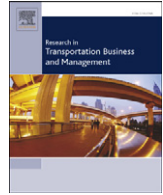




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Economy-wide impacts of reduced wait times at U.S. international airports☆



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ABSTRACT

Passport and customs inspections monitor the cross-border flows of people and goods, and are a “bottleneck” in the international transportation system that can cause significant and costly wait times for many passengers. U.S. passport inspection wait times have been criticized in recent years, and recent studies show that small changes in U.S. inspection wait times could change international travel demand, impact U.S. economic sectors reliant on international travel, and generate further impacts across the economy. This paper estimates economy-wide impacts of reduced passport inspection wait times at four international airports under two scenarios: 1) adding one Customs and Border Protection (CBP) officer to each of the 14 inspection sites and 2) reducing inspection wait times by 50%. We simulate the economy-wide GDP and employment impacts of these international travel-related spending changes using a computable general equilibrium model of the U.S. economy that accounts for price and substitution effects across supply-chain linkages. Adding 14 officers in the four airports is estimated to increase GDP by \$4.5 to \$11.7 million and add 36 to 93 jobs across the economy. A 50% wait time reduction at these four airports is estimated to increase GDP by \$81.5 m to \$260.7 m, and add 651 to 2152 jobs to the U.S. economy.

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1. Introduction

International airports perform an important function in the transportation system and economy of the U.S., allowing people to cross its borders for business, tourism, and family visits. As passengers move between international and domestic transportation modes, passport and customs inspections are employed to monitor the cross-border flows. Passport and customs inspections are a “bottleneck” in the process, such that a combination of demand surges and limited capacity can cause significant delays for many passengers. U.S. passport inspection wait

times have been criticized in recent years. This “wait time” is personally valuable to U.S. and foreign travelers, and can also contribute to missed flight connections, which increase costs to both travelers and airlines. Recent studies have shown that even marginal changes in inspection wait times could cause notable changes in demand for travel to and from the U.S. (Roberts, Rose, et al., 2014). Changes in demand for international travel would significantly impact U.S. economic sectors that rely on international tourism or have international business ties, and generate further impacts up and down the supply chains. Governments worldwide must balance the goals of security, immigration control, and international trade facilitation, within operational capacity and budgetary constraints. Such analysis highlights a growing concern in the international trade community of academics and practitioners for non-tariff barriers, especially the critical role of time and delays (see, e.g., Hummels & Schaur, 2013).

This paper contributes to this discussion by exploring the important economic impacts of changes in air travel wait times at U.S. border crossings. We estimate the economy-wide impact of reduced passport inspection wait times at four international airports¹ (Chicago O’Hare, JFK, LAX, and Miami) under two scenarios: 1) adding one CBP officer

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¹ The airports and terminals chosen for this study are the busiest in the U.S. with regard to international travel. We do not apply scenarios per se, but rather use CBP data on actual experience for the most recent year. We chose to analyze the addition of one CBP staff member during the most congested time period to measure the maximum benefit of alleviating the first discrete increment of this congestion.

Table 1
Economy-wide impact analysis overview.

Modeling element		Increase in foreign visitors to the U.S.	Increase in U.S. residents traveling abroad
Opportunity Cost Measurement		Total estimates of increase in foreign visitors to the U.S. based on opportunity cost estimate model.	Total estimates of increase in U.S. residents traveling abroad based on opportunity cost estimate model.
Expenditure Vector Measurement		Direct economic impacts: Change in spending by foreign visitors, distinguished by business (including government) and non-business (leisure) visitors, on U.S. goods and services while in the country. Change in spending on international air transportation provided by U.S. carriers, also distinguished by business and leisure travel.	Direct economic impacts: Spending by U.S. residents traveling abroad (for both business and leisure travel). This includes the total amount spent while abroad and the spending on international air transportation provided by U.S. airlines. The former is used to calculate the offsetting expenditures domestically.
CGE Modeling	Positive stimulus	Total economic impacts: 1. Increased spending by foreign visitors to the U.S. (Simulation A). <i>Method:</i> Increase in exports – according to the Direct Economic Impact levels estimated for the domestic sectors in which foreign visitors spend.	Total economic impacts: 1. Increased spending by U.S. residents and business travelers on U.S. airlines to travel abroad (Simulation B). <i>Method:</i> Increase in sales to U.S. households and businesses from Air Transport sector.
	Negative stimulus (offset effect)		2. Decreased spending in the U.S. due to increased U.S. resident leisure travel abroad (Simulation B). <i>Method:</i> Reduction in household spending across all sectors. 3. Decreased spending in the U.S. due to increased U.S. business travel abroad (Simulation C). <i>Method:</i> Reduction in business demand – according to Direct Economic Impact levels – for sectors in which business travelers spend

