Cruising Through School: General Equilibrium Effects of Cruise Ship Arrivals on Employment and Education

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Abstract

Cruise ship tourism has been the fastest growing branch of the tourism sector since the turn of the century. As a result, cruise tourism's increased port traffic has garnered attention as a development strategy for port cities of developing nations over the past two decades. I utilize 10.6 million automatic identification system (AIS) locations from 517 cruise ships to estimate granular city by year cruise ship arrivals in 265 port destinations. Matched with 355,463 individual Demographic and Health Survey (DHS) women's surveys in 23 countries from 2009 to 2016, this study examines cruise tourism's relationship to female labor participation and associated human capital attainment in destination port cities of developing nations. Using fixed effects to partially identify this relationship, I find positive general equilibrium effects from cruise tourism on labor participation and educational attainment with strong age dynamics. For each 1% increase in cruise ship arrivals to a port city, female labor participation increase 7% and women gain around a third more years of education. Additionally, this study employs a Kaplan Meier survivorship model as well as a Cox Proportional Hazard Ratios to understand the dynamic change in educational attainment related to age from a cruise tourism shock. Older women respond to an expanding service sector by seizing job opportunities, while younger women acquire a near secondary level of education in anticipation of employment opportunities. The mechanism behind tourism led growth may be the result of improvements in human capital attainment by women.

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Tourism has become an immense component of the global service sector in the 21st century, amassing $8.81 Trillion USD of global GDP (WTTC 2019). In the United States, tourism accounts for some 32% of service exports making it a vital component to trade for one of the largest contemporary economies (Department of Commerce 2017). Within the tourism industry, cruise tourism comprises of a diminutive portion ($126 billion USD), but has been the fastest growing component of the tourism sector with a 20.5% increase in demand from 2012 to 2017 (FCCA 2018a). Tourism is a special industry for instead of moving goods and services to meet market demand, tourism rather temporarily relocates consumers to different local markets.

Yet, the majority of the discussion regarding cruise tourism, and tourism in general, has only regarded advanced nations. Figure 1 shows a global port traffic density plot of cruise ship arrivals from 2009 to 2019. This density heat map of port traffic shows why the tourism literature focuses so heavily on the relationship with developed nations. It is simply the consequence of their attentions being focused on the areas with the greatest cruise tourism activity, which so happens predominately prioritized the interests of developed nations. But this leaves open a broad gap in the literature in respect to the impact that tourism has on developing nations. Specifically, numerous tropical island economies rely heavily on cruise tourism prompted by the notion that a tourism led growth strategy is the ideal method for capturing their comparative advantage. As consequence, the relationship of tourism and development is rather unexplored in the developing context. Previous dialogue has been limited to conjectures over macroeconomic changes due to a lack of microeconomic data at a wide scale to access the impacts of cruise tourism in developing nations.

Since tourism, as well as cruise tourism, have become an ever growing consideration for global economies, tourism's impact on economic growth and development has become a subject of concern. While anteceding work has been acutely concerned with the impact of increased tourism demand on GDP growth (See Brida and Pulina (2010) and Nunkoo et al. (2020)), there is a growing need to measure the impact of tourism on the development of local economies and the welfare of it's citizens. The promotion of the Tourism-Led Growth Hypothesis (TLGH) has been a driving force behind policymakers subsidizing of tourism ventures and infrastructure, as well as justifying prioritizing the concentration of revenue streams around taxes levied on tourists. And yet, this is an incomplete narrative as it is bounded to aggregate growth measures. Little is known beyond the macroeconomic shifts associated with an influx of tourists.

On whole, the tourism and cruise tourism literature has made few contributions towards comprehensively understanding their contribution to development economics and poverty alleviation. This narrow view of GDP per capita growth as development should be tested with other measures of development. Embedded in the capabilities set approach of development championed by Sen (1987), assessing the improvement of accessibility to education and the labor force provide a clearer image of whether tourism can improve an individual's capability set. An area of concern regarding robust growth is the expansion of women into the workforce. Exploring female empowerment allows for a sharper perspective of tourism as a development strategy.

To understand the impact of tourism on female development outcomes, I combine Automatic Identification System (AIS) location information for 517 cruise ships to estimate the number of cruise ship arrivals in over 5000 ports. Matched with Demographic and Health Survey information on 355,463 women in 23 countries from 2009 to 2016, I use a variety of panel fixed effects models to determine the general equilibrium effects of cruise tourism on labor participation and educational attainment. I find strong evidence that both employment and education move with the expansion of the tourism sector across a number of variations of my sample's composition. For each 1% increase in cruise ship arrivals, women living in a cruise tourism city are 7% more likely to be employed and gain around a third of a years education. These effects are largely driven by age dynamics. Older women from poorer households capitalize on job opportunities presented by tourism, while younger women from wealthier households raise their education levels in an anticipation of an increased supply of higher skilled labor opportunities. These findings are robust across a variety of tests and weighting estimations. The consequence of these results promote tourism as a development strategy in developing nations as means of improving human capital accumulation and female empowerment.

This study contributes a microeconomic perspective on tourism, which makes it one of only a handful of papers to do so. As such, it produces a novel combination of cruise ship location data with household level outcomes to manifest a unique treatment identification for cruise tourism. Rather than approaching tourism's effect on development through aggregate growth measures (e.g.

GDP per capita), this study examines a broader lens of how development occurs. Principally, this study provides the first prospectus for the relationship of cruise tourism, and tourism in general, on human capital attainment. Rhetoric regarding tourism's role as a development strategy appears to be more nuanced than previously attributed when considering educational choice. The rest of the paper continues as follows: Section 1 discusses briefly the literature on tourism, cruise tourism and service sector growth mechanisms, Section 2 explains the creation and composition of the data used in this study, Section 3 provides the identification strategy, Section 4 displays the empirical results, and Section 5 concludes and discusses the implications of this study in respect to the tourism and development literature.

1 Background

Tourism is one of the largest sectors in the global economy, accounting for one in ten jobs and generating $8.8 trillion USD (10.4%) of global GDP (WTTC 2019). As the global middle class expands, so too has demand for luxury services such as tourism allowing it to grow at 3.9% annually, above the 3.2% global growth rate in 2018 (WTTC 2019). Tourism is a unique aspect of the service economy as it, "Involves the export of otherwise non-traded local services by temporarily moving consumers across space, rather than shipping goods" (Faber and Gaubert 2019). The multi-faceted complexity of this industry arises due to its intertwined relationship with the transportation, beverage, security, hospitality, and restaurant industries among many other service-based components at global, regional and local scales. This illustrates the difficulty in defining the parameters of its impact.

Tourism over the past century has expanded globally to interact with both advanced and developing economies. This has made tourism of keen interest to development practitioners and policy makers in developing countries of destination locations. The World Tourism Organization proposes tourism as a mechanism for development by claiming that it supports Sustainable Development Goals (SDGs) (8) inclusive and sustainable economic growth, (12) sustainable consumption and production, and (14) the sustainable use of oceans and marine resources (UNWTO 2019). To this extent, a popular notion is for governments to adopt a tourism-led development strategy following the Tourism-Led Growth Hypothesis (TLGH) (Brida and Pulina 2010). Brida and Pulina (2010) conduct an extensive literature review on the subject and find that there is a correlative relationship to economic growth from tourism. This is further supported by Nunkoo et al. (2020)'s meta-analysis concludes empirical support for the TLGH, albeit sensitive to numerous factors. However, this literature is limited to predictive modeling and non-causal identification. The main outcome of concern has been GDP and GDP per capita growth in association with increases in aggregated tourism demand. Because tourism often requires the coordination of large private and public entities (the certification of temporary migration status and accommodating resources for departures, arrivals and stay), a considerable amount of effort has been exhausted in forecasting tourism demand and mapping tourist interactions with a host economy (Dritsakis and Athanasiadis 2000; Chang et al. 2016; R. E. Wood 2000). Some have modeled tourism through as input-output model (See Dritsakis and Athanasiadis (2000)), while most craft demand models predicting the main ingredients that dictate demand and fluctuations (See Chang et al. (2016) and R. E. Wood (2000)). In addition to their direct effect on consumption of consumer and luxury goods and services, there is some evidence that tourism creates the externality of overcoming regional trade barriers (See Tesanovic et al. (2013)) and acting as a multiplier effect for expenditure (See Frechtling and Horvath (1999) and Sharpley and Telfer (2002)).

Given the nature of tourism, measuring tourism's economic impact on development has been exceedingly difficult to pin down and hence the emphasis in the literature to limit the discussion to macroeconomic growth measures. One exception being Milne and Ateljevic (2001)'s global-local nexus theory of tourism which provides a context for traversing the macro- and microeconomic influence of tourism on economic development. This theory proposes that tourism builds off of established infrastructure and socio-cultural cohesions which permeate through locally, regionally, nationally and globally interlocked networks. Some of the development outcomes that this, and similar theories, propose are that tourism drives local consumption, is a balance of payments measure, a medium for driving the foreign exchange market, provides a proxy for an evaluation of environmental and cultural goods, increases local employment, and acts as a ripple effect through a national economy via a multiplier effect (Sharpley and Telfer 2002). In many ways, these effects should have positive impacts on growing economies but does not necessitate poverty alleviation.

Ferguson (2007) argues that while the World Tourism Organization, and other proponents for the TLGH, assert tourism is a poverty alleviation measure the promotion of multinational firms can often be in conflict with the development of entrepreneurial ventures for low income earners. Ferguson's article illustrates the fact that no study to present has explicitly measured tourism's impact on the broad aspects of poverty alleviation or general development outcomes leaving conjecture over the conclusion that tourism can be an effective development strategy.

