and statistically significant for national and Cozumel estimates pointing to the detrimental impact of cruise tourism on schooling. The coefficients for population are not statistically significant and their signs oscillate therefore precluding the possibility of discerning a consistent pattern.

4.5 Other Human Capital Indicator – Incidence of Violence

Even though school enrollment is the primary measure of human capital development in this paper, I make use of the data set compiled to test for another indicator – incidence of murders. Table 8 depicts the results for Quintana Roo, Baja California, Baja California Sur, and the entire country. None of the coefficients is statistically significant and their signs oscillate depending on geographical location. As such, there appears to be no meaningful correlation between the number of cruise ship passengers arrivals and number of murders reported.

5. Conclusion

This paper finds that the presence of cruise ship ports in three Mexican states has limited impact on school enrollment, even when taking into account gender and age considerations. The observed patterns are indistinguishable from those driven by mechanical changes in population or income and pre-trends. These results are consistent with recent literature that posits that low-skilled, low-paying employment, the characteristics exhibited by the aggregate labor force dedicated to tourism in Mexico,[23] is conducive to higher school dropout rates. The apparent mechanism for explaining this development is the detrimental effect on opportunity costs in the absence of countervailing gains in returns to schooling. Also, the findings corroborate research that advance the view that the local benefits derived from tourism are largely countervailed by contraction of economic activity in other sectors, particularly at the aggregate national level.

23 See Table 11 Tourism Labor Force Descriptive Statistics

The limitations of the study are considerable. The availability of passenger data circumscribed the period under consideration to eleven years even though the interventions date from three decades ago. Furthermore, the desired breakdown in school enrollment by municipality is no longer released for certain areas and years. The preferred measure of schooling – enrollment rate – is similarly not available. Wealth accumulation driven by employment gains may translate into increased enrollment in private schools, an effect that remains to be tested. Time constraints preclude collecting and examining the remainder of states in which cruise ship ports are located. Given their significantly larger populations and less reliance on cruise tourism coupled with the absence of relative geographic seclusion observed in the facilities considered, the findings are not likely to be different. Finally, the validity of the parallel trends assumption upon which the impact evaluation method hinges can not be corroborated conclusively. The study could benefit from assuming a wider scope that would entail taking into account, among other considerations, migration patterns, household composition, and employment data specifically as related to cruise tourism.

The policy implications of these findings are two-fold. First, local and federal authorities may need to assume a more active role in promoting schooling by incentivizing enrollment. Since increasing funding to educational institutions has proven to be a spurious populist nostrum, introducing more innovative schemes is warranted.[24] Ameliorating the opportunity cost could be addressed by expanding existing direct assistance programs or enacting new fiscal incentives and cash transfer schemes. For example, the onerous limitations placed of an existing program – Becas Benito Juarez[25] – could be relaxed, particularly for those interested in obtaining college or technical degrees. Assigning a share of port fees already been collected and instituting a local tax payable by cruise visitors represent potential

24 Mexico's public spending on education amounts to 5.9 percent of gross domestic product (GDP) per capita, above the Organization for Economic Co-operation and Development (OECD) average of 5.6 percent. The government currently spends about $28 billion yearly on education, almost a quarter of its programmable budget. On average, states fund 85 percent of education spending through federal transfers. Source: RAND Corporation.

25 A plan managed by the federal government that offers scholarships for up to 800 pesos (US$43) per month for 10 months to permit students to remain enrolled in public schools. Source: Coordinacion Nacional de Becas para el Bienestar

sources for bankrolling these initiatives.[26] The country is unlikely to attract jobs that require higher level skills unless its workforce is educated and trained appropriately. Moreover, if Atkin (2009) is to be believed, cruise tourism and its concomitant economic impacts may be noxious in the long-term to existing objectives relating to income growth and poverty reduction. Clearly, the unacceptably elevated student dropout rates ipso facto evince the ineffectiveness of compulsory school attendance laws. Second, the mantra that all forms of tourism are beneficial to the country deserves to be subject to serious scrutiny by policy makers and others responsible for its promotion using public sector resources. For example, the demise of Acapulco[27] as a major cruise ship port serves as irrefutable evidence that large capital investments sponsored by the government not necessarily translate into viable business ventures or become a source of sustainable enrichment for its constituents. Simply shifting domestic endowment factors to respond to conditions primarily controlled by outsiders can not be considered a panacea for addressing the country's failings in educational attainment; achieving developmental progress requires implementation of policies that entail more than merely attracting the type of employment opportunities concomitant with cruise tourism.

26 A study prepared by Administración Portuaria Integral Acapulco, S.A. de C.V. indicates that the profit margin of a cruise ship port can exceed 35%.

27 Annual passenger arrivals declined from over 250,000 in 1999 to 21,000 in 2018. Source: Secretaria de Comunicaciones y Transportes.

References

Aitken, B. and Harrison, A. (1994). "Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Panel Data," Policy Research Working Paper 1248, World Bank, Washington DC.

