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Brandon Dupont
Alka Gandhi
Thomas Weiss

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ABSTRACT

There were substantial fluctuations in the numbers of American overseas travelers, especially before World War II. These fluctuations in travel around the robust, long term upward trend are the focus of this paper. We first identify those fluctuations in the raw data and then try to explain the pattern of overseas travel in a quantitative way. As we show, despite the impact of a myriad of episodic events, the fluctuations in travel can be explained to a large extent by changes in the direct price of travel, changes in per capita GDP in the U.S., the extent of travel in the preceding year, and by periods of armed conflict in Europe. We attempt to explain some of the remaining variation for specific episodes in which the actual level of travel differed substantially from the predicted.

Brandon Dupont
Department of Economics
Western Washington University
Parks Hall 206B
516 High Street
Bellingham, WA 98225
brandon.dupont@wwu.edu

Alka Gandhi
Department of Economics
University of Maryland
College Park, MD 20742
Gandhi@econ.umd.edu

Thomas Weiss
3128 Campfire Ct
Lawrence, KS 66049
and NBER
t-weiss@ku.edu

Despite the fact that international tourism has long been a growing part of the U.S. economy, not much has been written about its economic history. Elsewhere we have described the long term rise in overseas travel and the notable changes in its composition that occurred. [1] Overseas travel by Americans rose at an average annual rate of around 5.0 percent per year from 1820 to 2000, a rate that exceeded the growth of population or GDP by a noticeable amount.[2] Before 1900, overseas travel was clearly and predominantly done by the elite of American society, and largely by men. Over time there was an increase in the number of women who went abroad, rising from 10 percent of travelers in the early 19th century to over half after World War II, and possibly before. Perhaps an even more fundamental change was the increase in middle income travelers. The industry rose from one that catered to the elite of American society in the early 19th century to what some have described unfavorably as mass tourism. And the numbers have continued to swell. As Gregory Clark (2007, p.4) put it recently, "Anyone who has visited the British Museum or the Sistine Chapel, for example, has had a foretaste of the relentless tide of tourism set to be unleashed on the world by another few decades of strong economic growth. Even the high-income demand for unique and individualized travel and dining experiences is now catered to on an industrial scale."

There were also substantial fluctuations in the numbers of travelers, especially before World War II. This should not be too surprising as this is an industry that has been noticeably affected by episodic events, such as war, civil disruption, famines, and natural disasters, as well as by technological advances in transportation, communication, finance and other service

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[1] See Brandon Dupont, Alka Gandhi and Thomas Weiss, "The American Invasion of Europe: The Long Term Rise in Overseas Travel, 1820-2000," NBER, Working Paper No. 13977 for details about the long term rise and the data used in this paper.

[2] Overseas travelers are based on Carter, et al, *Historical Statistics of the United States,* Series Dh319-26. We define travelers here as "Ocean-bound Tourists" prior to 1900, "Arrivals of U.S. Citizens" from 1901-1918 and "Overseas Travelers" from 1919-2000.

industries that cater to travelers. The primary impact of some of these events was to alter the destinations to which Americans traveled, but some had a more general impact on the number of overseas travelers, even if their functional relation to travel is not fully known or well specified. These are not, for the most part, predictable events, and not all of them are readily subject to measurement. Thus it seems unlikely that one hypothesis or model could explain all the fluctuations in travel. Nevertheless, given the importance of tourism in general, its share of the nation's export of services, and its likely greater importance in the future, an attempt to understand these fluctuations in travel is long overdue.

These fluctuations in travel around the robust, long term upward trend are the focus of this paper. We first identify those fluctuations in the raw data and then try to explain the pattern of overseas travel in a quantitative way. As we show, despite the impact of a myriad of episodic events, the fluctuations in travel can be explained to a large extent by changes in the direct price of travel, changes in per capita GDP in the U.S., the extent of travel in the preceding year, and by periods of armed conflict in Europe. Some of the remaining variation can be explained by events specific to individual periods of fluctuation, but some remains as yet unexplained, suggesting the need for further research.

A Chronology of Fluctuations in Overseas Travel

The history of overseas travel by Americans was characterized by numerous fluctuations around a strong upward trend. Most of these fluctuations were part of the more general business cycle variation in the economy, but beyond that there were a number of major downturns and upsurges. These major swings can be seen in both the number of travelers and in the percentage of the population that traveled overseas (Only the latter are shown here in figures 1a, 1b and 1c).

Statistics for the eighteenth and early nineteenth centuries are sparse and incomplete, but a comprehensive series begins in 1820. Those data indicate that prior to World War I there were major downturns in the 1830s, 1840s and 1890s, and serious but briefer downturns in the 1860s, 70s and 80, and a near elimination of travel during World War I.[3] On the upside, there were recoveries to the trend in each of those downturns, and in three instances the upsurges in travel went well beyond mere recovery to the trend.

In the first of the upsurges, the number of travelers in 1850 was nearly triple the average for the preceding five years, and in each of the subsequent five years the number of travelers was nearly triple that 1850 figure. Of course, the number of travelers was small - even with the surge of travelers in the 1850s the numbers rarely went above 30,000 – as was the share of the population that traveled overseas. Still, the magnitude of the increase must have been striking to those traveling and perhaps daunting to those engaged in supplying the travel industry. There was a resumption of travel after the disruption of the Civil War had abated, and for the next 15 years or so the share of the population traveling overseas hovered rather closely around the long term trend, albeit with sharp declines in 1869 and 1877-78. Beginning in 1883, however, there was a more noticeable upsurge. The share of the population traveling abroad nearly doubled between 1881 (0.097 percent) and 1885 (0.18 percent), and remained above the long term time trend until 1889. Overseas travel was curtailed by the crisis of 1893 and struggled to recover during the remainder of the decade, but in the opening decade of the twentieth century the numbers of travelers and the share of population going abroad rose to new heights. The share of the population going abroad on the eve of World War I was nearly double that found at the close

[3] The comprehensive series on overseas travel begins in 1820. See our paper "The American Invasion of Europe: The Long Term Rise in Overseas Travel, 1820-1999," NBER Working Paper, No. 13977.

of the nineteenth century. Even the Panic of 1907 could not slow the increase in travel. The percentages were still relatively small, however, with less than a quarter of a percent of the population traveling overseas, and both the long term and short term increases came to an abrupt halt during World War I. Travel abroad was severely reduced during the War, with the number of travelers falling from nearly a quarter of a million in the years just prior to the War to less than 50 thousand in 1918.