Along with the theoretical claims, some correlative evidence has manifested to support these plausible assertions. Looking at 144 countries, Cardenas-Garcia et al. (2015) show strong macroeconomic correlation between tourism and economic development. This study exemplifies similar studies, who interpret the theoretical notions for tourism by looking at trends of growth rates with self-reported tourism rates. From a macroeconomic lens, tourism appears to be a strong predictive force for growth in both developed and especially developing countries. But there is insufficient evidence to support all the proposed claims that the various tourism theories such as Milne and Ateljevic (2001) and Sharpley and Telfer (2002) purport. From a microeconomics perspective the strongest argument for tourism led growth has been made along the coastline of Mexico, where evidence has been found that tourism can have long-run local and aggregate effects in regions (Faber and Gaubert 2019). Additionally, this study found positive manufacturing spillovers from tourism which were often offset by the agglomeration of economies in the less touristic regions. Therefore, national gains are driven by a market integration effect of tourism along the coasts. The ensemble of these empirical studies show at a minimum a strong correlation between tourism and economic growth for economies and highlights the importance of the tourism sector for developing countries. And yet falls short of asserting strong causal relationships implied by the expansion of the tourism sector.

While similar in many respects, cruise tourism differs from traditional recreational tourism in that the transportation is the main experience rather than the destination. Cruise tourism is a more structured form of tourism where the suppliers provide a predefined, standardized itinerary of destinations and attractions with majority of the consumers' experience interacting with a single entity while on board the cruise liner. The competitive advantage in this arena is to provide for lavish experiences, and the ease of exploring numerous destinations with all encompassing accommodations. Arising from this, not only have cruise ships been marketed as, but also amount to, floating cities (Bonsor 2000). Already in one of the fastest growing global sectors at 3.9%, this subset of tourism is growing much faster than the overall industry at 4.5% to the tune of $126 billion as of 2018 (WTTC 2019; FCCA 2018a). In addition to it's growing popularity so too has its influence on the port destinations that it interacts with, especially in the Caribbean which comprises of 38.4% of the market (Cruise Industry News 2019). Table 1 gives the characteristic differences between cruise tourism and overnight-stay tourism (the general form of tourism).

The seminal work by Dwyer and Forsyth (1998) provides a framework for examining the costs and benefits of cruise tourism to destination nations. Building from this framework, a prominent concern has revolved around predicting cruise tourism demand and planning between private enterprises and local governments (Song, Dwyer, and ZhengCao 2012; Sinclair 1998). Taking a holistic analysis of social, environment, cultural, political and economic concerns, Brida and Zapata-Aguirre (2008) set forth that while local businesses benefit from an influx of cruise tourism into their port, a high cost in building and maintaining port infrastructure along with attracting cruise liners makes arguments for the sustainability of cruise tourism contentious.

From a development perspective, Brida and Zapata-Aguirre (2008) argue that cruise tourism's harmful environmental waste, unfair labor practices, and exasperation of social inequalities by consolidation of wealth and power towards an aristocratic class outweigh the revenues to local business and taxes levied on tourists. Their claim being that cruise tourism benefit foreign multinationals far more than can be recuperated by local economic gains. Thomas Murray and Associates discuss the inequality developed by cruise tourism in the Key West through its adverse effects on the divergence between incomes and housing costs (Thomas Murray & Associates 2005). Many locals feel inflationary pressures from increased expenditures by tourists, but do not garner equal increases in wages to meet higher costs. This emphasizes that cruise tourism can improve port economies, but often at a cost of affordable living standards for those not directly tied to the industry.

Essential to cruise tourism are ports. Talley (2006)'s Economic Theory of the Port suggests that due to time and size constraints, port resource utilization and port expenditures maximize traffic relative to revenue from different carriers. Subject to geographic characteristics and locational capacity, some ports may prioritize transportation vessels over cargo vessels and the like. This

implies that ports with a high return from tourism will prioritize cruise ship traffic over other vessels. T. W. Wood (1982) demonstrates that ports in developing countries rely on imported goods for a sizeable portion of domestic consumption. As such, there is higher competition in these ports for docking time and port access from cargo ships over cruise vessels. An implication being that the cost-benefit of cruise ships over cargo ships will generate heterogeneous specialization for port traffic in various ports of developing nations. A network-based integrated choice evaluation developed by Tang, Low, and Lam (2011) provides an understanding for preferences from differing types of port traffic. An important determinant for port choice being it's degree of trade connectivity and attributes to accommodate varying types of vessels and rates of traffic. Because cruise liners are larger vessels with highly endogenous coordinated choice of destination, the ports of call for cruise destination should tend to be larger port cities with stronger trading networks than their counterparts.

Tourism destinations often specialize and prioritize either parts or the whole of their city to cater exclusively to tourism services or production. Krugman (1991) articulates that industries will agglomerate in sectors and locations where they have a comparative advantage. The geographic, cultural or historical component of the city designates destination locations as attractive areas for high returns to scale in the tourism industry. This is consistent with New Trade Theory, which places multinational firms (e.g. the aforementioned cruise liners) at the heart of international trade in destination port cities (Markusen and Venables 1998). Endogenous global trade networks support the development of industries where the local multinational firm is able to capture rents from the spatial segregation of markets. In respect to cruise tourism, many port destinations have grown their service industry around an influx of seasonal tourism. The reallocation of productive resources into tourism is what has allowed for the rapid growth of service exports for tourism destinations Melitz (2003). Additionally, their interconnectedness with transportation and trade networks provides a positive catalyst for local economic activity as a whole, and is the reason common destinations have been sustained and reinforced. By consequence, those most likely to benefit from increases in tourism are those most closely tied to the service industry in tourism destinations. This agglomeration in tourist destinations around the tourism industry is highlighted in Faber and Gaubert (2019)'s examination of Mexican coastlines. This effect was found not only in the service sector but also spilled over into the manufacturing sector as well. A natural extension of this study is to explore human capital attainment associated with gains in employment from tourism shocks. Expanding upon the TLGH in respect to educational attainment follows with Romer (1989)'s evidence that economic growth is driven by human capital accumulation. For tourism to be an effective strategy for development it ought to not only improve labor outcomes but also increase educational attainment.

The service sector is of particular interest to tourism, because although tourism has a diverse entanglement with multiple industries its direct contribution is through services. Women have historically worked unpaid in the informal markets or in agriculture. But beginning in the 20^{th} Century, women made significant strides in Western countries at formal employment. While female employment has disbursed across labor markets in advanced economies, women are still quite reliant on service employment (United Nations 2015; Tingum 2016). According to World Bank Indicators 56% of women work in services globally, but women in developing countries are still transitioning to the services sector (48%) while high income countries are already highly dependent on the service economy (88%). Much of the growth in the United States can be attributed to the expansion of female labor participation (Hsieh et al. 2019). For robust and sustained growth, transitioning economies need bolster both female labor participation as well as the skill-level of that labor. The expansion of service labor supply should strongly influence gains in female employment in developing nations. Labor Market Segmentation Theory predicts women and men to be segmented in the labor pool and therefore highly reactive to their respective industries (Reich, Gordon, and Edwards 1973). Under this theory, much of the improvement and empowerment of women in developing countries can be associated with the more than doubling of female service employment over the past two decades. Moreover, wage disparities between genders has been strongly linked to occupational choice furthering the importance of the composition of the service sector for women in the developing world (Nelson and Lorence 1988). These income differences, while tied to differential occupational choice, do seem to allow for increased female labor participation (Lorence 1991, 1992). It follows that in developing countries, where the outside option is agricultural production or the informal labor force, the welfare benefits from the expansion of the service sector should primarily be exhibited by young women pursuing moderately higher skilled employment.

2 Data

The sample of ships are those which comply with International Maritime Organization (IMO) nautical regulations from 2009 to 2018. To construct this dataset, I combine ship level locational data, ship level attributes, and port level characteristics with a variety of individual level information. Exploiting the Automatic Identification System (AIS) public transmission data required for ships over 300 tons by the International Maritime Organization, I scrape cruise ship locations globally from 2009 to 2018. This allows AIS information to provide a census for contemporary ship locations. Matching cruise ship AIS coordinates obtained from Sail WX for daily ship activity by ship along with vessel level crew and passenger capacities using a web scraper on Wikipedia and supplementing missing information from Cruise Mapper provides an approximate measure of cruise ship arrivals for anywhere in the world over roughly a decade. From 517 cruise vessels, I observe 10,048,575 locational transmissions. This vessel data is then matched to a given port city by using Nth nearest neighbor matching of the vessel's daily location to fixed geocodes from a list of given port cities. Figure 2 shows the cruise ship arrival log scale count annually for ships within a 15 kilometer caliper of ports. This figure demonstrates that the majority of ports receive less than 20 cruise ships a year, while there are numerous hubs of traffic receiving thousands of vessels annually. This is concurrent with the Talley (2006)'s Theory of the Port that certain ports will specialize by prioritizing cruise vessels over other forms of traffic, but remains loose evidence as I do not control for port size, capacity or demand from other forms of traffic.

Then I construct a dataframe of 5,644 port cities globally across 220 countries and territories. The port names are gathered from three main sources: (1) Wikipedia using a web scraper, (2) Natural Earth's port classification dataset, and (3) the Central Intelligence Agency's collection of identified ports. For an accurate latitude and longitude for each port, this combined list of ports were geocoded through Google Map's API. Given each port has a fixed point in space, I used Nth nearest neighbor matching of daily vessel location by euclidean distance in a Cartesian plane to match ships to ports. For a ship to be considered 'in port', the ship's location must be within a 15 kilometer radius of the port's coordinates. The methodology for this is further discussed in Section 3 on distinguishing tourism port cities. Combined with the ship level data, this dataset shows the frequency and duration of cruise tourism activity for a given port in a given year. The port identification is the foreign key that combines vessel data to household data. Figure 3 provides a spatial distribution of these ports distinguishing potential cruise tourism ports in green as defined by having a cruise ship terminal in port. Evident from this figure is the large dispersion of cruise tourism globally and throughout various developing nations.

