



Limits to growth: Tourism and regional labor migration

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ABSTRACT

The paper provides a methodology for considering the carrying capacity and limits to growth of a labor-constrained mature tourism destination. A computable general equilibrium model is used to examine the impacts of visitor expenditure growth and labor migration on Hawai'i's economy. Impacts on regional income, welfare, prices, sector-level output, and gross state product are considered under alternative migration scenarios. Labor market constraints impose limits to growth in real visitor expenditures. Labor market growth with constrained visitor demand generates falling per capita household welfare.

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1. Introduction

Small tourist destinations can experience wide economic fluctuations in response to changes in visitor expenditures. Visitor-led demand shocks influence prices and factor market demand in ways that induce migration as people enter and exit in response to regional economic opportunities. The impact on prices, output, standards of living, and the visitor experience depend on the interaction of these factors.

Since Hawai'i statehood, visitor spending and the gross state product (GSP) have generally moved together and are positively correlated with household incomes in California, Japan, and Korea. The Hawai'i economy and residential population expanded significantly with growth in the economies of Asia during the 1980s and 2000s. The 1990s witnessed an unprecedented economic downturn and out-migration, often referred to as the 'lost decade.' Hawai'i tourism responded quite rapidly to external demand shocks such as the events surrounding the Japanese asset market collapse in 1990, the Asia financial crisis of 1997, and the 1995–2001 dot-com rise and fall of the U.S. technology sector. Hawai'i experienced steady economic growth and an expansion of the labor force from 2000 until the recent global financial crisis. With a resident population of 1.3 million, nearly 7.5 million visitors came to Hawai'i in 2007. While the Hawai'i real

estate market was relatively isolated from the sub-prime mortgage crisis that hit the U.S. mainland, the economy suffered a delayed response to the present financial crisis. By 2008, visitor arrivals plummeted to 6.7 million and continued to slide. From a base of 2007, Hawai'i experienced a cumulative drop of 14.4% in visitor arrivals triggering a severe economic slowdown resulting in a 4.5% drop in employment by 2009.

Optimal levels of tourism, and associated population growth, generate substantial policy discussion Hawai'i and other visitor destinations. Visitors generate jobs and contribute positively to economic growth and development in Hawai'i. At the same time, tourism and in-migration creates congestion and imposes stress on Hawai'i's limited infrastructure and environmental resources. Many current residents lobby to constrain population growth to preserve living standards while employers advocate for an expansion of the labor force.

Local policymakers cannot legally restrict tourism or inter-state migration and have no jurisdiction over immigration policy. Yet population growth is actively managed through land-use, permitting, and availability of public infrastructure. For example, Hawai'i zoning laws severely restrict new hotel construction. Regulations have been preserved on the grounds that they support sustainable economic development and respect the human carrying capacity of the Hawai'ian Islands.

The volcanic Hawaiian island chain is spread over 2400 km in the Pacific Ocean. As is typical of island economies, the mountainous terrains and water availability limit inhabitable areas to the coasts of eight main islands. Population density varies across the islands with

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567 per km² on Oahu, 62 per km² on Maui, and 11 per km² on Molokai. Archeological evidence dates the first inhabitants at 300 BCE. Following the 1778 arrival of James Cook, missionaries and whalers migrated to the islands. Chinese, Japanese, and Korean immigrants arrived from 1885 to the early 1900s as contract laborers for sugar cane and pineapple plantations. Today, the key economic drivers in the State are tourism and military services.

Whether growth in visitor demand will improve resident standards of living depends significantly on regional labor mobility conditions. A visitor demand shock puts pressure on labor markets and prices, particularly within a confined regional economy. The ultimate economic impact of increased visitor spending will depend on the rate of entry (or exit) of new workers. Not addressed in this paper is the impact of technological progress or capital accumulation on living standards.

Several studies have demonstrated that intraregional migration is positively related to external demand shocks. Chan et al. (2005) develop a CGE model of Vietnam. In their model, unemployment is treated as a pool of workers who will enter (or exit) the market until wages are in equilibrium at benchmark levels. Trade liberalization increases overall welfare but redistributes income and unemployment in a manner that hurts poor households in real terms. For the regional economy of Learmonth et al. (2007) consider the environmental and economic impacts of alternative population assumptions. The study finds that small in-migration lowers average household income while increasing congestion and pollution. Gelan (2002) develops a computable general equilibrium (CGE) model that considers rural labor migration into urban Ethiopia and finds that trade liberalization will contract urban economic growth when urban real wages are fixed but will lead to rural and urban growth when wages are flexible.

The CGE model of Cutler and Davies (2007) considers sector-specific regional factor mobility in a city where policymakers can target sectors for expansion. The analysis demonstrates that expanding high-wage sectors increases output and tax revenues while low-wage retail growth generates higher household income per acre. Hoffmann et al. (1996) develop a CGE model of California and find that defense spending cuts generate a drop in gross state product ranging from a factor of one to five, depending on the degree of interstate labor mobility.