Immediately after World War I traveled resumed rather quickly and the upswing was long-lasting. By 1920 the share of the population traveling overseas reached the levels that had prevailed before the war and remained high despite the downturn in the U.S. economy in 1921. That brief economic crisis appears to have caused only a small blip in the upward movement of overseas travelers as their number continued to rise throughout the 1920s. This upsurge of the twenties was of course reduced severely in the short term by the Great Depression. The demand for foreign travel did not fall initially, as the number of travelers going abroad in 1930 was 4 percent higher than the figure for 1929.[4] Thereafter, however, overseas travel plummeted. The decline in travel was proportionately greater than the decline in GDP or employment, with the number of travelers in 1933 being 56 percent below the peak of 1930 and 58 percent below the 1929 figure. Recovery was slow as well, slower too then the upswing in the economy generally. By 1937 the number of travelers going overseas had risen to only 84 percent of the 1929 figure.[5]

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[4] The Department of Commerce attributed this to a number of things: people expected the downturn to be short-lived and had accumulated savings to draw upon for travel, "and the break from the strenuous boom period of 1929 served to free many people for travel who had previously been too preoccupied." Hal Lary and Associates, 1943, "The United States in the World Economy," Bureau of Foreign and Domestic Commerce, Department of Commerce, Economic Series No. 23. Washington, D.C.: U.S. Government Printing Office, p. 76.

[5] This may have reflected the fact that among the countries that had depreciated the dollar were France and Italy, two of the more popular destinations. Lary and Associates, "The United States in the World Economy," p. 77.

In the following years the number of travelers continued to decline, initially perhaps in response to the recession of 1937, but subsequently because travel to Europe was discouraged by political disturbances and the onset of fighting in World War II. By 1941 when the U.S. entered the War, overseas travel had fallen to around 40 percent of the 1937 figure and was fully two-thirds below the peak travel of 1930. Indeed, a figure as low as the 170 thousand travelers in 1941 can be found only by going as far back as the opening decade of the century. The number of overseas travelers fell even further during the War, reaching a nadir of 57,000 in 1943, a level not seen since the 1880s.

Recovery of travel after World War II was held in check initially by the shortage of shipping capacity - the War had destroyed much of the fleet and the government used much of what remained to bring troops home. – and by government restrictions on who could travel to Europe immediately after the War.[6] Once the restrictions were lifted in early 1947, growth was quite rapid. In the first decade after restrictions were lifted the number of overseas travelers rose by nearly 300 percent and for the entire post-war-period 1946 to 2000 it rose at 8.5 percent per year. During this sustained boom in overseas travel after World War II, fluctuations in travel were less noticeable than those that had taken place in earlier times. Measured by the share of the population traveling overseas, in the last 5 decades of the century there were only four slight downturns in 1961, 1974-75, 1986 and 1991, and in each case recovery was rapid.[7] Travel in the post-war period is characterized most clearly by a strong upward trend.

Factors Influencing Fluctuations in Overseas Travel

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[6] Endy, *Cold War Holidays*, p. 25. In 1937 there had been 91 ships available for civilian travel, but only 14 in 1947.

[7] There was a negligible downturn of 120,000 travelers, about 1.5 percent, in 1981.

While the long term rise in travel can be explained to a large extent by a handful of variables, most notably the growth of population and income, many more variables have influenced the fluctuations. Moreover, it seems that changes in the growth of population and even income could not have played much of a role in explaining the fluctuations -- except of course during the more severe economic downturns, such as the Great Depression -- because both of those variables increased too steadily to generate swings in travel. Other factors that were less important to the long term rise had to have played a larger role in generating the many ups and downs in overseas travel. Only some of these variables, however, are measurable. Fluctuations in the value of the dollar and variations in passenger fares were two influences that are amenable to measurement. Other factors less easily measured include: improvements in the quality of ship travel, improvements in the supply and quality of hotels and restaurants abroad, the publication of guide books, as well as the growth and evolution of the package tour industry, and the myriad of changes that were taking place in travel and tourism within the United States, as well as the occurrence of special events, such as the Columbian Exposition in Chicago in 1893. That is to say, there was variation in the availability and prices of substitute goods and services.[8]

Over the entire period 1820 to 1999, the dollar appreciated against the British Pound at an annual rate of 0.6 percent per year, but almost all of this took place after World War II. Indeed, the Sterling/Dollar rate did not change at all for much of the period before World War I, and its value in 1914 was about the same as in 1820. In the period since 1950, on the other hand, the dollar appreciated at 1.11 percent per year, but did not do so steadily. In the period since World

[8] Most of these factors, as well as others such as increased importance of multinational business travel, and travel by immigrants to visit family, had more of an impact on the long term rise in travel than on the fluctuations.

War I, the French Franc showed a large depreciation from around $20 per franc to $4 shortly after the War, a rally to about $7.00 per franc during the Great Depression, and then a subsequent decline to values of less than $1.00. The large depreciation of the franc did not statistically account for growth in travel over the post World War I period, but those large changes in its value, as well as some of the short term changes in the British Pound from year to year, could have generated some variation in the volume of travel.[9]

Passenger fares too would seem to have been an important determinant of overseas travel. Indeed, since tourism is likely a luxury item, one might expect it to have a rather high demand elasticity. Ocean passenger fares did not decline much before World War I, but there were short-term fluctuations that might have contributed to the ups and downs in travel.[10] After World War II, airline passenger fares declined substantially in real terms, but fluctuated very little, except for an upturn in fares in the 1970s.

Variation in fares, however, does not capture all of the changes in the costs of travel. Ocean liners were improved over time in a variety of ways, and such improvements were not necessarily reflected in the fares.[11] And, for both air and ocean passenger travel, changes in fares did not capture fully the changes in technology that made travel more appealing, and less costly in terms of time. Travel overseas went through several major shifts. Until World War II, people traveled to and from their destinations by sea.[12] World War II marked a turning point in the

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[9] These changes in the value of the franc almost certainly altered the destinations to which travelers went, and perhaps the length of time they remained abroad in France.