Atkin, D. (2015). “Endogeneous Skill Acquisition and Export Manufacturing in Mexico,” NBER Working Paper 18266

Baland, J. and Robinson, J. (2000). “Is Child Labor Inefficient?,” Journal of Political Economy 108(4), 663-79

Barro, R. and Jong-Wha Lee (1996). "International Measures of Schooling Years and Schooling Quality," American Economic Review, 86/2: 218-23.

Bernard, A. et al. (2007): “Firms in International Trade,” Journal of Economic Perspective, 21(3), 105-130.

Caliendo, L. and Parro, F.,(2015). "Estimates of the Trade and Welfare Effects of NAFTA," Review of Economic Studies, vol. 82(1), 1-44.

Dell, M., Jones, B., and Olken, B. (2012). “Temperature Shocks and Economic Growth: Evidence from the Last Century,” American Economic Journal, 4(3), 66-95.

Donaldson, D. (2012). “Railroads of the Raj: Estimating the impact of transportation infrastructure,” American Economic Review, 108(4), 899-934.

Duflo, E. (2001). "Schooling And Labor Market Consequences Of School Construction In Indonesia: Evidence From An Unusual Policy Experiment," American Economic Review, 91, 795-813.

Duflo, E. (2003). "Grandmothers and Granddaughters: Old Age Pension and Intra-household Allocation in South Africa,” World Bank Economic Review, 17(1), 1-25."

Dutt, A. (1986). "Vertical Trading and Uneven Development," Journal of Development Economics, 20/2: 339-59.

Edmonds, E. V., N. Pavcnik, and P. Topalova (2010): “Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform,” AEJ: Applied Economics, 2(4), 42– 75.

Faber, B. and Gaubert, C., (2019). "Tourism and Economic Development: Evidence from Mexico's Coastline," American Economic Review, 109, 2245-93.

Findlay, R. and H. Kierzkowski (1983): “International Trade and Human Capital: A Simple General Equilibrium Model,” The Journal of Political Economy, 91(6), 957-978.

Federman, M., and Levine, D. (2005): “The Effects of Industrialization on Education and Youth Labor in Indonesia,” The BE Journal of Macroeconomics, 5(1), 1.

Hanson, R., Sawyer, G., Begle A., and Hubel G. (2010): “The impact of crime victimization on quality of life,” J Trauma Stress, 23(2):189–197.

Haushofer, J., Schunk, D. and Fehr, E. (2013). “Negative Income Shocks Increase Discount Rates,” Working paper, Department of Psychology, Princeton University.

Heckman, J., Lochner, L. and Todd, P. (2003). “Fifty Years of Mincer Earnings Regressions,” NBER Working Paper 9732.

Heckscher, E. (1922). Westergaard, Harald (ed.).The Continental System: An Economic Interpretation(1 ed.). Oxford: At the Clarendon Press.

Helper, S., Levine, D., and Woodruff, C. (2006): “How Does Economic Liberalization affect Investment in Education?: Evidence from Mexico,” Discussion paper, UCSD.

Helpman, E., Itskhoki, O. and Muendler, M. (2017): “Trade and Inequality: From Theory to Estimation,” The Review of Economic Studies, 84(1), 357-405.

Helpman, E., Melitz, M. and Yeaple, S.(2003): “Export Versus FDI,” National Bureau of Economic Research (Cambridge, MA) Working Paper No. 9439.

Ishikawa, J. (1996). “Scale Economies in Factor Supplies, International Trade, and Migration,” Canadian Journal of Economics, 29, 573–94.

Jensen, R. (2012): “Do Labor Market Opportunities Affect Young Women’s Work and Family Decisions? Experimental Evidence from India,” The Quarterly Journal of Economics, 127(2), 753–792.

Katz, L. and Murphy, K. (1992). “Changes in Relative Wages, 1963-1987: Supply and Demand Factors,” Quarterly Journal of Economics, 107(1), 35-78.

Leamer, E. (1980). “The Leontief paradox, reconsidered,” Journal of Political Economy, 88(3): 495-503

Le Brun, A., S. R. Helper, and D. I. Levine (2011): “The Effect of Industrialization on

Children's Education. The Experience of Mexico," Review of Economics and Institutions, 2(2).

Leontief, W. (1953). "Domestic Production and Foreign Trade; The American Capital Position Re-Examined," Proceedings of the American Philosophical Society. 97(4): 332–349.

Lillo-Bañuls, A., and Casado-Diaz, J. (2010). "Rewards to Education in the Tourism Sector: One Step Ahead," Tourism Economics, 16(1), 11–23.

MacNeill, T. and Wozniak, D. (2018), "The economic, social, and environmental impacts of cruise tourism," Tourism Management, 66, 387-404.

McKenzie, D., and H. Rapoport (2010): "Can Migration Reduce Educational Attainment? Evidence from Mexico," Journal of Population Economics, 24(4), 1331–1358.

Melitz, M.(2003): "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," Econometrica, 71(6), 1695-1725.

Mincer, J. (1974). Schooling, Earnings, and Experience. New York: Columbia University Press.

Munshi, K., and M. Rosenzweig (2006): "Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy," American Economic Review, 96(4), 1225–1252.