To explore individual level changes in developing nations, I gather household level observations by combining the women's Demographic and Health Surveys (DHS) across several developing countries. These household observations provide labor participation, educational attainment, age, wealth and urban residency information. Table 3 gives the DHS variables used in this study as well as how they are defined. I match the Nth nearest household by euclidean distance to a ports coordinate within a 50 kilometer caliper. For 23 countries from 2009 to 2016, there is a total of 355,489 individuals present in this dataset after matching. Figure 4 shows the spatial distribution of the ports that matched to households covered by DHS surveys. The distribution of the matched survey data is displayed in Table 2 for the survey years represented by each country. This table shows that the data allows for a pooled cross-section of households in developing countries over this time period. Table 4 provides summary statistics on port level and individual characteristics in this sample. Panel A of Table 4 demonstrates that tourism port cities in this sample receive around 43 cruise ship arrivals a year with ships roughly carrying 3000 people. The individual summary statistics in panel B of Table 4 shows that only 6% of women live in a tourism port city. The mean age is 29 years old. Anticipating age dynamics in respect to tourism shocks, I construct a binary variable for women under the age of 30 and designate them as 'young'. This allows me to compare the response by older and younger women to cruise ship arrivals as broader cohorts.

3 Methodology

3.1 Determining Cruise Tourism Ports

A fundamental component of this study is defining exposure to cruise tourism in port cities. While ideally tourism expenditures should be the measure to capture the impact of cruise tourism, the lack

of public port level tourism arrival or expense estimates at a global scale necessitates an alternative proxy measure. As a proxy for passenger expenditures, I substitute ship arrivals at the port level. The purpose of measuring cruise tourism in this fashion is that provincial and metropolitan level tourism arrival data is sparse, if non-existent, for the majority of developing nations. This is a reasonable proxy for cruise tourism impacts as the magnitude and direction of the effects should move concurrent to tourism expenditures. This proxy is arguably a more unbiased estimate of cruise tourism exposure as this measure is not self-reported by cruise liners or port authorities. I define exposure to cruise tourism for cruise ship locations that are within a 15 kilometer caliper of a port destination. This is a conservative measure consistent with the UN's Convention on the Law of the Sea for territorial sea to extend 12 nautical miles for the coast (Oceans & Law of the Sea 2018). The households that are assigned to these port cities, and subsequently are exposed to cruise ships, are those within a 50 kilometer radius of the port city. Households outside a port city radius are assigned to their DHS administrative cluster. Figure 5 provides a cartographic example of two cities, one in treatment and one in control, that visually demonstrates how cruise tourism cities are defined. The interior radius of 15 kilometers (in red) shows how close a cruise ship must be in order to be defined as a cruise tourism city. The outer radius of 50 kilometers (in green) shows the geographic scope of individuals who are assigned to that port city, and therefore have some level of exposure to treatment as their respective port. As seen by this example, those households (in purple) who are inside the outer radius for Santiago de Cuba received cruise tourism while those inside the outer radius for Manzanillo did not. Alternatively, had the cruise liner path (in black) entered within the interior radius (in red) for Manzanillo, then households from both of these port cities would be considered residents of a cruise tourism city.

To capture the variations in equilibrium effects, I compare outcomes first (1) within cruise tourism port cities to examine the intensive margin, (2) between cruise tourism port cities and other cities with coastal access and (3) cruise tourism port cities to all DHS defined administrative regions within a country to better understand the extensive margin.

To determine the intensity of cruise ship arrivals in a cruise tourism port city, I measure an annually aggregated count of the number of times a cruise ship's AIS location is within the interior 15 km radius of a port city. Because of the distribution of cruise ship arrivals being skewed by outliers (Seen in Figure 2, I adjust this measure by taking the log transformation. Due to this, I use a binary indicator for a resident of a cruise tourism port when exploring the extensive margin. Due to the endogeneity of ports self-selection by port cites to build cruise terminals the inference from this study should be seen as variations in cities shifting the general equilibrium of their labor participation and educational attainment as a result of tourism shocks, rather than the causal effect of cruise ship arrivals on female development outcomes. To calibrate my proxy estimation for the number of ship arrivals, I compare my estimation against the New Zealand Cruise Ship Traveller and Expenditure Statistics for 2015 to 2019 (New Zealand Government 2020). On average, 44% of cruise passengers disembark for shore excursions when arriving at port (Grimme et al. 2018). All passengers boarding a cruise ship should be eligible to depart at their port destination as the cruise liners vet passports before purchase. This is ensured by the common practice of cruise liners obtaining passport information before departure (U.S. State Department 2019). Using information on passenger capacity for cruise ships, I estimate the number of passenger arrivals that my measure predicts for New Zealand. Table 5 provides the difference between my estimated cruise passenger arrivals and those reported by the New Zealand Government. My proxy estimates have a 60% to 74% correlation with reported arrivals, reassuring the accuracy of my proxy measure and method for defining cruise tourism port cities. My estimates can be considered a lower bound estimate as I under-estimate passenger arrivals across all 5 reported years.

3.2 Model Specification

To measure the impacts of tourism through cruise tourism, it must be assumed that cruise tourism, conditional on being similar to over-night stay tourism (As shown in Table 1), is a good proxy for tourism in general. If this holds, then these results are transferable as generic remarks on the tourism industry. Two potential limitations of doing so are that: (1) cruise tourism is a fraction of the overall tourism sector and may have idiosyncrasies distorting the nature of this proxy, and (2) the composition of both the firms, passengers and relationship of the industry to their host city might be unobservably distinct from regular tourism.

This study focuses on the impact of cruise ship arrivals on labor participation and educational

attainment. The influence of tourism on these parameters are measured through demographic information at the individual and household level. Exploiting the granular cruise ship arrivals by port as a measure of cruise tourism, I implement a panel fixed effects estimation design to isolate the general equilibrium shift from cruise tourism. To control for endogenous disparities between ports and macroeconomic trends stipulated by fiscal or monetary policy, I include port/DHS admin region and country-year/year fixed effects to this model. The port city and DHS administrative region fixed effects control for path dependent differences in the development of these cities which may over estimate the difference between cities. The year and country-year fixed effects capture year over year investment and subsidizes to specific regions and cities for tourism or cruise tourism development. The sources of identifying variation is the result of two possibilities. Firstly, cruise tourism exposure will vary with the frequency of cruise ship interactions with a port city. This varies year to year and port to port due to changes in demand for cruise tourism leading to more trips or longer stays in particular ports as well as the introduction of new cruise liners in response to demand. Secondly, weather fluctuations may alter course of a preset itinerary leading to either longer or shorter stays in port depending on the situation. Because of these variations, different ports will receive varying exposure to cruise tourism.

There are two main reasons why this study is limited from making a causal identification. The first is the omitted variable bias of intra-port coordination between local governments and firms to develop the local tourism industry leading to path dependent differences in outcomes. The second is the self-selection into treatment by ports to create capacities to allow cruise ships to dock in port, as well as cruise liners actively choosing certain ports over others. Since panel fixed effects cannot account for these biases, the resulting estimations are partially identified showing the general equilibrium shifts in labor and education outcomes within a city over time. To improve the precision of these estimations, I include a vector of individual level controls. A major concern is that urban areas may have policies that encourage education and labor for women, or may attract residents with either higher means or abilities to pursue such avenues. Controlling for whether a women lives in an urban area partials out this confounding effect. Accounting for household wealth, through a pre-specified DHS wealth index, controls for the variation in wealth from household to household which may afford or necessitate attending either school or the workforce.

Equation 1 specifies the OLS fixed effects model for examining the relationship of cruise tourism on female labor participation and years of education:

$$\gamma_{i,c,y} = \delta_{i,c,y} + \psi_i \times \delta_{i,c,y} + X'_{i,c,y} + \theta_c + \tau_y + \epsilon_{i,c,y} \tag{1}$$

where γ represents educational and labor outcomes which vary for individual i in city c in year y, δ represents log cruise ship arrivals for the intensive margin (within tourism cities) and an indicator for being a resident of a port that receives any cruise tourism for the extensive margin (comparing tourism cities to port cities or other DHS administrative regions), ψ stands for the interaction between young (< 30) and cruise ship tourism, X' is a control vector including an individuals residency in a port city, urban residency, and a household wealth index constructed in the DHS survey. Θ represents city and DHS administrative region fixed effects and τ represents year and country-year fixed effects. For labor participation, this is a linear probability model. Standard errors are clustered at the city level. This fixed effects model provides an estimate of the general equilibrium shift in female labor participation and educational attainment.

To explore age dynamics related to educational choice, I construct a backward panel from the DHS cross-sections to determine if an individual drops out of school as a result of a tourism shock to their city. This results in a panel of 39,817 observations for 20,811 women from ages 13 to 33. Equation 2 modifies an unadjusted Kaplan Meier Curve to determine the age at which a potential school-age laborer drops out of school conditional on cruise tourism activity:

$$\mathrm{S(t)} = \pi \frac{DropOuts}{InSchool}_t | \delta_{i,c,y} \tag{2}$$

where S represents the survivorship of staying in school at a given age (t), π represents the ratio of students dropping out of school to those in school for a respective age (t), and δ is an indicator for the student-age women i living in a cruise tourism city c in the year y. This is a

logistical model bounded by zero and one with standard errors clustered at the individual level. The Kaplan Meier model provides a predictive estimate for the likelihood of a school-age women to drop out of school for a respective age group.

Accompanying the Kaplan Meier model, I employ a Cox Proportional Hazards model to examine the risk ratios of various individual characteristics on dropping out of school. Equation 3 shows the modified Cox model to look at the risk ratio of each student-age women dropping out of school due a specific covariate:

$$\mathrm{h(t)}_{i,c,y} = h(\emptyset)_{i,c,y} e^{\beta_1 \delta_{i,c,y} + \beta_2 X'_{i,c,y}} \tag{3}$$

where h is the hazard ratio of dropping out at a given age (t) for individual i in city c for year y, $h(\emptyset)$ is the default rate of dropping out for each student-age individual, δ is an indicator variable for a student living in a cruise tourism city, and X' is a control vector for the various factor variables endogenous with the decision to leave school. This is a logistical model whose standard errors are clustered at the individual level. Interpreting a risk ratio greater than one relative to one asserts that there is a marginal increase in a student's likelihood of dropping out. For example, a risk ratio of 1.3 implies that given an individual possess that characteristic they are 30% more likely of dropping out, certis paribus. The Cox model provides a measure for determining which individual characteristics lead her to choosing to drop out of school.