As a mature tourism destination, there are several econometric studies of Hawai'i's visitor economy. Bonham et al. (2009) estimate a vector error correction model of Hawai'i tourism where both demand and supply side variables are incorporated. They identify reasonable long run relationships for visitor demand, hotel room price, and production. The paper by Fujii et al. (1985) estimates Hawai'i visitor expenditures using time series data and find that food, lodging, clothing and transport demand elasticities are not statistically different than one, which is consistent with Cobb–Douglas preferences. These analyses serve to inform the parameter and functional form selection for an applied general equilibrium model.

In the present study a computable general equilibrium model is developed to identify the key economic tradeoffs involved with allowing labor market expansion through population in-migration. The analysis demonstrates how sensitive a regional economy is to fluctuations in visitor expenditures and the mobility of labor. The model is calibrated to 1997 data for Hawai'i, including a detailed social accounting matrix comprised of 131 sectors, three factors, households, investors, and four government categories. Tourism represents a significant share of regional exports. Calibrated sensitivity analysis quantifies the economic impacts of alternative visitor spending scenarios. Household income, wages, commodity prices and output respond endogenously to changes in visitor expenditures. The model is used to show how regional welfare, price levels, and production respond to alternative labor market rigidity scenarios.

The paper is organized as follows. Section 2 provides a detailed discussion of the Hawaii data set and the CGE model. Section 3 analyses three alternative numerical growth scenarios. Concluding remarks are drawn in Section 4.

2. Data and methodology

In order to assess the effects of the alternative tourism and labor force growth scenarios, a numerical applied general equilibrium model of Hawai'i is developed. A Social Accounting Matrix is assembled which describes the flow of goods, services, and factors through each economy in a baseline year. For each production sector, the purchases of intermediate inputs and primary factors (labor and capital) are provided. Demand in each sector is a combination of intermediate demand and final expenditures by households, government, exporters, and investors. The baseline conditions are derived from a 1997 Input–Output table comprised of 131 industrial sectors, three factor markets, and 11 agents of final demand (DBEDT, 2002). The Social Accounting Matrix is supplemented with additional data on visitor expenditures, population, and infrastructure.

An aggregated summary of output and production is presented in Table 1. Hawai'i is a service-based economy. Key services, many of which are visitor related, supply significant output shares including real estate (15.4%), trade (10.4%), hotels (5.9%), restaurants (3.9%), and air transportation (3.5%). Other services, including health, business and professional services, account for an additional 25.8% of production and 29.8% of employment. The government sector employs 22% of Hawai'i's civilian workforce and generates 33.2% of labor income.

Table 2 presents expenditure patterns by households and visitors. Of total final demand output of \$73 billion, imports account for 19.5%. Imports include foreign goods and services as well as imports from the U.S. mainland. It is important to note that the Hawai'i market is geographically isolated from the U.S. and Asia. Thus it is possible to distinguish locally produced goods and services from imports to the Islands.

As shown in Table 2, the 1.2 million households in Hawai'i consumed approximately \$25 billion in 1997. 'Other services' and real estate comprise more than half of total consumption. One fifth of household expenditures are on imported products. Visitor expenditures in Hawai'i are a significant part of total sales at \$10.9 billion in 1997, Table 2. Hawai'i visitors spend largely on hotels (29.7%), air transportation (14.2%), retail (11.7%), and restaurants (10.3%). Imports (including U.S. mainland and international imports) make up about 13% of total visitor expenditures. It is important to note that real per capita personal income has grown less than 1% since the 1970s. This gives indication that technological progress has lagged in Hawai'i relative to the U.S. mainland.

Hawaii is modeled as a small and very open economy, in which visitor expenditures generate a significant share of foreign exchange. The approach is similar to that of Konan and Maskus (2000, 2006) and Konan and Kim (2003, 2004). Visitors demand a bundle of goods, such as hotel and restaurant services, most of which are not importable. Goods are produced under perfect competition and constant returns to scale using intermediate commodities, imports, labor, and capital. Final demand is generated by households, visitors, various government entities, and exports. Within this context, prices are calibrated to clear markets.

2.1. Consumer behavior

There are two types of consumers in the economy, residents (r) and visitors (v). The economy produces n commodities and imports a single composite commodity m . The Cobb–Douglas utility function for the type- h consumer is given by

$$U_h = \prod_i C_{hi}^{b_{hi}} \quad \sum_i b_{hi} = 1 \quad (1)$$

where C_{hi} is consumption and b_{hi} the income expenditure share of $i = 1, \dots, n, m$ by consumer $h = r, v$. An import matrix has not been constructed for Hawaii and information on imports by commodity is

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