Neary, P. (1981). "On the Harris-Todaro Model with Intersectoral Capital Mobility," Economica. 48 (191): 219–234.

Ohlin, B., (1933). Interregional and International Trade, Harvard University Press

Oster, E., and B. M. Steinberg (2013): "Do IT Service Centers Promote School Enrollment? Evidence from India," Journal of Development Economics, 104, 123–135.

Psacharopoulos, G., E. Velez, A. Panagides, and H. Yang (1996): "Returns to Education During Economic Boom and Recession: Mexico 1984, 1989 and 1992," Education Economics, 4(3), 219–230.

Redding, S., (2016). "Goods trade, factor mobility and welfare," Journal of International Economics,101, 148-167.

Salah-i-Martin, X. (1996). "The Classical Approach to Convergence Analysis," Economic Journal, 106 (July): 1019-36.

Singer, H. (1950). "The Distribution of Gains Between Borrowing and Investing Countries," American Economic Review, 40: 473-85.

Socher, K. (1986). “Tourism in the theory of international trade and payments,” The Tourism Review, 41(3), 24-26.

Stolper, W. and Samuelson, P. (1941). "Protection and real wages," The Review of Economic Studies. 9(1): 58–73.

Trefler, D. (1993). “International Factor Price Differences: Leontief was Right!,” Journal of Political Economy, 101(6), 901-87.

Topalova, P., (2010). “Factor immobility and regional impacts of trade liberalization: evidence on poverty from India,” American Economic Journal, 2(4),1-41.

Vanek, J. (1968). “The Factor Proportions Theory: The N-Factor Case,” Kyklos 21, 749–756.

Wassily, L.(1953). "Domestic Production and Foreign Trade; The American Capital Position Re-Examined," Proceedings of the American Philosophical Society. 97(4), 332–349.

Willis, R. and Rosen, S. (1978). “Education and Self-Selection,” Journal of Political Economy, 87(5), 7-36

Wood, A. and Berge, K. (1994). "Exporting Manufactures: Trade Policy or Human Resources?," IDS Working Paper 4, Institute of Development Studies, University of Sussex.

Wood, A. (1994). North-South Trade, Employment and Inequality: Changing Fortunes in a Skill-Driven World, Clarendon Press, Oxford.

Table 1: Cruise Ship Passengers 2018

STATE	CRUISE PORT	POPULATION*	PASSENGERS
Quintana Roo	Cozumel	86,000	4,299,871
Quintana Roo	Mahajual	600	1,227,695
Quintana Roo	Cancun	628,306	0
Quintana Roo	Puerto Morelos	9,188	0
Quintana Roo	Punta Venado	149,923	0
Quintana Roo	Playa del Carmen	149,923	0
Baja California Sur	Cabo San Lucas	81,111	540,459
Baja California Sur	Loreto	20,385	6,853
Baja California Sur	Pichilingue	244,219	5,263
Baja California Sur	La Paz	244,219	4,637
Baja California Sur	Puerto Escondido	45,000	0
Baja California Sur	San Carlos	30,499	0
Baja California Sur	Santa Rosalia	14,160	0
Baja California	Ensenada	522,768	674,469

Source: passengers: Secretaria de Comunicaciones y Transportes (2019); population: INEGI Encuesta Intercensal 2015; *Population is reported by municipality.

Table 2: School Enrollment Descriptive Statistics

Panel A: Quintana Roo			
	Mean	Std, Dev.	Observations
Total Enrollment	29,992	36,717	169
Female	4,768	18,078	169
Male	15,223	18,640	169
Pre School	5,154	5,760	169
Primary	17,458	21,707	169
Secondary	7,380	9,352	169
Panel B: Baja California Sur			
	Mean	Std, Dev.	Observations
Total Enrollment	28,659	22,776	55
Female	14,062	11,277	55
Male	14,597	11,559	55
Pre School	5,262	4,258	55
Primary	16,206	12,831	55
Secondary	7,191	9,352	55
Panel C: Baja California			
	Mean	Std, Dev.	Observations
Total Enrollment	137,286	119,682	55
Female	67,678	59,044	55
Male	69,608	60,639	55
Pre School	21,566	17,666	55
Primary	79,325	70,240	55
Secondary	36,395	32,178	55

Source: Servicios Educativos de Quintana Roo, Instituto de Servicios Educativos y Pedagógicos del Estado de Baja California, and Secretaria de Educacion Publica del Estado de Baja California Sur.