Based on the Tourism Led Growth Hypothesis, I anticipate that an expanding tourism sector should increase economic growth. Because tourism is closely tied to the service sector, increased cruise tourism should expand the service sector. Considering the literature mentioned in Section 1, it is ambiguous ex-ante how laborers will respond to a tourism shock in terms of educational attainment. It might be that low-skilled laborers need to obtain a moderate skill-set to become attractive employment for service sector jobs and jobs on the docks servicing the shipping sector. Alternatively, because the employment opportunities allotted by tourism sector growth may be low-skilled labor, the opportunity cost to stay in school could rise. Given an expansion in labor demanded, laborers may forgo further educational attainment to take advantage of the job market.

Due to this, I anticipate that these driving forces should cancel one another out. As a result, those who would have otherwise dropped out and those who would have otherwise graduated at a higher level may cancel each other out in equilibria. This divergence in choice may be highly driven by path dependent factors such as ability, wealth, and parental education. Accounting for household wealth provides a proxy to control for household environments that encourage and allow for higher levels of educational attainment. As discussed in the literature, women disproportionately benefit from growth in the services sector. But there may be heterogeneous effects for women depending on their age. The gains to education may be higher for younger women, while returning to school may have a higher opportunity cost for older women.

4 Results

4.1 Female Employment and Education

Table 6 shows the fixed effects general equilibrium estimations for female labor participation amongst port cities residents and across the DHS administrative regions. Compared to both other women in coastal access areas and women who live inland, women in cruise tourism cities have a increased likelihood of working. In both equilibria, this increase in employment is entirely being driven by women over the age of 30. While women under the age of 30 are less likely work irrespective, there is a statistically significant decrease in employment of 14% compared to other port cities and 16% to inland areas for younger women as a result of living in a cruise tourism city. These results imply that older women are taking advantage of labor opportunities created by tourism shocks while younger women are leaving the labor force for reasons made apparent in Table 7. Women living in rural areas are more likely to work than women in urban settings, while women coming from poorer households are more likely to be employed than women from wealthier households. While this does not determine if tourism leads to pro-poor growth in employment, the benefits are most likely seen by women living in poorer households.

Table 7 shows the fixed effects general equilibrium estimations for female years of education amongst port cities residents and across the DHS administrative regions. Compared to women

in other port cities, women in cruise tourism cities have less years of education. But, compared to women living inland in other DHS administrative regions women in cruise tourism cities are gaining around .15 more years of education than they would otherwise. This disparity is resolved by the fact that women in port cities have higher levels of education as seen in Column 3. Similar to Table 6, these effects are highly dependent on the age of the women. Women over the age of 30 have a mild decrease in education as a result of living in a city with cruise tourism. And although younger women are more educated altogether, women under the age of 30 are gaining an additional year or year and half more of school as a result of them living in a cruise tourism city. These results suggest that younger women in cruise tourism cities are staying in school longer, while older women are unlikely to change their educational choice. Women in urban areas have higher levels of education likely endogenous with the development of infrastructure around education and the demand for higher skilled laborers. Women from wealthier households attain more years of education consistent with resource constraints which limit poorer households from improving educational access.

Table 8 explores the intensive margin for female labor participation and years of education amongst cruise tourism cities. There is strong evidence that increases in cruise ship arrivals are associated with increases in both labor participation and years of education. For an additional 1% increase in cruise ship arrivals to a city, a women is 7% more likely to be employed and have around a third of a years more education. Similar to the findings in Tables 6 and 7, women over the age of 30 absorb almost all of the labor gains and none of the educational gains. While women under the age of 30 have no change in their employment status and are the ones increasing their educational choice. The findings for urban residents and household wealth within cruise tourism cities are consistent with the findings in Tables 6 and 7.

4.2 Dynamics of Staying in School

Due to the strong age dynamics found through the pooled cross-sectional fixed effects results of Table 7, I use a survivorship model and risk ratios to explore the age dynamics of dropping out of school. These models are useful to illustrate whether the opportunity cost of staying in school becomes too high as a result of an influx of cruise ship activity. Figure 6 shows the unadjusted Kaplan-Meier survivorship curve for the percentage of student-age women in school across their school age years. This model distinguishes the likelihood of staying in school depending on whether the woman is lives in a cruise tourism city. Across all ages, this figure shows that women in cruise tourism cities are more likely to stay in school. The difference is most notable for ages during primary school and secondary school. This provides strong evidence that cruise tourism activity drives incentives for young women to obtain more education than they would otherwise. This appetite for human capital accumulation from school-age women is consistent with my findings that women under the age of thirty are more likely to gain a higher level of education and forgo job opportunities.

Concurrent to this survivorship model, I estimate Cox Proportional Hazard Ratios to determine the factors that lead these women to drop out of school. Figure 7 shows that women in cruise tourism cities are around 7% more likely to stay in school than women of the same age. Additionally, it shows that living in a port city, having higher household wealth and living in an urban setting strongly determine their choice to stay in school. These additional factors demonstrate that resource constraints within a household and the infrastructure supporting education within a city are the largest determinants of promoting educational attainment. And yet, there remains evidence that cruise tourism activity leads young women to pursue higher levels of education.

Furthermore, I simulate Cox Proportional Hazard Ratios for dropping out of school by age. This simulates the impact of cruise ships arriving in a city only for the women living in cities that do not currently receive any cruise ship arrivals. In other words, the effect of going from a world with no cruise tourism to a world where every city receives cruise tourism. Figure 8 shows the results for 1000 pairwise bootstrapped simulations clustered at the city level. Interestingly, girls under the age of 15 are more likely to stay in school while girls over the age of 15, especially those in their early 20's, are around 50% more likely to drop out of school as a result of cruise ship arrivals. This means that if a city was to start receiving cruise ship arrivals, girls under the age of 15 are more likely to stay in school while women in their twenties will leave school. This suggests that cruise tourism improves primary and secondary education, but not higher levels of education. If we imagine that these women are gaining education to match employment credentials, this would

be consistent with the skill levels required of the jobs created by the cruise tourism sector.

4.3 Robustness

Exploring into the different variations that lead to these general equilibria, Table 9, 10, and 11 help to expand my findings by exploring alternative measures of labor and educational outcomes to seasonal employment, literacy, primary education, and secondary education. Columns 1 and 2 of Tables 9, 10, and 11 expands on the variation for seasonal employment. Similar to Column 1 in Table 6, Column 1 in Table 9 on seasonal employment shows a large 33% increased in seasonal employment by tourism shocks. This is true for both younger and older women and appears to be mainly for rural and poorer households. While less strong in effect, Table 10 Columns 1 and 2 show a similar relationship across port city residents. Oddly though, there is a reduction in seasonal employment associated with cruise tourism activity when looking at the whole sample in Table 11. Column 2 in Table 11 shows a robust finding that all subgroups of individuals are less likely to be seasonally employed with a tourism shock. This suggests that while cruise tourism boosts seasonal employment within tourism cities, the jobs created by cruise tourism are not primarily seasonal employment. As a result, cruise tourism jobs may crowd out seasonal employment which and shifts tourism and port cities away from seasonal employment compared to other inland areas. This would imply that cruise tourism provides longer term employment opportunities.

Columns 3 and 4 of Tables 9, 10, and 11 expands on the variation for literacy. Within tourism cities, female residents benefit from increases in cruise ship arrivals by increasing their literacy rate as seen in Table 9. This is robust across age groups and household wealth. While Table 10 does find a small negative association with cruise ship activity to literacy rates, Column 4 shows that this is almost entirely driven by older generations who are no longer in school. And Table 11 shows that across the full sample that having cruise ship arrivals, living in an urban port city, being young and from a higher wealth bracket affords the higher rates of literacy found in the tourism city variation of Table 9. These indicate that literacy improves with tourism; a finding consistent with the educational gains seen in Table 7.

Columns 5 and 6 of Tables 9, 10, and 11 expands on the variation for attaining a primary education. The designation of receiving a primary and secondary education are mutually exclusive (e.g. you either reach a primary or a secondary level of education). For cruise tourism cities, there are mild gains in primary education which appear to be driven by poorer households. Again for port city residents, cruise tourism activity increases to a near primary education, but is dominated by older women in poorer households. Younger women in port cities are obtaining less primary education which is further explained by their large gains in the likelihood of obtaining a secondary education as seen in Columns 7 and 8. These findings are persistent when looking across the full sample. Older women from poorer households are obtaining primary educations, while young women are less likely to do so.

Columns 7 and 8 of Tables 9, 10, and 11 expands on the variation for attaining a secondary education. For tourism city residents, women increase their likelihood of a secondary education by 4.5% for each additional 1% increase in cruise ship arrivals. This shift towards secondary education is strongly associated with women under the age of 30 and households from a higher wealth bracket. Across port city residents, this effect is highly influenced by younger women in both tourism and non-tourism cities with a very similar relationship across all cities. These findings suggest that allow younger women and wealthier households across the board are more likely to obtain a secondary education, cruise tourism activity heavily influences younger women to obtain a secondary level education. Tables 9, 10, and 11 shows that my findings are robust to similar forms of outcomes, and provide consistent conclusions to my initial findings.

To ensure that these results are not being driven by changes that only occur for larger countries in the sample, I test the robustness of my findings by weighting my sample by national population. Table 12 shows the univariate estimations for female labor participation and years of education weighted by population. While the estimations for labor participation are consistent with my initial findings, there is only a positive association for cruise ship arrivals with years of education within cruise tourism cities. Although, the negative associations found for years of education amongst port city residents and all DHS administrative regions are not statistically significant. Furthermore, the standard errors are nearly as large if not larger than their beta coefficients spanning positive terms. Therefore, Table 12 shows that my results are not sensitive to national population weights.