[10] See Dupont, Gandhi and Weiss, "The American Invasion"

[11] Emory Johnson and Grover G. Huebner, (1920) *Principles of Ocean Transportation*, New York and London: D. Appleton and Company, p. 337

[12] While the first regular international commercial passenger flights began in 1920 with service between Key West, Fl and Havana, Cuba, transatlantic passenger service did not start until 1939. Civil Aeronautics Board, "Milestones and Landmarks in U.S. Air Transport: 1903-72," *Handbook of Airline*

mode of travel used by travelers, and in the time required to travel. Whereas steam ships took more than 3 days to reach Liverpool from New York in the years after Word War II, the journey by airplane was measured in hours. There were changes as well within the ocean-going and airline eras. In the former, there was a shift from sail to steam shipping, while in the latter there was a change from propeller to jet propulsion. In both cases, there were reductions in the length of time it took to cross the oceans, as well as improvements in the regularity of schedules. But, these technological changes would not seem to have fluctuated; progress went in only one direction. And although technological progress may have been faster at some times than at others, it is unlikely these phenomena had much of an influence on the variation in travel. Nevertheless, in the analysis below we attempt to quantify the impact of these technological forces by looking at the impact of variations in the rate at which shipping tonnage was shifted to steam, by using the steam share of all documented tonnage, and the variations in the improvement in airline speed in the post-World War II era.

The major technological change that affected travel was the shift from ocean liner to air transportation which took place almost entirely in the period between the two world wars. By splitting our overall sample into periods that separately represent travel by ship (from 1852 to 1914) and by air (post-World War Two) we can focus on two periods in which there were little or no effects of this transition from ship to air. We then examine this transitional period separately. This was a period of sharp and unusual movements in income, as well as in travel, and a period in which economic behavior was constrained to a large extent by World War II and its attendant government regulations. As a consequence, and quite surprisingly, there appears to

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Statistics, 1971, pp. 470-501. Some small percentage traveled by zeppelin. See Asif Siddiqi, "The Beginnings of Commercial Transatlantic Services."

be no obvious effect of this dramatic shift in the primary mode of international travel, at least not in a formal statistical sense.[13]

Quantitative Analysis

In our analysis, we attempt to explain the variation in the share of the population that traveled overseas in any year, rather than the absolute number of travelers. In order to identify those fluctuations in travel to be explained, we used deviations in the number of travelers per 1,000 population from its underlying trend over three different periods between 1852 and 2000, and over the long period running from 1820 through 2000.[14] Since our dependent variable is expressed in log terms, it can be interpreted as indicating by what percentage actual travel was either above or below its trend in any given year. For example, the dependent variable has a value of 0.32 in the year 1852, which indicates that the number of overseas travelers in that year (about 1,030 people) was 32 percent higher than the trend value in that year.

For practical reasons having to do with data availability, we have focused on two subperiods representing the ocean travel era from 1852 to 1914 and the air travel era from 1946 to 2000 (See Figures 2 and 3).[15] The intervening period from 1910 to 1950 was treated separately for several reasons. Most noticeably it contained some large and unusual fluctuations

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[13] Our analysis of this period is, however, hampered by the lack of data on passenger fares and some exchange rates.

[14] All models except for the post-1946 model use deviations from a linear trend. While we report the results using a linear model in the Post-WWII period, we focus our discussion on the results using cycles generated from a Hodrick-Prescott (HP) filter. We use this alternative specification because the post-WWII cycle is nonstationary under the linear model, which introduces some distortions into the regression results. The cyclical fluctuations derived from the HP filter are, by contrast, stationary over this period.

[15] While data on some variables are available from 1820, we start at 1852 because we want to include ocean passenger fares, which are not available until that year.

that distort the overall picture of fluctuations in travel over the long-term. During World War II, there were significant increases in per capita GDP, but because of travel restrictions there were large declines in travel to Europe.[16] Also for this subperiod the shift from sea to air travel began, albeit slowly, and we are lacking data on passenger fares for both ocean and air travel. Despite these difficulties, our crude estimating equation for this period, which controls for the effects of World Wars I and II, explains a significant portion of the variation for the period.

The models estimated for the ship era, from 1852 to 1914, express fluctuations in the number of travelers as a function of changes in ocean fares, average ship speed, the steamship share of gross total shipping tonnage, growth in per capita real GDP, the U.S. dollar/British pound exchange rate, a lagged dependent variable, and a dummy variable for the American Civil War.[17] The average values of the variables are shown in Table 1 and the estimated coefficients for our models are reported in Table 2. In summary, these models do a reasonably good job of explaining fluctuations in travel, although the economic variables – price and income - do not account for much of the explanation.

Growth in per capita real income, for example, is positively related to travel fluctuations from 1852 to 1914, but the standard errors on this coefficient are large and the coefficients are not statistically significant in both versions of the model. And, not surprisingly, we find that the direct price of ocean travel as measured by the change in ocean fares is negatively related to the percent deviation of actual travel from trend. The coefficient on change in ocean fares of -0.2 is statistically significant, but would not have an especially large effect. A likely difference in the growth of ocean fares would be on the order of a 0.1 unit change; that is to say a 10 percent

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[16] We find that the effect of GDP per capita is large and negative. See Table 2.

[17] The steam share of gross total shipping tonnage and per capita real GDP both enter the models in first differences because both are I(1) variables.

increase or decrease in fares. Such a decrease in fares would change the dependent variable by only 0.02. In other words, we would expect travel to have been 18 percent above trend rather than 16 percent above trend if ocean fares declined by 10.7 percent rather than 0.7 percent.

While growth in the steamship share of gross tonnage on the Atlantic is positively related to the fluctuations variable, its effect is small and not statistically significant, whereas our other technology variable which measures average ship speed on eastbound crossings is significant at the five percent level although its impact on travel fluctuations is also very small. Neither of these results is very surprising given that year-to-year changes in the steam share of tonnage and in ship speed were small.

The one variable that exerted very large effects on travel fluctuations in the period 1852 to 1914 is the lagged value of the dependent variable. Being above trend last year is a good indicator that travel would be above trend in the current year during that period. The relatively strong persistence of fluctuations in travel coupled with the relatively small effects of income, direct and indirect prices of travel, and exchange rates suggests that whoever was traveling overseas during this period did not respond very strongly to changes in real economic variables. This is consistent with, although not proof of, the anecdotal evidence on who was traveling – almost exclusively the upper class elites who would not be expected to react too strongly to changes in the growth rates of either travel prices or average per capita income levels. This implication is confirmed as well in the transitional period from 1910 to 1950, when the main factor that seems to have affected travel by this group was war in Europe rather than prices or incomes.

The models estimated for the airline era, from 1946-2000, express fluctuations in the number of travelers as a function of a similar set of explanatory variables including changes in

average air fare, a measure of airline carrying capacity (the number of seats, on average), average airspeed, growth in per capita real GDP, exchange rates - both the British pound and French franc - and dummy variables for the Korean and Vietnam conflicts. Our dependent variable in this subperiod is slightly different than that used from 1852-1914 but still measures percent deviations from the underlying trend. The difference lies in how we computed that trend. The cycle measured as deviations from a linear trend failed to reject the null hypothesis of a unit root while the fluctuations variable as constructed from an HP filtering methodology did not. We therefore used the trend from the HP filtering approach in the models for this subperiod.