Figure 1: Location of Cruise Ship Ports

Source: MexicoCruises.com

Figure 2: Municipalities of Quintana Roo

Source: Descargamapas.net

Figure 3: Municipalities of Baja California Sur

Source: Descargamapas.net

Figure 4: Municipalities of Baja California

Source: Descargamapas.net

Table 3: Effect of Cruise Ports on National School Enrollment

Dependent Variable:	Log National Total School Enrollment	Log National Female School Enrollment	Log National Secondary School Enrollment
Log Number of Cruise Passengers	-0.006	-0.002	0.118*
	(0.012)	(0.011)	(0.042)
Constant	17.137***	16.383***	14.126***
	(0.158)	(0.151)	(0.556)
R-squared	0.024	0.004	0.0464
Observations(periods)	11	11	11
Log Lag Number of Cruise Passengers	-0.018	-0.016	0.064
	(0.012)	(0.011)	(0.055)
Constant	17.399***	15.560***	14.838***
	(0.154)	(0.149)	(0.722)
R-squared	0.228	0.199	0.146
Observations(periods)	10	10	10
Log Mean Number of Cruise Passengers	-0.039	-0.011	0.013
	(0.011)	(0.013)	(0.066)
Constant	17.583***	16.497***	15.526***
	(0.148)	(0.172)	(0.870)
R-squared	0.671	0.079	0.006
Observations(periods)	11	11	11
Log Geometric Mean Number of Cruise Passengers	-0.017	-0.016	0.074
	(0.011)	(0.010)	(0.053)
Constant	17.287***	16.560***	14.703***
	(0.143)	(0.138)	(0.898)
R-squared	0.214	0.200	0.178
Observations(periods)	11	11	11

Standard errors in parentheses.

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

Table 4: Effect of Cruise Ship Ports on State School Enrollment

Dependent Variable: **Log School Enrollment**	**Quintana Roo**	**Baja California Sur**	**Baja California**
Log Number of Cruise Passengers	-0.027	-0.006	0.037
	(0.017)	(0.013)	(0.032)
Constant	9.866***	9.642***	11.092***
	(0.193)	(0.067)	(0.421)
R-squared	0.980	0.999	0.999
Observations(periods*mun)	168	55	55
Log Lag Number of Cruise Passengers	-0.033*	-0.008	0.014
	(0.015)	(0.017)	(0.027)
Constant	9.879***	9.889***	11.284***
	(0.065)	(0.128)	(0.071)
R-squared	0.982	0.999	0.999
Observations(periods*mun)	148	50	50
Log Mean Number of Cruise Passengers	-0.034	-0.023	0.042
	(0.020)	(0.036)	(0.036)
Constant	9.894***	10.015***	11.208***
	(0.094)	(0.275)	(0.095)
R-squared	0.982	0.999	0.999
Observations(periods*mun)	148	40	40
Log Geometric Mean Number of Cruise Passengers	-0.019*	-0.085	0.028
	(0.009)	(0.051)	(0.028)
Constant	9.802***	10.466***	11.243***
	(0.052)	(0.384)	(0.073)
R-squared	0.990	0.999	0.999
Observations(periods*mun)	116	55	55

Standard errors in parentheses. All errors are clustered at the municipality and survey year level.
*** p < 0.01, ** p < 0.05, * p < 0.1

Table 5: Effect of Cruise Ship Ports on Municipality School Enrollment

Dependent Variable:	**Log School Enrollment**	**Log School Enrollment**	**Log School Enrollment**
State	**Quintana Roo**	**Quintana Roo**	**Quintana Roo**
Municipality	**Cozumel**	**Othón P. Blanco**	**Solidaridad**
Log Number of Cruise Passengers	0.282***	0.003	-0.084***
	(0.058)	(0.005)	(0.015)
Constant	5.525***	10.816***	10.816***
	(0.859)	(0.066)	(0.066)
R-squared	0.569	0.569	0.018
Observations(periods)	20	20	20
State	**Baja California Sur**	**Baja California Sur**	**Baja California Sur**
Municipality	**La Paz**	**Loreto**	**Los Cabos**
Log Number of Cruise Passengers	-0.024	0.002	0.002
	(0.028)	(0.004)	(0.005)
Constant	9.794***	10.833***	8.147***
	(0.187)	(0.039)	(0.049)
R-squared	0.076	0.032	0.009
Observations(periods)	11	11	11
State	**Baja California**		
Municipality	**Ensenada**		
Log Number of Cruise Passengers	0.027		
	(0.016)		
Constant	11.239***		
	(0.211)		
R-squared	0.322		
Observations(periods)	8		

Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Table 6: Effect of Cruise Ship Ports on Female School Enrollment

Dependent Variable:		Log Female School Enrollment
Sample:		All Municipalities
Panel A: Quintana Roo		
Controls:		
Log Number of Cruise Passengers		-0.024
		(0.015)
Log Lag Number of Cruise Passengers		-0.032
		(0.014)
Log Mean Number of Cruise Passengers		-0.032
		(0.018)
Log Geometric Mean Number of Cruise Passengers		-0.036
		(0.018)
Municipality	Cozumel	0.296***
		(0.059)
	Othón P. Blanco	0.003
		(0.005)
	Solidaridad	-0.085***
		(0.015)
	Constant	9.133***
		(0.065)
	Observations	176
Panel B: Baja California Sur		
Controls:		
Log Number of Cruise Passengers		-0.005
		(0.014)
Log Lag Number of Cruise Passengers		-0.005
		(0.017)
Log Mean Number of Cruise Passengers		-0.022
		(0.035)
Log Geometric Mean Number of Cruise Passengers		-0.090
		(0.052)
Municipality	La Paz	-0.017
		(0.024)
	Loreto	-0.003
		(0.004)
	Los Cabos	0.004
		(0.005)
	Constant	8.917***
		(0.070)
	Observations	55
Panel C: Baja California		
Controls:		
Log Number of Cruise Passengers		0.031
		(0.028)
Log Lag Number of Cruise Passengers		0.004
		(0.025)
Log Mean Number of Cruise Passengers		0.008
		(0.036)
Log Geometric Mean Number of Cruise Passengers		0.019
		(0.025)
Municipality	Ensenada	0.021
		(0.016)
	Constant	10.458***
		(0.371)
	Observations	55