Due to the endogenous nature of selection by both cruise ships selecting which ports to arrive

at and ports actively developing infrastructure to provide terminals for cruise ships to dock in port, I test the influence of unobservable selection bias using Oster Bounds (Oster 2017). This test estimates the influence that unobservables outside my specified model would need to have in order for my estimation to return a false positive (Null effect). Using the full DHS sample, Table 13 shows the Delta influence of selection bias in my model. For an Rmax of 0.7 and 1, the influence that unobservables need have for my findings on labor participation to return a null effect are between 30% and 60% as important as the observables included in my specification. Furthermore, these unobservables would need to go against treatment. In other words, my findings are a lower bound estimate. For an Rmax of 0.7 and 1, the influence that unobservables would need for my findings on years of education to return a null effect are between 2,927% and 6,539% as important as the factors included in my model. Again, these unobservables would need to go against treatment, and suggest my findings are a lower bound. Table 13 is very strong evidence that my findings are not spurious correlation driven by selection bias.

5 Conclusion

These results suggest that there are positive gains to both labor participation and education for women as a result of positive cruise tourism shocks. But these gains are largely driven through age dynamics. Older women appear to be taking advantage of labor opportunities provided by the expansion of the tourism/service sector. While young women seem to be accumulating higher levels of education in an anticipation of obtaining higher skilled labor positions. Poorer women are most likely to be employed and benefit most from the job opportunities provided from cruise tourism. Although, household wealth constraints restrict increases to education to women from households of poorer means. Compared to women from other port cities and women who live inland, women in cruise tourism cities have better employment and educational attainment.

Older women are obtaining primary educations and are in a position to match with current opportunities made available by cruise tourism. While younger women expand their human capital to a near secondary education in anticipation of the manifestation of higher skilled positions from cruise tourism. Seasonal employment is crowded out for other forms of employment, such as full time employment opportunities suggesting that female laborers are transitioning away from agricultural and migrant labor to permanent or semi-permanent position in the service or manufacturing sectors. This leads overall female employment and education attainment to rise with the arrival of cruise ships.

These findings are concurrent with Faber and Gaubert (2019) for positive employment gains from tourism. And shows that education is a primary factor in determining how women respond to job opportunities created by an influx of tourism. These finding strongly support Romer (1989)'s conjecture that human capital accumulation is the engine for growth. Tourism appears to incentivize local growth by motivating women to obtain higher education levels to match higher skilled labor supplied by the expansion of the tourism sector. Furthermore, these findings suggest that tourism development is important for female empowerment. As Hsieh et al. (2019) discusses, the expansion of women in the workforce is a vital step in the development of an economy. As such, my findings provide a deeper understanding for why Tourism Led Growth Hypothesis (TLGH) studies have found raises in GDP per capita growth with higher levels of tourism. This broadens the scope of the TLGH in showing that much of what is seen in the macroeconomic trends are in fact shifts in female labor force growth.

Although these findings pertain to cruise tourism, distinct from its parent (overnight-stay tourism) in a variety of ways, these differences are limited as seen in Table 1. Considering Table 1, these findings are externally valid as representative of tourism in general. While these findings are endogenous shifts in local equilibrium, these findings are robust to numerous measures and provide a glimpse at the path dependent movement of educational attainment by women to match employment opportunities created by positive tourism shocks.

Further questions from this study remain un-investigated. Do these findings extend to male employment and educational attainment? Should estimated number of passenger arrivals provide different results? What are the driving mechanisms behind tourists arriving which lead to the growth seen here? An important aspect missing from the policy advocacy is whether cruise tourism gains are driven by the taxes levied on ships and passenger arrivals, or from the money spent by ships and passengers on shore. What does remains evident is that tourism in fact plays a significant role in development and requires the rigorous examination that other fields of development (e.g.

microfinance, conditional cash transfers) have experienced. Given this novel micro-dataset on annual cruise ship arrivals at the city level, this study creates an avenue for studying tourism's regional welfare effects at a global scale.

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Appendix

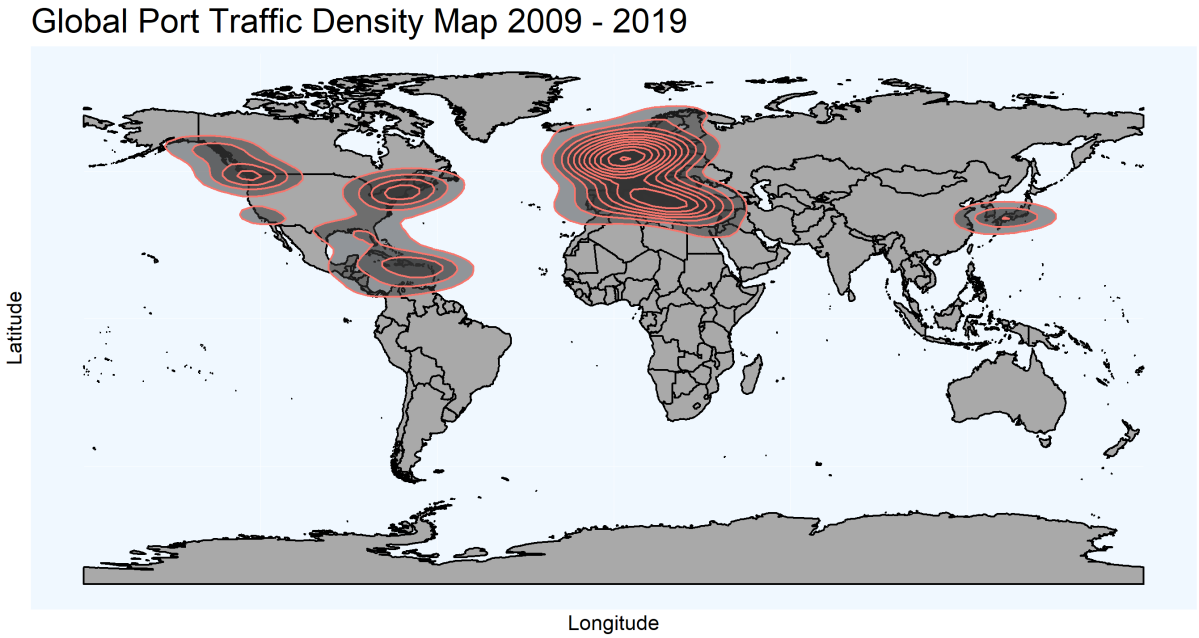

Figure 1: Global Cruise Ship Port Traffic Density Plot for 2009 to 2019

This figure shows the density of cruise ship traffic in cruise tourism port cities from 2009 to 2019. The contour lines display the density and concentration of port traffic with the shading indicating the level of intensity.

Characteristics of Overnight-Stay and Cruise Tourism		
Characteristic	**Overnight-Stay Tourism**	**Cruise Tourism**
Global Capitalization	$8 Trillion USD	$126 Billion USD
Growth Rate	3.9%	4.5%
Avg. Host Nation	Asiatic Nations	European and American
Avg. Trip Length	5.1 Nights	7.2 Nights
Tourist Avg. Age	42 years old	46 years old
Tourist Avg. Expenditure	$1,364 per Trip	$67.10 per disembarkment

Table 1: Comparing the Characteristics of Overnight-Stay Tourism and Cruise Tourism

Sources: The results are condensed from findings found in the reports of FCCA (2018a), Cruise Market Watch 2018, CLIA 2019, WTTC 2019, UNWTO 2019, and FCCA 2018b.