Changes in airfare exert a modest negative and statistically significant effect on fluctuations in travel in both models. The coefficient on airfare growth is approximately -0.4 in both models. From 1946 to 2000 average airfare declined by about 3.5 percent annually. The estimated coefficient implies that a slightly more aggressive decline in airfare of 5.0 percent (which is less than one standard deviation) would have pushed travel about 2 percentage points higher above trend than actual. Including the two technology variables in the air travel period does not impact the model in any material way. Both the growth in airline capacity and the growth in airspeed have large standard errors and, in fact, reduce slightly the adjusted R-squared value for the model.

The income effects are, however, considerably larger in the airline era as compared to the ocean shipping era. Growth in real per capita income exerts a fairly strong effect on travel in this post-WWII period in all of our models although the standard errors are somewhat high and thus the GDP growth coefficient is only statistically significant in the model that excludes the technology variables. The stronger effects of per capita income changes on travel in the post-World War II period are consistent with the opening up of overseas travel to a wider segment of

the American population; a segment which was probably more sensitive to changes in income and direct travel prices compared to those who made trips to Europe in the 19th century.

The intervening transitional period from 1910 to 1950 is estimated first as a function of only dummy variables for World Wars I and II and the exchange rate. For this period our ability to model the variation is limited because of the absence of data on both ocean passenger and airline fares.[18] Moreover, this period was characterized by the largest swings in travel and income, and the relationship between the two was circumscribed by regulations during war time. As a consequence, the variation does not reflect *prima facie* what we think of as normal economic behavior. As can be seen in Figure 5, the two series behave as we would expect during the 1920s and 1930s, but are negatively correlated during the two world wars.[19]

Thus it is somewhat surprising that the simple model we are able to estimate for this period does a fairly good job of explaining the variations in travel. We find high adjusted R-squared values for this period. This shows the power of War: travel in this period was greatly influenced by both world wars. In one of our models for this period, we include only dummy variables for those wars, the British pound exchange rate and a lagged dependent variable and find that we are still able to explain roughly 80 percent of the fluctuations in travel over this period. In the other version of the model for this transitional period which includes changes in GDP per capita, the fit of the model is improved slightly but the effects of the wars remain large. The GDP growth variable in this model has a large negative impact on fluctuations in travel.[20]

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[18] This time period also contains only 36 observations, somewhat fewer than either of the other two periods.

[19] The correlation coefficient for the entire period is -0.27.

[20] As discussed earlier, in this period the effect of wars distorts the relationship between income and travel; war spending pushed up GDP and GDP per capita, but travel was artificially curtailed. The

Although it seems that the shift from ship to air travel should have had a substantial impact on travel during this transitional period, an examination of the data indicates that this did not happen, or at least can not be measured for this transitional period, because of the constraints imposed by World War II and perhaps by other constraints such as the carrying capacity of airlines. The shift from ship to air was essentially over by 1950, yet in that year the share of the population traveling overseas was about the same as it had been in 1930. Although the war-time regulations on travel were effectively removed in 1947, it seems there must have been some other constraints at work to prevent the full impact of the technological shift in transportation. In any case, the impact of this technological shift would have been primarily to increase the number of travelers and the share of the population traveling overseas, not to cause variation in travel from year to year.

Finally, we estimate a version of the model over the entire period from 1820 to 2000. Because we do not have direct travel prices in the form of ocean or air fares over this entire period we model fluctuations in travel here as a function of growth in real per capita GDP, the Dollar/Sterling exchange rate and dummy variables for wars. We find that World Wars I and II negatively impacted travel in a substantial way while real per capita GDP growth had a negative effect. This latter result is driven by the strong negative correlation between income growth and travel in the 1910-1950 period.

As noted earlier, all of our models include a one-period lagged dependent variable as a regressor.[21] The lagged dependent variable is positive and statistically significant in all of the

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coefficient on GDP per capita in this period is so largely negative that it results in a negative coefficient in the overall sample (the 1820-2000 model) as well.

[21] Given our use of the lagged dependent variable as a regressor, the standard Durbin-Watson statistic for serial correlation in the residuals is invalid we used the F-statistics from a Breusch-Godfrey LM test for

models, which indicates that the fluctuations variable takes some time to adjust. In other words, past period values of the fluctuations variable positively impact current period values. There appears to have been some inertia displayed in travel fluctuations, particularly in the pre-World War I period. While it is not possible to determine the precise reason for this it may be due to travelers persuading others to follow, or possibly repeat visits by some travelers. And, as discussed earlier, perhaps a more homogeneous segment of the population made these trips in the 19th century whereas international travel was open to more diverse segments later on and whose travel plans were more influenced by business cycle fluctuations.

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serial correlation. Based on these F-Statistics, no serial correlation is found in the residuals of any of the models.

Unusually Large Deviations

While the models work reasonably well in explaining travel fluctuations, more so after World War II than before, there are episodes in which they fail to capture the full magnitude of the fluctuations even though they capture the direction of change in most cases. As can be seen in Figures 6 and 7, there were notable incidences in which the models do not do a good job of tracking the fluctuations, especially in the period 1852-1914. In that period the fluctuations in travel were larger than in the post World War II period, and the residual differences between our predicted levels of travel and the actual were more extreme as well.[22] In the post World War II period, the residual differences rarely approached ten percentage points and exceeded ten percent in only one instance (1961 in Model 3). In the period 1852-1914, on the other hand, the residual difference exceeded twenty percentage points in eight years.[23]

These extreme deviations are unexplained by our model for two general reasons. On the one hand, while our models track changes in the direction of travel and capture some of the effect of changes in the explanatory variables, they do not capture fully the impact of unusually large annual changes in those variables. That is, our models do not capture well the impact of fluctuations in income or passenger fares that were substantially larger than the average annual variation in those variables. And, although we include the effect of wars in our model, the impact on travel of a war that is not worldwide in scope, such as the Korean or Vietnam wars, quite likely varied from year to year during wartime.

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[22] The average deviation from trend (in absolute value terms) was 11 percentage points in the 1852-1914 period while it was only 4 percentage points in the 1946-2000 period.