Standard errors in parentheses. All errors are clustered at the municipality and survey year level.
*** p < 0.01, ** p < 0.05, * p < 0.1

Table 7: Effect of Cruise Ship Ports on Secondary School Enrollment

Dependent Variable:		Log Secondary School Enrollment
Sample:		All Municipalities
Panel A: Quintana Roo		
Controls:		
Log Number of Cruise Passengers		-0.026
		(0.016)
Log Lag Number of Cruise Passengers		-0.035
		(0.016)
Log Mean Number of Cruise Passengers		-0.034
		(0.019)
Log Geometric Mean Number of Cruise Passengers		-0.038
		(0.019)
Municipality	Cozumel	0.519***
		(0.106)
	Othón P. Blanco	0.008
		(0.005)
	Solidaridad	-0.097***
		(0.018)
	Constant	8.423***
		(0.069)
	Observations	176
Panel B: Baja California Sur		
Controls:		
Log Number of Cruise Passengers		-0.012
		(0.018)
Log Lag Number of Cruise Passengers		-0.009
		(0.018)
Log Mean Number of Cruise Passengers		-0.018
		(0.042)
Log Geometric Mean Number of Cruise Passengers		-0.114
		(0.067)
Municipality	La Paz	-0.072
		(0.034)
	Loreto	0.021
		(0.015)
	Los Cabos	0.003
		(0.022)
	Constant	8.314***
		(0.096)
	Observations	55
Panel C: Baja California		
Controls:		
Log Number of Cruise Passengers		0.029
		(0.027)
Log Lag Number of Cruise Passengers		0.037
		(0.031)
Log Mean Number of Cruise Passengers		0.025
		(0.050)
Log Geometric Mean Number of Cruise Passengers		0.041
		(0.033)
Municipality	Ensenada	0.137
		(0.070)
	Constant	9.755***
		(0.354)
	Observations	55

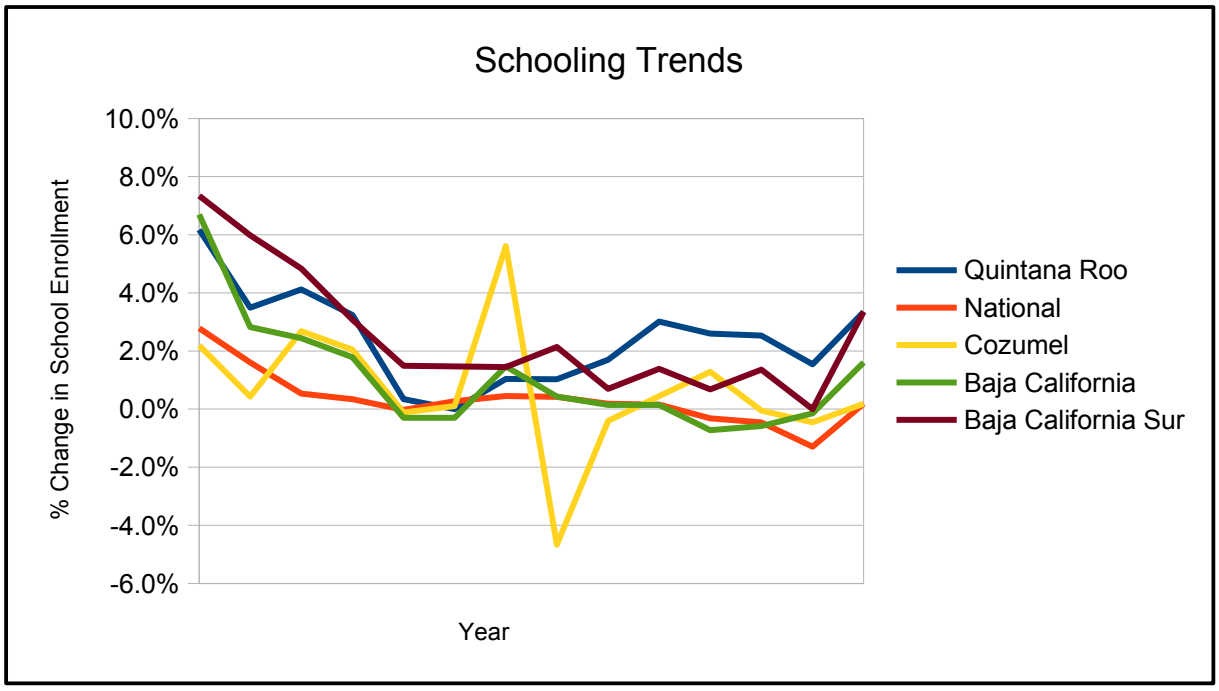
Standard errors in parentheses. All errors are clustered at the municipality and survey year level.
*** p < 0.01, ** p < 0.05, * p < 0.1