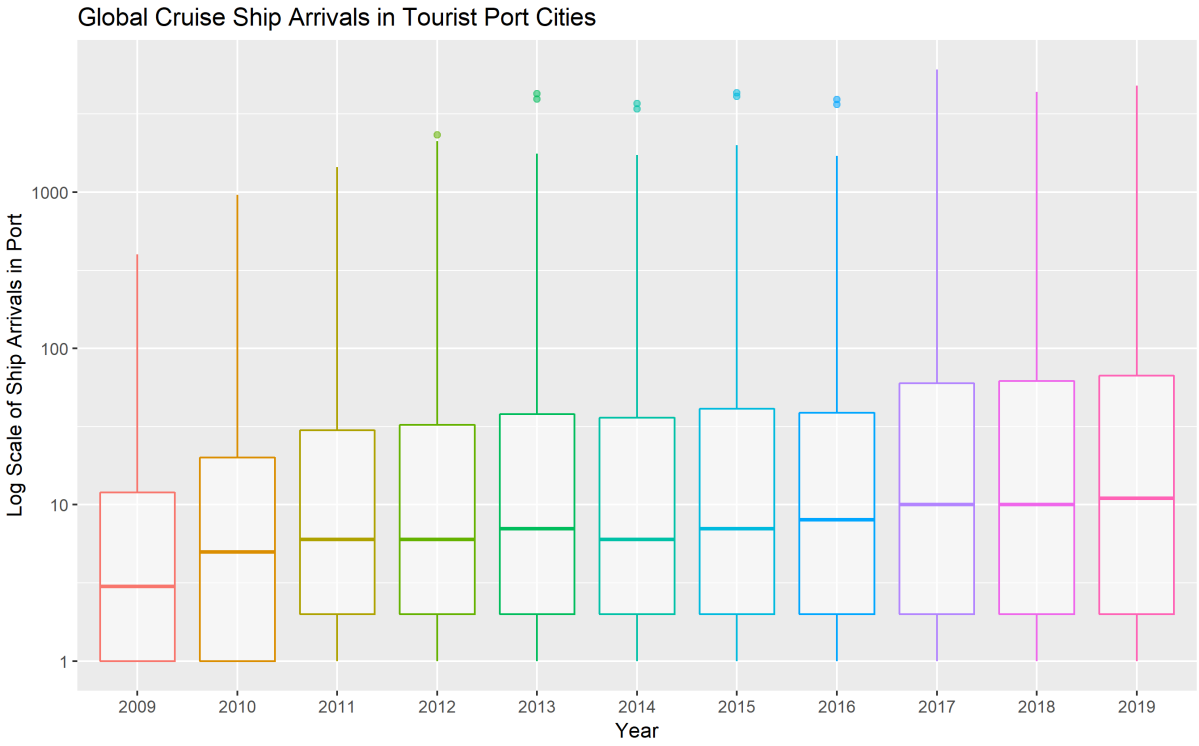

Figure 2: Cruise Ship Arrivals Time Trend from 2009 to 2019

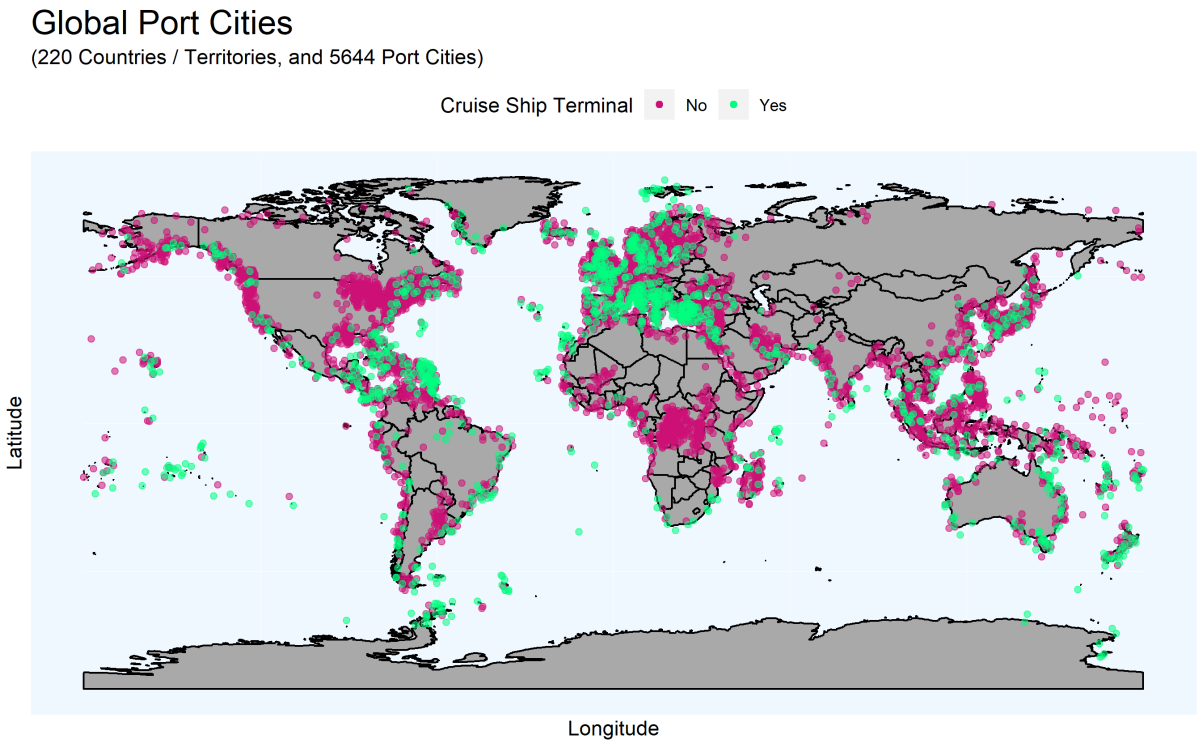

Figure 3: Global Port Cities Spatial Distribution

This figure shows the spatial distribution of port cities highlighting whether that port has an cruise ship terminal to receive potential cruise ship arrivals. This includes all potential port cities before the DHS spatial matching.

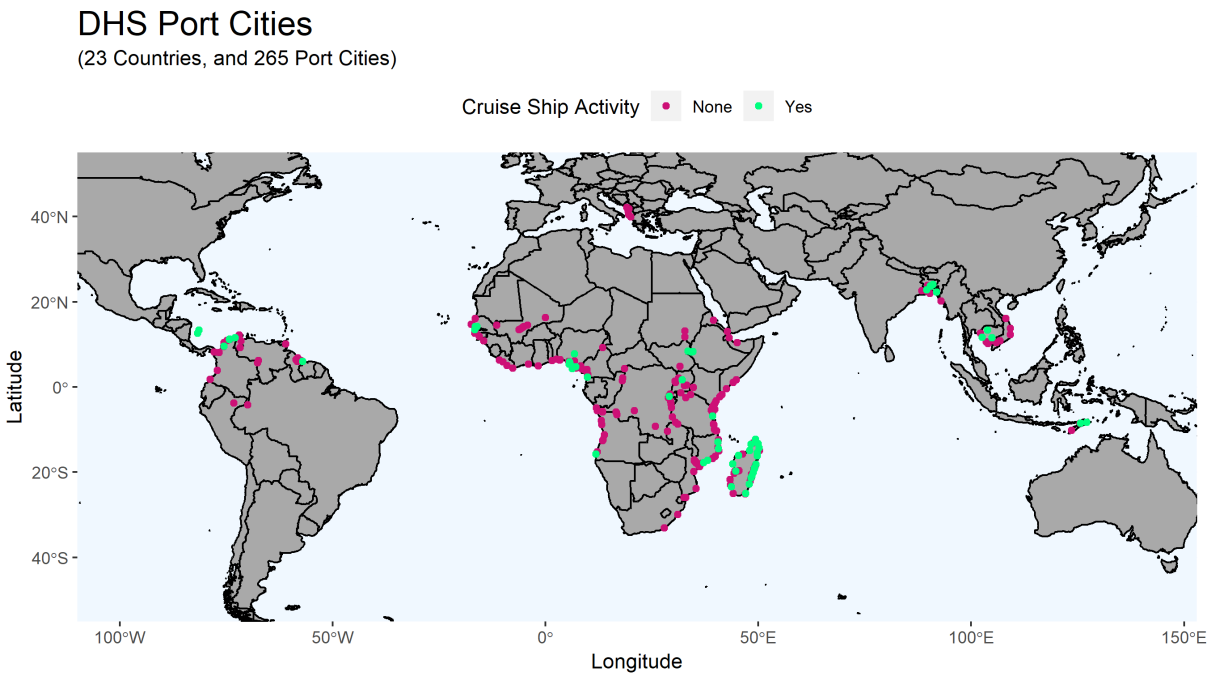

Figure 4: DHS Matched Port Cities Spatial Distribution

This figure shows the spatial distribution of port cities that have DHS survey participants and are included in the study. The ports are highlighted depending on whether their port cities received any cruise ship tourism from 2009 to 2016.

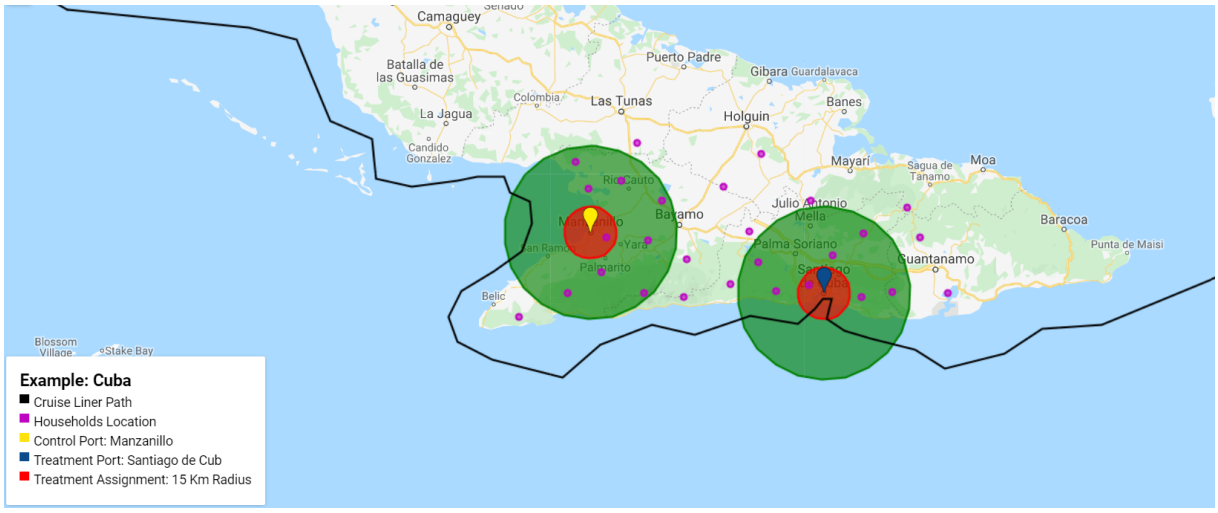

Figure 5: Tourism Vs Non-Tourism Port City Identification

Provided the black line is a cruise ship's path, the blue port is assigned a cruise tourism port while the yellow port is classified as a non-tourism port. Households within a 50 KM radius of a city is assigned to that city, while any outside this caliper refer to their DHS administrative regions. This figure is an illustrative example and does not display real household locations nor a real cruise liner's path.

Countries and Years in Full Sample								
Country	2009	2010	2011	2012	2013	2014	2015	2016
Albania	X							
Angola			X					
Bangladesh			X					
Burkina Faso		X						
Burundi		X	X					
Cambodia		X	X					
Cameroon			X					
Colombia	X	X						
Ethiopia		X	X					
Guyana	X							
Kenya	X							
Lesotho	X	X						
Liberia	X		X					
Madagascar	X		X		X			
Malawi		X		X		X		
Mozambique	X							
Nigeria		X						
Rwanda		X	X					
Senegal	X	X	X					
Tanzania	X	X						
Timor Leste	X	X						
Uganda	X	X	X			X	X	X
Zimbabwe		X	X					

Table 2: DHS Sample Composition by Country and Survey Year

This table provides the countries and years for DHS surveys included in this sample.