[23] Of course, the volume of travel was rather low at the time. For example, in 1869 the number of overseas travelers totaled 26,705, about 12,000 below the long term trend value. Our model predicted that the number would have been about 2,300 less than the long term trend value

At the same time, there were factors outside our model - such as international exhibitions, political unrest or terrorist incidents - that influenced travel in specific years. It would be difficult to identify all the extraneous factors that provided a short-term impetus or deterrent to travel, but a look at some of the instances in which there were large differences between the actual and predicted levels of travel - those where the residual exceeded 20 percentage points in the period 1852-1914 and 10 percentage points in the post World War II era – sheds light on some of those influences, and perhaps suggest ways in which the explanatory models might be improved.

In the first period, actual travel was more than 20 percent above the predicted level in 1859, 1865 and in all but one year from 1883 to 1887 (Model 2), while it was substantially below the predicted value in 1869 and 1994. The details about the extent to which each of these was above or below trend is summarized in Table 3. We offer the following explanations for these discrepancies.

The large discrepancy in 1859 could be due to the large declines in ocean fares that had taken place in 1858 and 1859. The fares in 1859 were 17.3 percent below those for 1858, the 8th largest annual decline in ocean fares over the period for which we have fare data. And, this decline followed on the heels of a 10 percent decline in the previous year. Our model estimates a negative relation between changes in fares and in travel, but that relationship over the long term was rather small. Thus the coefficient on changes in fares does not gauge well the impact of very large, short-run changes in fares. Fares also declined in 1865, but only by 2.7 percent. Clearly factors outside the model had an impact in both years, perhaps more so in 1865.

Tourist travel may have been boosted in1859, and perhaps in 1865 as well, because immigration fell off after 1857. The substantial decline in immigration left shipping companies

with space to be filled, and although it appears that they did not compete by reducing fares, shipping companies made accommodations more spacious and food more palatable, which made the voyage more attractive even at the same fares.[24] Moreover, for whatever reason, there had been a falloff in overseas travel in the preceding three years from the levels that had prevailed in the opening years of the decade. The surge in 1859 may have been due to a backlog of travelers, or pent-up demand. The increase in 1865 may also reflect pent-up demand due to the American Civil War that ended in April of 1865. And, since documented tonnage of all merchant vessels was down only slightly from its level at the beginning of the Civil War, and immigration was still slightly below its 1857 peak, it seems the pent-up demand for overseas travel could have been accommodated.[25] This result also suggests that travel resumed rather quickly once the War had ended. Our prediction of travel being below trend reflects in part the impact of the dummy variable for war. With the war having ended in April, our dummy variable may give too much weight for the whole year.

Other changes were taking place as well that made international travel easier and somewhat less expensive. Among these were improved services for the traveler, including increased availability of travel guide books in English and an increase in financial services available to Americans abroad, chief among which may have been the circular letter of credit.[26] Until 1859, however, it was still somewhat inconvenient to use these letters of credit because they required the traveler to go to a London office in order to complete the necessary paperwork.

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[24] See Dulles, *Americans Abroad*, pp. 43-54 or 102-09. Perkins, "Tourists and Bankers: Travelers' Checks and the Rise of American Tourism, 1840-1900," *Business and Economic History* VIII (1979) p. 16; and Withey, *Grand Tours*, pp. 171ff.

[25] Carter, et al, *Historical Statistics of the United States*, Series Ad1 for immigration and Df579 and 580 for gross tonnage of documented merchant vessels. Steam tonnage was in fact 20 percent higher, and with faster and more regular service than sail, may have provided a greater potential capacity.

[26] Perkins, "Tourists and Bankers."

In that year, the House of Brown made it possible for those traveling to the continent to obtain their circular credits in New York, but its full impact would not occur until after the American Civil War. It seems that this financial development would not have had much impact in 1859, but may have had an effect in 1865.[27]

Those improvements in the circular letter of credit must have had a greater impact in the 1880s. In the years 1883-87, travel exceeded the predicted levels by a substantial amount, except for 1886. Improvements in the letters of credit may have increased the likelihood of travel for each income level, and by the 1880s, guidebooks were explaining to travelers how the letters of credit worked and advised their use. Moreover, in the late 1870s the issuing banks had eliminated a fee they had previously charged customers, and did not reinstitute it until the 1890s.[28]

A more noticeable change in the travel industry after the Civil War was the emergence and growth of organized tours. In 1867 Thomas Cook organized his first tour from the United States to take travelers to the Paris Exhibition.[29] Cook catered to the middle class both as regards price and time of year, with his tours leaving at the end of June to accommodate summer vacations.[30] These package tours no doubt helped push up the number of Americans going

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[27] The letters of credit issued by the House of Brown, the leading firm in this line of business, amounted to only 6 percent of all tourist expenditures abroad in 1859. By 1868, that figure had risen to approximately 25 percent (Perkins, 1979 "Tourists and Bankers," p. 21). Barings Bros. catered "primarily to VIPs while snubbing the typical tourist." (Perkins, 1979 "Tourists and Bankers," p. 23).

[28] In the 1890s, the American Express Company began issuing traveler's checks and expanded the number of locations and the hours at which these checks could be cashed. The Company began issuing money orders in small denominations in the 1880s and had built a network of offices that would cash them, but this may have been primarily for the domestic market.

[29] Levenstein, *Seductive Journey*, p. 96. Mark Twain's *The Innocents Abroad*, is based on his travel to the exhibition. Foreign travel may have been boosted by the fact that Jews were more welcome in Paris than in U.S. resorts. *Ibid*, p. 144.

[30] Levenstein, *Seductive Journey*, p. 159-60. Withey, *TheGrand Tour*, chap. 6, also claims that in the late 19th century package tours made travel more accessible to middle income Americans

abroad and may very well have attracted travelers from the middle income classes, but its effect seems not to have been very forceful: at the peak in 1885 less than one percent of the population went abroad.[31] Moreover, the impact of this first foray into package tours, if indeed that is what brought about the increase in the early 1880s, was not long lasting. After the initial upsurge, the share of the population traveling overseas declined thereafter and remained below the 1885 figure until the turn of the century.

What might explain why actual travel in 1869 and 1894 was much lower than predicted? In both cases, the declines in travel that lay behind the deviations were the two largest peace-time declines in overseas travel during our sample periods. Indeed, the percentage decline in travel in each of these two years was larger than took place in the Great Depression. Our model captured some decline in travel, predicting levels of travel below the long term trend and substantially so in 1994, but clearly other factors were at work pushing travel down even further.