Table 8: Effect of Cruise Ship Ports on Incidence of Murders

Dependent Variable:	Number of Murders
Panel A: Quintana Roo	
Sample:	All Municipalities
Controls:	
Cruise Passengers	0.0003
	(0.0005)
Constant	-75.432
	(130.696)
Observations (periods*municipalities)	188
Panel B: Baja California Sur	
Sample:	All Municipalities
Controls:	
Cruise Passengers	-0.0001
	(0.0001)
Constant	-11.984
	(16.505)
Observations (periods*municipalities)	55
Panel C: Baja California	
Sample:	All Municipalities
Controls:	
Cruise Passengers	-0.0003
	(0.0004)
Constant	131.386
	(114.808)
Observations (periods*municipalities)	105
Panel D: National	
Sample:	All States
Controls:	
Cruise Passengers	0.019
	(0.003)
Constant	9117.854
	(17032.140)
Observations (periods)	15

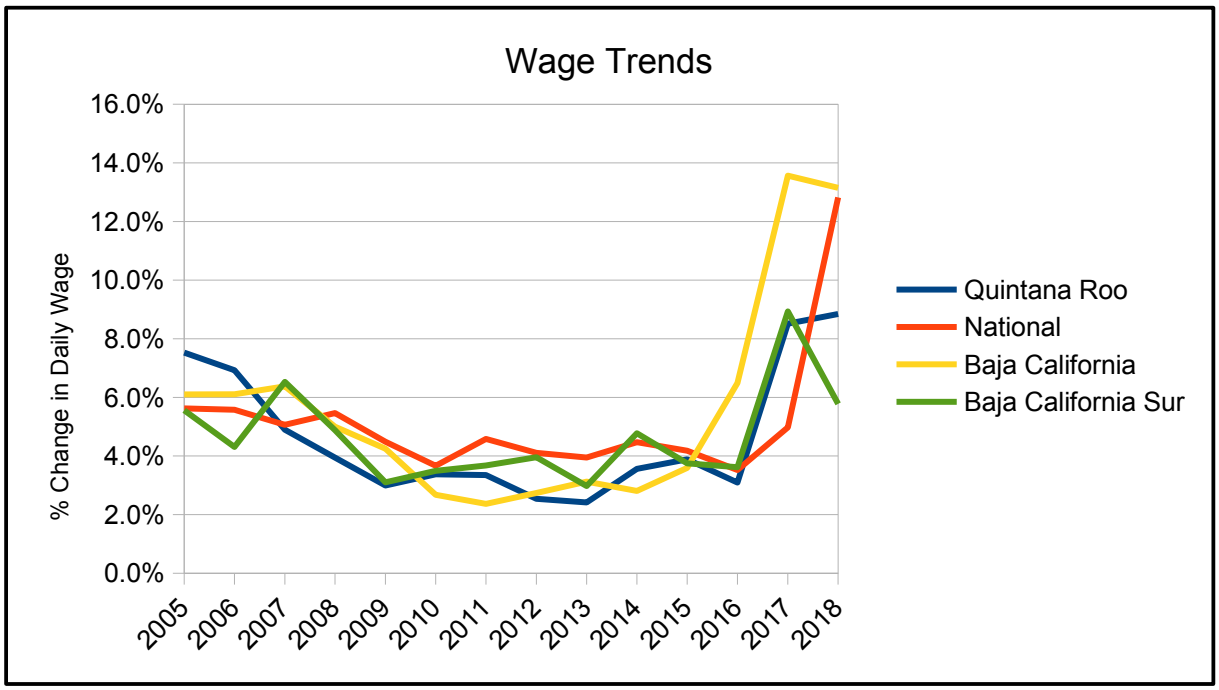
Standard errors in parentheses. All errors are clustered at the municipality and survey year level.
*** p < 0.01, ** p < 0.05, * p < 0.1