Variable	Question
Years of Education	Highest year of education gives the years of education completed
Primary Education	Highest education level attended.
	This is a standardized variable providing level of education in the following categories: complete primary
Secondary Education	Highest education level attended.
	This is a standardized variable providing level of education in the following categories: complete secondary
Higher Education	Highest education level attended.
	This is a standardized variable providing level of education in the following categories: higher education
Literacy	The respondent is asked to read a written sentence and the interviewer would note whether the respondent could read it or not at all
Employment Status	Whether the respondent is currently working
Seasonal Employment	Whether the respondent works throughout the year, seasonally, or just occasionally
Age	Age of the household member
Urban Resident	De facto type of place of residence. Type of place of residence where the respondent was interviewed as either urban or rural.
	Note that this is not the respondent's own categorization, but was created based on whether
	the cluster or sample point number is defined as urban or rural.
Household Wealth Index	Wealth index factor score (5 decimals).

Table 3: Questions taken from DHS Surveys

This table provides a description of the variables used in this study that were standardized across DHS surveys.

Panel A: Cruise Tourism City Characteristics				
	Mean	SD	Min	Max
Crew Capacity	833.66	424.71	18	2150
Passenger Capacity	2298.37	1255.45	54	6780
Cruise Ship Arrivals	43.28	118.26	1	671
Tourism Port Observations	61			
Panel B: Full DHS Individual Characteristics				
Tourist City Resident	0.06	0.24	0	1
Port City Resident	0.24	0.43	0	1
Age	29.14	9.88	13	65
Young (< 30)	0.56	0.50	0	1
Urban Resident	0.37	0.48	0	1
Household Wealth Index	3.06	1.45	1	5
Individual Observations	355,489			

Table 4: Summary Statistics

This table shows descriptive statistics on the port cities and women observed in this study. Panel A provides statistics on the port cities that received any cruise ship arrivals. Panel B provides statistics on all women who spatially matched from the DHS surveys.

Year	Est. Ship Arrivals	Est. Passenger Arrivals	Reported Passenger Arrivals	Difference	Correlation
2015	127	268,290.5	1,076,752	-808,461.5	.60
2016	152	324,969.3	1,267,016	-942,046.8	.69
2017	311	651,779.3	1,283,661	-631,881.8	.72
2018	439	973,007.8	1,308,305	-335,297.3	.73
2019	577	1,214,780	1,717,523	-502,743.5	.74

Table 5: Comparing Proxy Measure to New Zealand Reported Statistics

This table compares the proxy estimates of the number of cruise ship arrivals and estimated cruise ship passenger arrivals to the reported cruise ship passenger arrivals in New Zealand from 2015 to 2019. Both the estimates and reported accounts are aggregated to the country level by year.

	Port Cities		Full Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Employed	Employed	Employed	Employed
Any Cruise Ship Arrivals	0.00822		0.0213	
	(0.0436)		(0.0224)	
Port City Resident			-0.0130	-0.00732
			(0.0122)	(0.0124)
Old X Any Cruise Ship Arrivals		0.0127		0.0319
		(0.0403)		(0.0263)
Young X No Cruise Ship Arrivals		-0.157***		-0.155***
		(0.0202)		(0.0159)
Young X Any Cruise Ship Arrivals		-0.158***		-0.139***
		(0.0417)		(0.0246)
Urban Resident		-0.0125		-0.0122
		(0.0175)		(0.0160)
Household Wealth Index		-0.0139***		-0.00474
		(0.00423)		(0.00372)
Constant	0.413***	0.554***	0.464***	0.567***
	(0.0119)	(0.0234)	(0.00235)	(0.0161)
Observations	69,132	69,132	301,181	301,181
R-squared	0.369	0.396	0.366	0.390
Cities / Admin Regions	199	199	237	237
Countries	20	20	23	23
Country-Year FE	✓	✓	✓	✓
City FE	✓	✓		
DHS Admin Region FE			✓	✓

Table 6: Women's Labor Participation Fixed Effects

Estimations for port cities are clustered at the city, while estimates for the full sample are clustered at the DHS administrative region. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

	Port Cities		Full Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Years Educated	Years Educated	Years Educated	Years Educated
Any Cruise Ship Arrivals	-0.182		0.156	
	(0.314)		(0.301)	
Port City Resident			0.753***	0.0762
			(0.194)	(0.0859)
Old X Any Cruise Ship Arrivals		-0.443*		-0.144
		(0.250)		(0.195)
Young X No Cruise Ship Arrivals		1.243***		1.309***
		(0.158)		(0.0927)
Young X Any Cruise Ship Arrivals		1.147***		1.446***
		(0.234)		(0.173)
Urban Resident		0.837***		1.158***
		(0.139)		(0.141)
Household Wealth Index		1.207***		1.071***
		(0.0559)		(0.0374)
Constant	6.380***	1.119***	5.370***	1.104***
	(0.0830)	(0.281)	(0.0386)	(0.117)
Observations	85,025	85,025	355,286	355,286
R-squared	0.283	0.417	0.290	0.456
Cities / Admin Regions	199	199	237	237
Countries	20	20	23	23
Country-Year FE	✓	✓	✓	✓
City FE	✓	✓		
DHS Admin Region FE			✓	✓

Table 7: Women's Years of Education Fixed Effects

Estimations for port cities are clustered at the city, while estimates for the full sample are clustered at the DHS administrative region. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

	Cruise Tourism Cities			
	(1)	(2)	(3)	(4)
VARIABLES	Employed	Employed	Years Educated	Years Educated
Log(Cruise Ship Arrivals)	0.0719***		0.350**	
	(0)		(0.163)	
Old X Log(Cruise Ship Arrivals)		0.0725*		-0.0721
		(0.0431)		(0.168)
Young X Log(Cruise Ship Arrivals)		0.00688		0.302
		(0.0444)		(0.198)
Urban Resident		0.0115		0.257
		(0.0346)		(0.206)
Household Wealth Index		-0.0213***		1.315***
		(0.00671)		(0.0807)
Constant	0.380***	0.499***	5.265***	1.343***
	(0)	(0.0915)	(0.293)	(0.428)
Observations	18,903	18,903	22,463	22,463
R-squared	0.277	0.303	0.276	0.409
Cities / Admin Regions	61	61	61	61
Countries	15	15	15	15
Year FE	✓	✓	✓	✓
City FE	✓	✓	✓	✓

Table 8: Intensive Margin of Women's Outcomes Fixed Effects

Estimations for cruise tourism cities are clustered at the city. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

Figure 6: Unadjusted Kaplan-Meier Survivorship Curve

This figure shows the likelihood of a school-age girl remaining in school depending on whether they live in a cruise tourism city. The stair-step lines show the estimated likelihood while the shaded area displays a 95% confidence interval clustered at the individual level. N = 39,817 for 20,811 women ages 13 to 33.

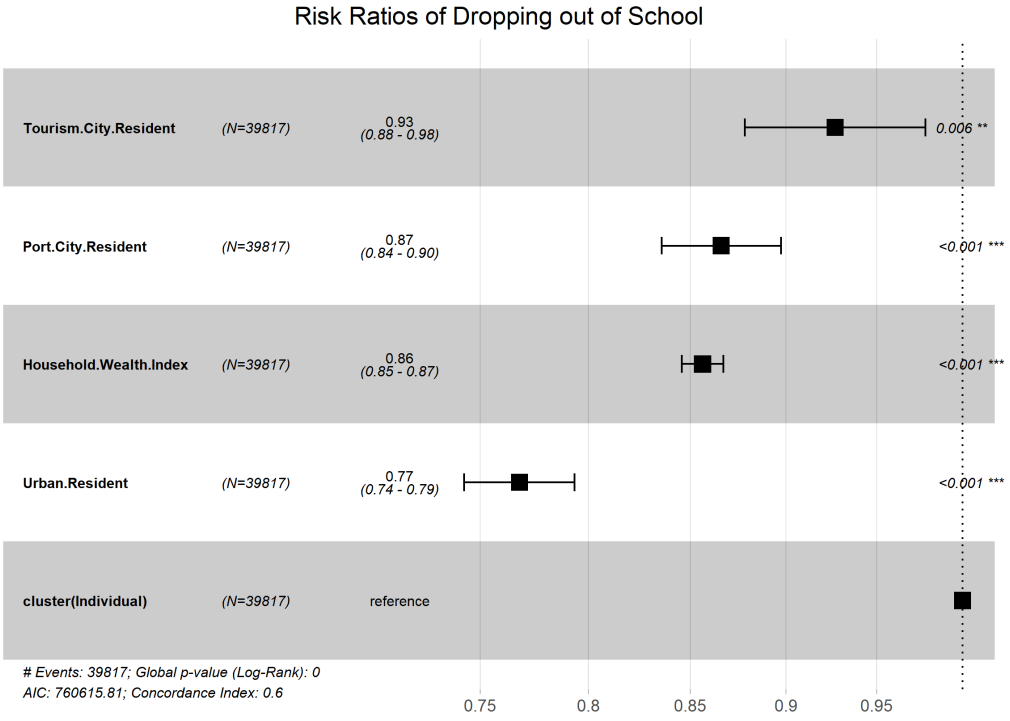

Figure 7: Cox Proportional Hazard Ratios for Dropping out of School

This figure shows the risk of a school-age girl dropping out of school dependent on characteristic provided. These ratios are relative to 1, where the risk between those with and those without that characteristic are equal. The squares are the point estimates with 95% confidence intervals clustered at the individual level. N = 39,817 for 20,811 women ages 13 to 33.