We can only speculate that the 1869 decline was influenced by financial turmoil associated with the Fisk/Gould scandals of that year.[32] Financial crises, which are not reflected in any of our independent variables such as GDP per person, may have had a greater impact on the upper income classes that made up the bulk of overseas travelers. Likewise, for 1894, we can only suggest that the impact of the depression following the 1893 crisis is simply not fully captured by the changes in real GDP per capita, again because overseas travel was dominated by the wealthy. In that year, an article in the New York Times was predicting that the wealthy

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[31] We are unaware of any time series of the total number of people who may have taken package tours. Correspondence with the archivist at Cook's Archives indicates they have not compiled any such series.

[32] Fisk, Gould and Lane misused stocks and funds of the Erie Railroad, and attempted to manipulate the price of gold in September 1869. They were eventually thwarted in that attempt, but not without a subsequent collapse of the price of gold. See for example, "The Gold Ring," New York Times, Oct. 18, 1869 and "The Erie Ring Crushed at Last," New York Times, Nov. 25, 1869.

would travel overseas because they could not afford to entertain in this country at their summer villas.[33] But, the article also reported that for many the decision to travel abroad depended on their being able to rent their summer cottage. The large decline in overseas travel suggests that many were unable to find tenants.

In the post World War II era, there were only a handful of years – 1951, 1961, 1972, 1979 and 1991 - in which the difference between the actual and predicted travel approached 10 percent, and it exceed 10 percent in only one instance – 1961 – and then only in Model 3. In each case, except 1972, the actual level of travel was less than the predicted.

For 1951, Model 4 predicts travel would have been 7.9 percent above trend, but the actual was slightly below. One could imagine that some of the 8 percent disparity reflects the fact that Europe had not yet fully recovered from World War II.[34] And yet, travel had been increasing smartly since the war's end, and travel in 1951 was up over the preceding year. The increase in 1951, however, was smaller than had occurred in any of the post-war years. While travel rose by 14 percent in 1948, 16 percent in 1949, and 18 percent in 1950, in 1951, it rose by only 1 percent in 1951. And, our model predicted fairly well the level of travel in those earlier post-war years, so it is not clear why recovery problems would materialize only in 1951. It seems the inclusion of a lagged dependent variable in our model is part of the explanation, at least in a statistical sense, for why our 1951 prediction was more optimistic than what materialized. That, of course, still leaves unexplained why travel increased so little in that one year. Our best explanation is that it was due to a deteriorating situation in the Korean War. While we control for that war, the

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[33] "Summer Plans of Society," *New York Times*, April 15, 1894.

[34] Although reconstruction was well underway in most countries by 1950, food rationing in Britain did not end until 1954 when restrictions on meat were removed. We thank Bertram M. Gordon for bringing this to our attention.

average impact of such a dummy variable cannot account for the shifting fortunes within the war. In late 1950, China had entered the war, enemy forces had driven U.N. forces out of North Korea, and in early 1951 captured Seoul. This low point in the war from the perspective of the U.N. forces, and perhaps the American public, could have deterred travel more than war would do on average. The Anglo-Iranian oil dispute contributed as well.[35] When those international problems seemed settled, or at least less threatening, travel picked up in the last half of the year, but nevertheless the total for the year was well below that for the preceding year.[36]

Our Model 4 predicted that travel in 1961 would be below trend by 4.2 percent, but the actual level fell off even more, ending up 13.3 percent below trend. Those in the travel industry were puzzled by the decline, and there was "no general agreement on the importance of political and economic factors."[37] Our model takes the economic factors into account, and they would appear to account for about one-third of the decline. The remainder of the reduced travel was most likely a reaction to the escalation of cold war tensions, and in particular the erection of the Berlin Wall in August.[38]

The discrepancy in 1979 amounted to 8.2 percent; our predicted value was 3.6 above trend while the actual was 4.6 percent below. That year witnessed a rash of IRA bombings: the British consulate in Antwerp was bombed on July 6, Lord Mountbatten was killed by a bomb on August 27, and a bomb exploded near the Grand Place in Brussels on August 28. Travelers in the latter part of the year would have been deterred by the Iran hostage crisis which gripped the

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[35] "Shipping Lines Hit By World Unrest," *New York Times*, Aug., 19, 1951.

[36] Paul Kennedy, "Travel to Europe Gains," *New York Times*, Mar 16, 1952.

[37] Milton Bracker, "American Travel to Europe Drops," *New York Times*, July 2, 1961.

[38] Sydney Gruson, "West Puts Tanks and 1,000 Troops on Berlin Border, *New York Times*, Aug. 24, 1961 and "Notes from the Field of Travel," *New York Times*, Sept.3, 1961.

nation's attention in November, and may have been deterred from traveling to Asia by the assassination of the President of South Korea in October.

For 1991 our Model 4 predicts travel would be 1.1 percent above trend while the actual level was 8.3 percent below. It may be that the 1991 recession was more severe than the average business cycle downturn, so while our income variable captures some of that recession's effect, it does not capture all of it. At the same time, the Persian Gulf War had some impact on travel overseas, and we have not controlled for this conflict.[39] Our underestimation of the decline in travel in 1991 reflects in part the inclusion of the lagged dependent variable and the fact that travel in 1990 was well above the preceding few years.

Finally, for 1972 our predicted level of travel was 9.1 percent above trend, whereas the actual was 17.8 percent above. It seems inherently more difficult to identify events or factors outside our model that would spur travel to greater heights. One such event is the Olympics, and 1972 was an Olympic year. Although the Munich Olympics turned tragic, travelers would already have made the trip overseas. But, it is not clear that this could explain much of the above-average amount of travel, and such a positive impact is not obvious in other Olympic years. Another contributing factor may have been the signing of the Anti-ballistic Missile Treaty by the U.S. and the USSR in May. More likely, travel may get a boost when the situation around the world has simply calmed down. Not that 1972 was a calm year, with the Vietnam War unraveling and a political campaign underway. Nevertheless, the absence of negative news may have a greater impact than we might imagine.

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[39] Barry James, "Gulf War and Recession Leave Tourism Down but Not Out," *International Herald Tribune*, August 2, 1991.