Figure 5: Growth in School Enrollment



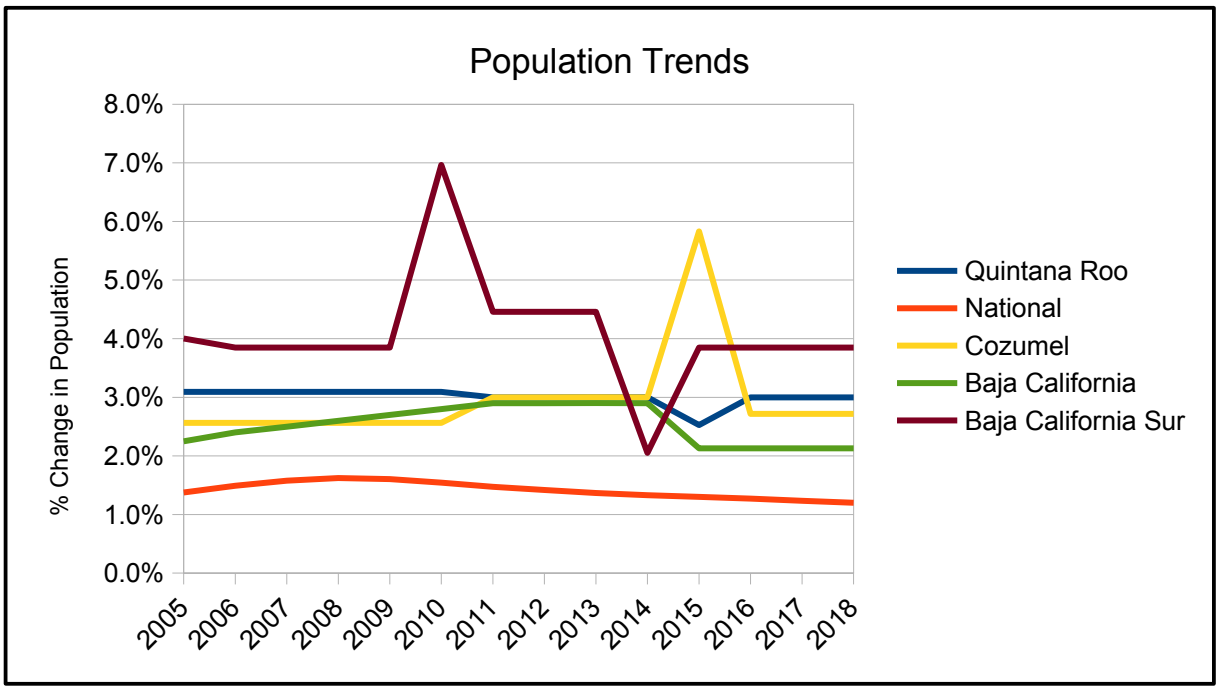
Source: Secretaria de Educacion Publica

Figure 6: Growth in Income



Source: Secretaría del Trabajo y Previsión Social

Figure 7: Growth in Population



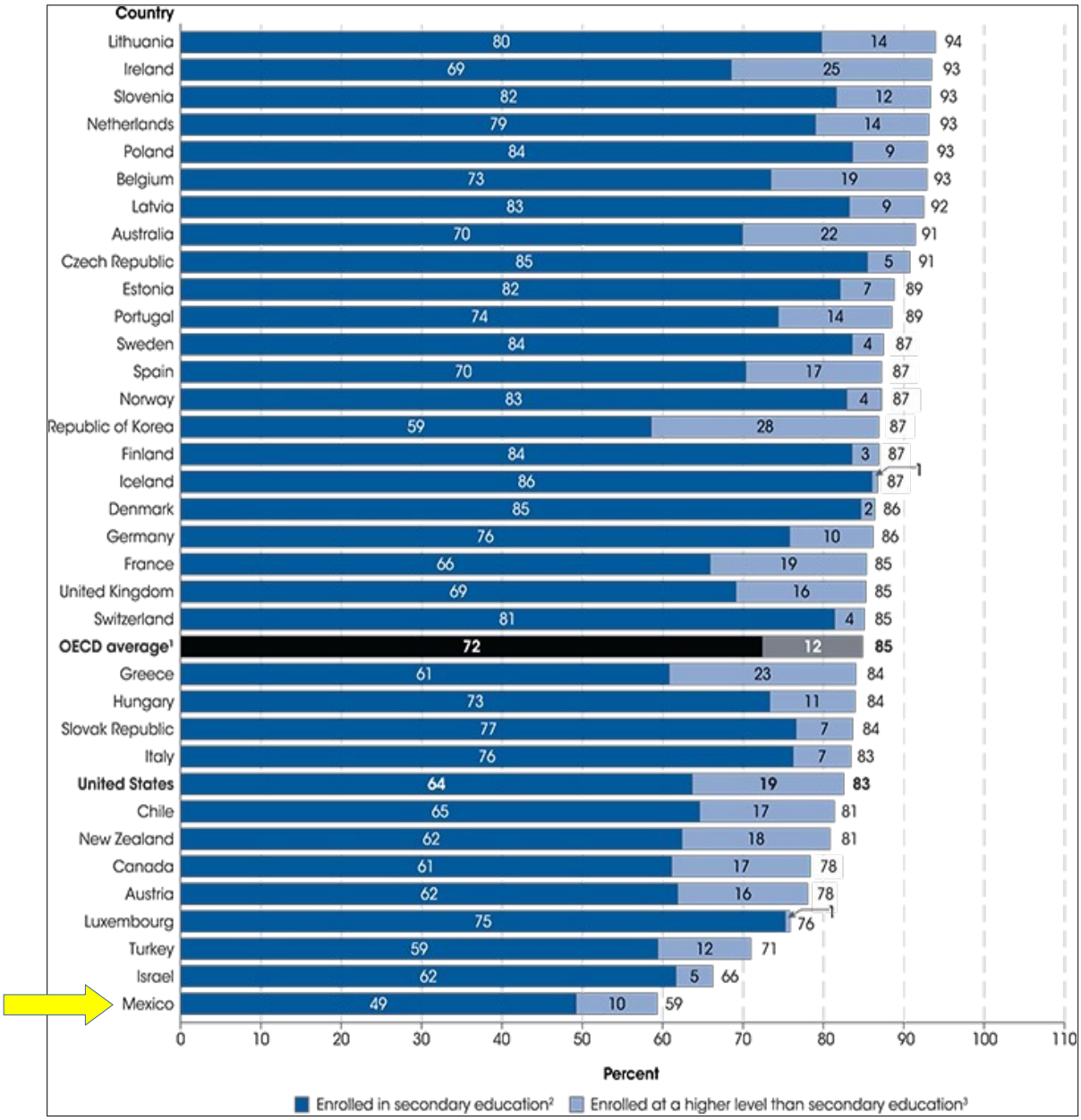
Source: INEGI Censos 2005, 2010, 2015 (data interpolated)