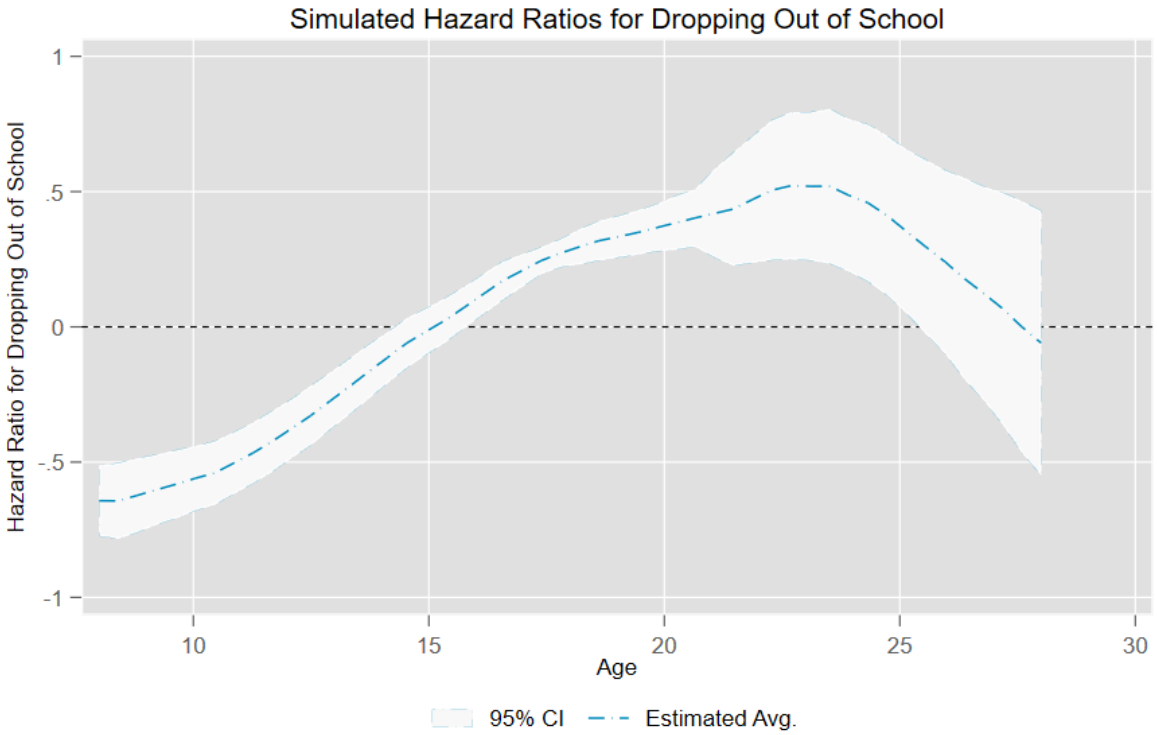

Figure 8: Simulated Risk Ratios for Dropping out of School by Age

This figure shows the simulated risk of a school-age girl dropping out of school by age for women who live in non-tourism cites. This simulates 1000 times a pairwise bootstrap clustered at the city level of the effect of a women living in a non-tourism city if cruise ships began to arrive in her city. These risk ratios are relative to 0 where the risk of dropping out at that age is even between cruise tourism and non-tourism cities. N = 37,644 for 19,655 women ages 13 to 33.

VARIABLES	(1) Seasonal Employment	(2) Seasonal Employment	(3) Literacy	(4) Literacy	(5) Primary Education	(6) Primary Education	(7) Secondary Education	(8) Secondary Education
Log(Cruise Ship Arrivals)	0.337***		0.0410**		0.0179		0.0452***	
	(0)		(0.0162)		(0.0228)		(0.0133)	
Old X Log(Cruise Ship Arrivals)		0.146**		0.00410		0.0337		0.00554
		(0.0706)		(0.0144)		(0.0229)		(0.0131)
Young X Log(Cruise Ship Arrivals)		0.131		0.0387**		0.0203		0.0529**
		(0.0782)		(0.0181)		(0.0273)		(0.0207)
Urban Resident		-0.0725**		0.0260		-0.00262		0.00591
		(0.0296)		(0.0224)		(0.0206)		(0.0263)
Household Wealth Index		-0.0380**		0.108***		-0.0538***		0.0847***
		(0.0143)		(0.00996)		(0.0115)		(0.0128)
Constant	-0.442***	0.0331	0.391***	0.0674*	0.273***	0.430***	0.305***	0.0573
	(0)	(0.178)	(0.0291)	(0.0385)	(0.0412)	(0.0724)	(0.0240)	(0.0477)
Observations	18,420	18,420	22,472	22,472	22,471	22,471	22,471	22,471
R-squared	0.115	0.170	0.312	0.392	0.091	0.112	0.121	0.180
Cities / Admin Regions	61	61	61	61	61	61	61	61
Countries	15	15	15	15	15	15	15	15
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓	✓	✓

Table 9: Tourism City Residents Fixed Effects

Estimations for cruise tourism city residents with standard errors clustered at the city. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Seasonal Employment	(2) Seasonal Employment	(3) Literacy	(4) Literacy	(5) Primary Education	(6) Primary Education	(7) Secondary Education	(8) Secondary Education
Tourist City	0.0783		-0.000440		0.0286		0.00673	
	(0.0583)		(0.0317)		(0.0318)		(0.0332)	
Old X Tourist City		0.0813		-0.0339		0.0438		-0.0193
		(0.0511)		(0.0318)		(0.0348)		(0.0330)
Young X Non-Tourist City		-0.0321***		0.114***		-0.0242		0.157***
		(0.00659)		(0.0162)		(0.0171)		(0.0157)
Young X Tourist City		0.0288		0.132***		-0.00275		0.174***
		(0.0403)		(0.0296)		(0.0334)		(0.0327)
Urban Resident		-0.0736***		0.0425***		-0.0550***		0.0611***
		(0.0141)		(0.0118)		(0.0154)		(0.0137)
Household Wealth Index		-0.0293***		0.0942***		-0.0462***		0.0777***
		(0.00559)		(0.00601)		(0.00639)		(0.00653)
Constant	0.0890***	0.242***	0.510***	0.101***	0.346***	0.546***	0.377***	-0.00781
	(0.0169)	(0.0216)	(0.00838)	(0.0294)	(0.00839)	(0.0318)	(0.00878)	(0.0256)
Observations	63,676	63,676	85,060	85,060	85,056	85,056	85,056	85,056
R-squared	0.135	0.169	0.365	0.436	0.106	0.126	0.131	0.205
Cities / Admin Regions	199	199	199	199	199	199	199	199
Countries	20	20	20	20	20	20	20	20
Country-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓	✓	✓

Table 10: Port City Residents Fixed Effects

Estimations for port city residents with standard errors clustered at the city. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Seasonal Employment	(2) Seasonal Employment	(3) Literacy	(4) Literacy	(5) Primary Education	(6) Primary Education	(7) Secondary Education	(8) Secondary Education
Tourist City	-0.0559		0.0316		0.0260		0.00613	
	(0.0536)		(0.0308)		(0.0221)		(0.0228)	
Port Household	-0.0311*	-0.00914	0.0509***	0.00237	-0.0374***	-0.00960	0.0560***	0.00942
	(0.0178)	(0.0137)	(0.0169)	(0.0120)	(0.0127)	(0.0108)	(0.0141)	(0.00871)
Old X Tourist City		-0.0335		-0.00583		0.0481**		-0.0242
		(0.0332)		(0.0218)		(0.0206)		(0.0169)
Young X Non-Tourist City		-0.0358***		0.118***		-0.0144		0.154***
		(0.00449)		(0.0121)		(0.0210)		(0.0114)
Young X Tourist City		-0.0869		0.160***		0.00362		0.169***
		(0.0561)		(0.0237)		(0.0305)		(0.0161)
Urban Resident		-0.0987***		0.0547***		-0.0702***		0.0851***
		(0.0176)		(0.0143)		(0.0145)		(0.0130)
Household Wealth Index		-0.0308***		0.0864***		-0.0370***		0.0696***
		(0.00525)		(0.00698)		(0.00619)		(0.00644)
Constant	0.192***	0.337***	0.411***	0.0727***	0.399***	0.540***	0.295***	-0.0239
	(0.00440)	(0.0231)	(0.00356)	(0.0278)	(0.00258)	(0.0303)	(0.00285)	(0.0173)
Observations	285,835	285,835	355,489	355,489	355,463	355,463	355,463	355,463
R-squared	0.205	0.243	0.341	0.422	0.120	0.140	0.140	0.230
Cities / Admin Regions	237	237	237	237	237	237	237	237
Countries	23	23	23	23	23	23	23	23
Country-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
DHS Admin Region FE	✓	✓	✓	✓	✓	✓	✓	✓

Table 11: Full Sample Fixed Effects

Estimations for all women included in the DHS sample with standard errors clustered at the DHS administrative region. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

	Tourism Cities		Port Cities		Full Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Employed	Years Educated	Employed	Years Educated	Employed	Years Educated
Log(Cruise Ship Arrivals)	0.0626***	0.241				
	(0)	(0.147)				
Tourist City			0.0161	-0.412	0.0199	-0.0310
			(0.0270)	(0.429)	(0.0291)	(0.392)
Port Household					-0.0182*	0.931***
					(0.00978)	(0.209)
Constant	0.316***	5.291***	0.299***	6.848***	0.339***	5.419***
	(0)	(0.231)	(0.00511)	(0.0778)	(0.00272)	(0.0527)
Observations	18,883	22,443	69,099	84,992	301,088	355,193
R-squared	0.331	0.211	0.373	0.319	0.375	0.331
Cities / Admin Regions	61	61	199	199	237	237
Countries	15	15	20	20	23	23
Year FE	✓	✓				
Country-Year FE			✓	✓	✓	✓
City FE	✓	✓	✓	✓		
DHS Admin Region FE					✓	✓

Table 12: National Population Weighted Fixed Effects

Estimations for cruise tourism city and port city residents have standard errors clustered at the city, while the full sample estimations have standard errors clustered at the DHS administrative region. Clustered standard errors in parentheses and significance levels are displayed as *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Employed	(2) Employed	(3) Years Educated	(4) Years Educated
Delta	-0.60	-0.30	-65.39	-29.27
Rmax	0.7	1	0.7	1
Observations	301,181	301,181	355,286	355,286
Cities / Admin Regions	237	237	237	237
Countries	23	23	23	23
Country-Year FE	✓	✓	✓	✓
DHS Admin Region FE	✓	✓	✓	✓

Table 13: Oster Bounds of Selection Bias Influenced by Unobservables

These estimations use the full sample fixed effects model specification. Delta represents the influence that unobservables outside the model specification need have for the specification to return a false positive due to selection bias. Rmax represents the maximum potential fit of the model specification.