It is also possible that some chicanery involved with charter fares boosted travel in 1972. Charter fares were supposed to have been available only to groups with some defined affinity. But in 1972, regularly scheduled airlines sold such fares through travel agents, allowing the agents to make up a group. In August, The Civil Aeronautics Board surveyed flights leaving Kennedy Airport for Europe and discovered among other things that "33.6 percent of the passengers on 17 Trans World Airlines international flights were flying at below legal rates."[40] If recorded properly, these discounts should be captured in our measure of airline fares, but it is possible some of the discounts were not recorded properly. Moreover, it is possible that passengers did not pay the fully discounted fares offered to travel agents by the airlines. Industry sources claim that passengers paid the legal fares while travel agents and tour operators pocketed the discounts.[41]

Conclusions

We have attempted to give international travel and tourism some of the attention it deserves due to its importance in the nation's trade balance, and its likely greater importance in the future. Overseas travel by Americans has been affected by a host of forces, including major disasters and wars, the business cycle, changes in exchange rates and passenger fares, changes in the price, quality and availability of substitute travel services in the domestic market, improvements in the supply and quality of hotels and restaurants abroad, and the proliferation of package tours. We have shown that despite this myriad of influences, many of the fluctuations in overseas travel by Americans that occurred since 1820 can be explained by a few variables that

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[40] Robert Lindsey, "Inquiry at Kennedy Finds 1 in 8 Flies to Europe on Illegal Fares," *New York Times*, Nov. 10, 1972.

[41] *Ibid.*

can be measured, and for which we have adequate time series data, namely war, changes in passenger fares and GDP per capita, as well as the previous year's overseas travel. War appears to have been a particularly strong influence, especially World Wars I and II. In both instances, war reduced overseas travel to a trickle compared to what it had been. Indeed, war had such a strong impact that for the period 1910 to 1950, the fluctuations in overseas travel are largely explained by these wars, offsetting the perverse effect of the income changes that occurred during the same period.

Our models, however, do not explain all of the variation in overseas travel. In both the era of ocean travel, 1852-1914, and of air travel, 1946-2000, our model explains less than 50 percent of the variation (adjusted R-squares were 0.50 and 0.43, respectively). While we have suggested here that this could be related to the relatively homogeneous, and privileged segment of the population that traveled abroad prior to the First World War, this remains conjectural at this point. Given the importance of travel in the balance of trade, and its greater importance in the future, it seems clear that further research is called for. On the one hand, additional time series data on passenger fares are needed in order to be able to produce better estimates over the long term since 1820, using our model. Beyond that we need to devise imaginative ways of measuring some of the likely determinants that are not easily quantified, such as the psychological impact of bad news, and expand the explanatory model to include these sorts of variables.

Figure 1a
Number of Americans Returning as a Percent of the U.S. Population, 1820-1919

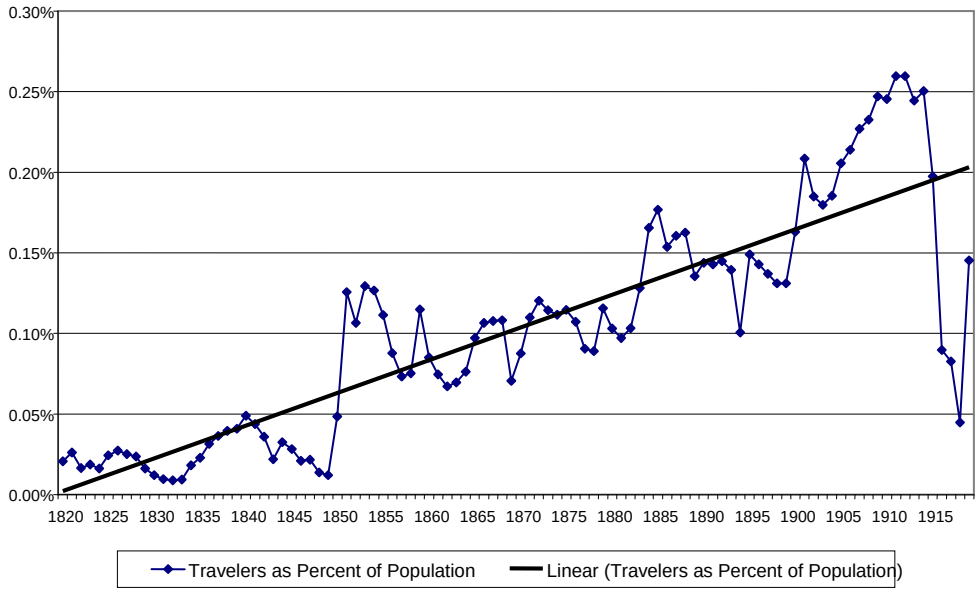


Figure 1b
American Overseas Travelers as Percent of U.S. Population, 1919 to 1950

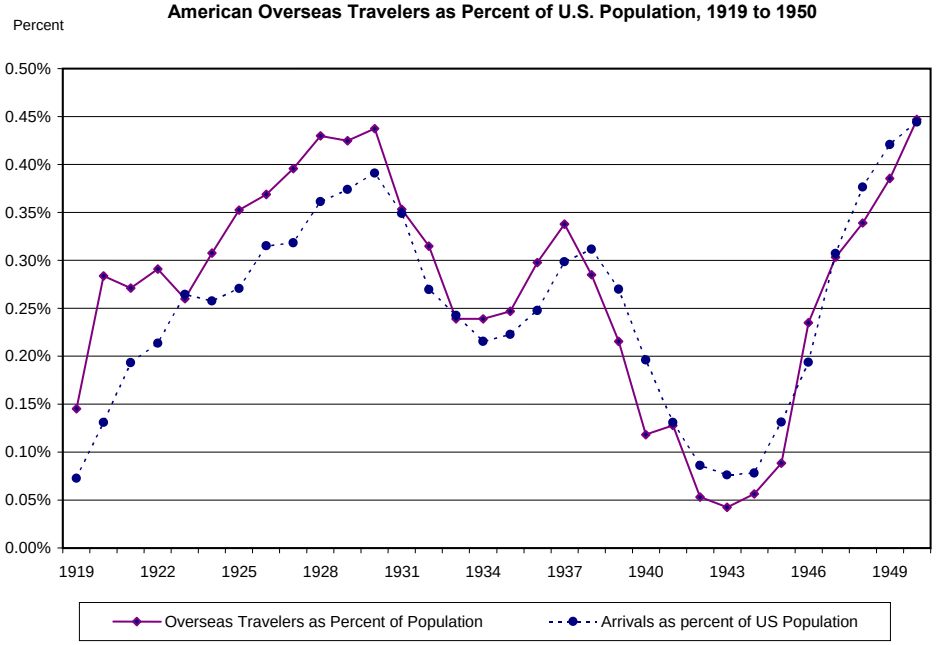
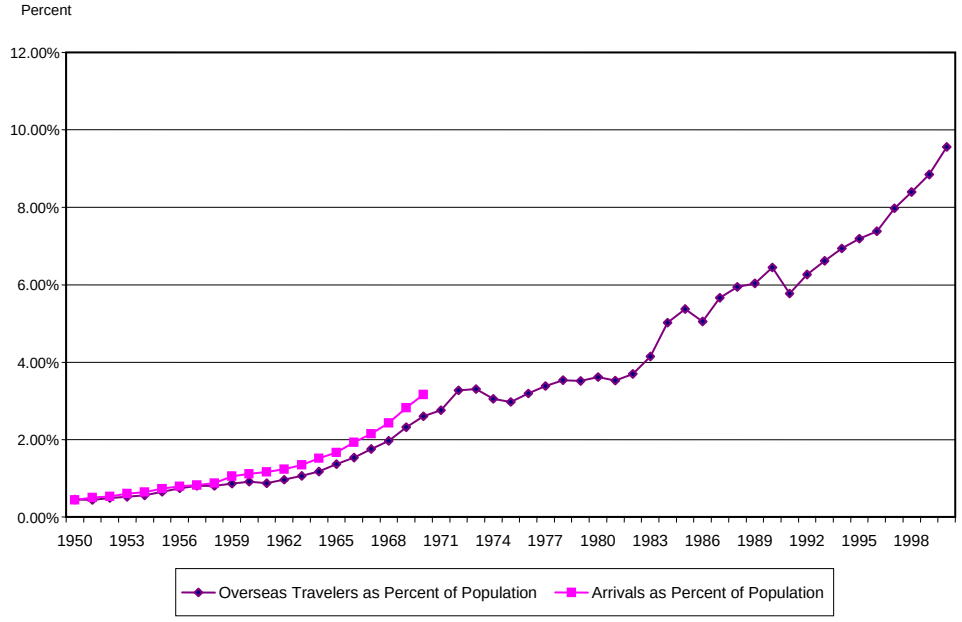