Table 9: Robustness: Income Effects

Quintana Roo	(1)	(2)	(3)	(4)
Estimates of Income Elasticity	0.25	0.40	1.00	1.25
Actual % Change in Income	4.70%	4.70%	4.70%	4.70%
Predicted Percent Increase in Enrollment	1.20%	1.90%	4.70%	5.90%
Actual Increase in Enrollment	2.44%	2.44%	2.44%	2.44%
Baja California	**(1)**	**(2)**	**(3)**	**(4)**
Existing Estimates of Income Elasticity	0.25	0.40	1.00	1.25
Actual % Change in Income	5.56%	5.56%	5.56%	5.56%
Predicted Percent Increase in Enrollment	1.39%	2.22%	5.56%	6.95%
Actual Increase in Enrollment	1.11%	1.11%	1.11%	1.11%
Baja California Sur	**(1)**	**(2)**	**(3)**	**(4)**
Existing Estimates of Income Elasticity	0.25	0.40	1.00	1.25
Actual % Change in Income	4.67%	4.67%	4.67%	4.67%
Predicted Percent Increase in Enrollment	1.17%	1.87%	4.67%	5.84%
Actual Increase in Enrollment	2.52%	2.52%	2.52%	2.52%
Cozumel	**(1)**	**(2)**	**(3)**	**(4)**
Estimates of Income Elasticity	0.25	0.40	1.00	1.25
Actual % Change in Income (STATE)	4.70%	4.70%	4.70%	4.70%
Predicted Percent Increase in Enrollment	1.20%	1.90%	4.70%	5.90%
Actual Increase in Enrollment	0.66%	0.66%	0.66%	0.66%

Source: (1) Glenwe and Jacoby (2004); (2) Glick and Sahn (2000); (3) Orazem and King (2007); (4) Alderman et al. (2001).

Figure 7: OECD Percentage School Enrollment (age 16-19)



Source: National Center for Educational Statistics (2016)

Table 10: Effect of Cruise Ship Ports on School Enrollment

Dependent Variable:	Log Enrollment	
Model Specification	**(1)[a]**	**(2)**
Sample	**National**	**National**
Controls		
Log Wage	-0.6263	0.0468
	(0.3465)	(0.1418)
Log Population	2.1681	0.0334
	(1.1059)	(0.4191)
Log Cruise Passenger		-0.0554*
		(0.0209)
Constant		10.1319
	-26.7028	(7.2182)
	(18.6509)	
R squared	0.0659	0.6187
Observations (periods)	15	15
Sample	**Cozumel[b]**	**Cozumel[b]**
Controls		
Log Wage	2.5440	0.2736
	(4.4406)	(0.1294)
Log Population	-3.1414	-0.0453
	(5.7954)	(0.1864)
Log Cruise Passenger		-0.1135*
		(0.0481)
Constant	31.5019	10.5086***
	(41.4638)	(1.1685)
R squared	-	0.7305
Observations (periods)	15	15
Sample	**Quintana Roo**	**Quintana Roo**
Controls		
Log Wage	-1.5731	0.5845**
	(4.7816)	(0.1482)
Log Population	2.7515	-0.0401
	(6.3084)	(0.2004)
Log Cruise Passenger		-0.0490
		(0.0267)
Constant	-24.8132	3.8768
	(63.6682)	(2.0508)
R squared	0.5788	0.9817
Observations (periods)	15	15

[a]Column (1) pertains to model that uses passenger arrivals as instrumental variable for wages while column (2) does not. [b]Wages for Cozumel are not reported so estimates assume parity with state level. Standard errors in parentheses.
All errors are clustered at the municipality and survey year level.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 11: Tourism Labor Force Descriptive Statistics

PARAMETER	MEASUREMENT	RANKING
Age group (16-24)	22%	Highest
Gender (female)	57%	Second Highest
Monthly Wage	M$5,440 (US$240)	Third Lowest
Superior School	13%	Fourth Lowest

Source: Encuesta Nacional de Ocupacion y Empleo (2019)

Table 12: Durbin-Wu-Hausman Test Results

Data Set	Probability > chi2
National	0.0333
Cozumel	0.0486
Quintana Roo	0.0599