to each of the 14 inspection sites at these four airports; and 2) reducing inspection wait times by 50% at each inspection site. First, we estimate changes in demand for international travel in response to changes in passport inspection wait times. Second, we calculate detailed changes in international traveler spending. Finally, we simulate the economy-wide GDP and employment impacts of these international travel-related spending changes using a computable general equilibrium model of the U.S. economy that accounts for price and substitution effects across supply-chain linkages. We find that the +1 CBP Officer case (adding 14 officers in the four airports) results in an estimated \$4.5 m to \$11.7 m increase in GDP, while creating between 36 and 93 additional jobs for the economy as a whole. Reducing wait times at the 14 inspection sites of these four airports by 50% is estimated to increase GDP by \$81.5 m to \$260.7 m, and add between 651 and 2152 jobs to the U.S. economy.

1.1. Overview of the method

We estimate the macroeconomic impacts of reduced wait times at four major U.S. international airports for two scenarios: 1) reductions in wait times from adding one CBP officer at each international terminal in these airports; 2) a 50% wait time reduction at each terminal. Increases in the number of foreign visitors to the U.S. that would be stimulated by reduced wait times are calculated and summarized below (see Roberts, McGonegal, et al., 2013, for details). Reduced wait times at the four U.S. airports would also benefit returning U.S. residents, who would likely increase travel abroad for leisure and business. We assume that increased U.S. resident expenditures abroad would reduce their expenditures within the U.S. This offsetting effect must be factored in to yield the appropriate net effect.

As outlined in Table 1, we use estimated changes in air passenger volume due to reduced wait times to compute increases in direct expenditures by foreign airline travelers to the U.S., and decreased expenditures for purchases of goods and services in the U.S. due to increased airline travel abroad by U.S. residents. Both sets of expenditure estimates are adjusted to account for only the portion of spending on airline tickets from American carriers. These spending changes are operationalized as four Simulations:

- A. Increased spending by foreign visitors (for both leisure and business travel) in the U.S.;
- B. Decreased spending in the U.S. due to increased U.S. residents' leisure travel abroad;

- C. Decreased spending in the U.S. due to increased U.S. residents' business travel abroad;
- D. Increased spending by U.S. leisure and business travelers on U.S. airlines to travel abroad.

We calculate the indirect and economy-wide effects of the two scenarios (+1 CBP officer and 50% wait time reduction) and four Simulations using a computable general equilibrium model. This model and its regional variants have been used in more than a dozen studies related to national security (see, e.g., Oladosu, Rose, & Lee, 2013; Rose, Avetisyan, & Chatterjee, 2014; Rose, Beeler Asay, Wei, & Leung, 2009; Rose, Oladosu, Lee, & Beeler Asay, 2009; Rose, Oladosu, & Liao, 2007).

2. Reduction in U.S. airport wait times and impacts on value of time saved and travel demand

We estimate the impact of changes to passport inspection wait times if an extra passport inspection officer is added to 14 inspection sites at the 4 major international airports listed in Table 2 (see Roberts, McGonegal, et al., 2013, for details). The analysis assumes that the extra officer is deployed to an 8-hour shift at an inspection site that is the most congested shift of the day, with congestion measured by the total number of passengers that must be inspected. An algebraic methodology was developed and applied to data on actual flight and wait time outcomes in fiscal year (FY) 2012 to quantify how the average wait time changes with the addition of the extra officer.² These changes are summarized in Table 2.

We then quantify the value of time saved for existing travelers in FY 2012 with the addition of an extra officer (Roberts, McGonegal, et al., 2013). This involves the valuation of time for air travelers as suggested by the U.S. Department of Transportation and also includes the differentiation between leisure and business travelers. The value of time saved by a reduction in the time spent in passport inspection is sensitive to an assumption related to baggage delivery time. A traveler arriving at an international airport must first undergo passport inspection and then obtain baggage at a delivery carousel before continuing on the trip. If reducing passport inspection wait time only redistributes time

² See Roberts, McGonegal, et al. (2013) for details on the methodology. Although U.S. residents and foreign residents are processed through separate lines, we cannot analyze change in wait time for the two groups separately, because CBP does not record the number of booths used to process each group separately. The change in wait time presented in Table 2 thus represents an average change across the two groups.

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