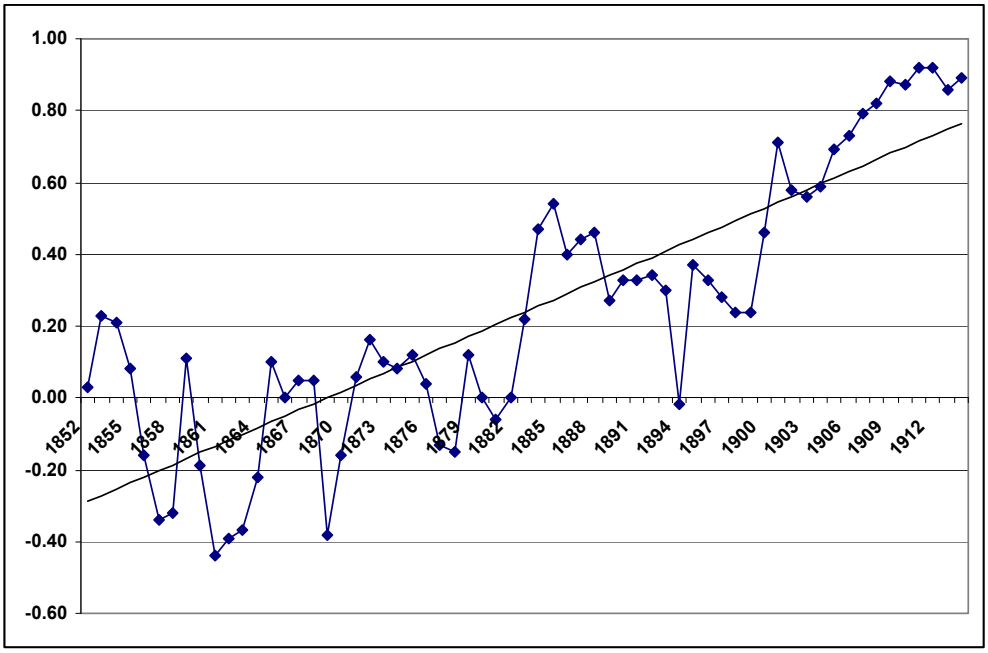
Figure 1c
American Overseas Travelers as Percent of U.S. Population, 1950 to 2000



Notes and Sources for Figures 1A, 1B and 1C

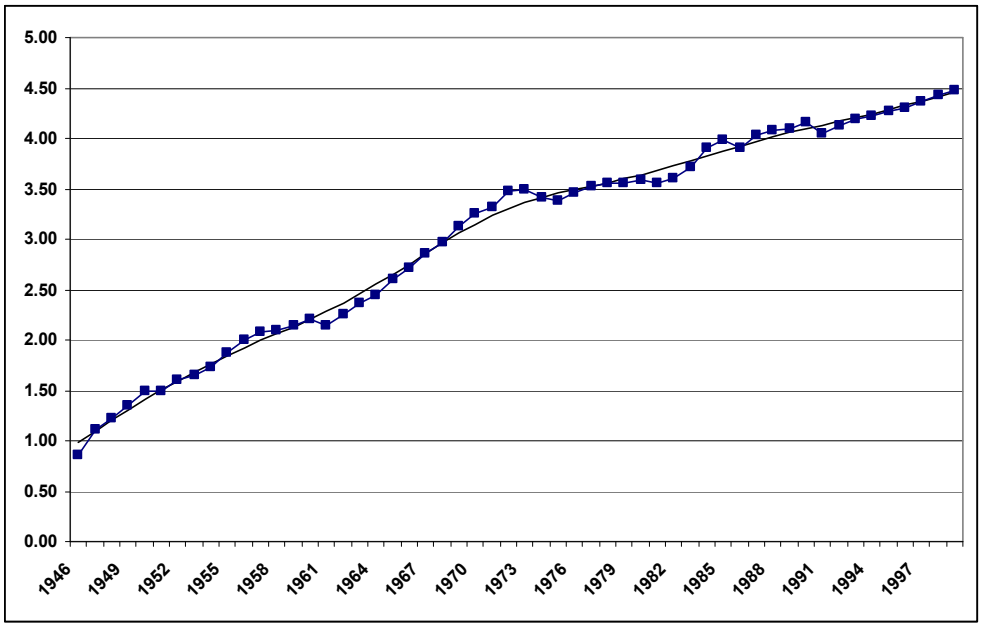
Sources: For travelers, Brandon Dupont, Alka Gandhi and Thomas Weiss, "The American Invasion of Europe: The Long Term Rise in Overseas Travel, 1820-1999," Appendix Table 1. For population, the figures for 1820 to 1929 are from Historical Statistics, 1975, Series A7: Total Resident Population (and included armed forces residing in the U.S.). The figures for 1930 to 2001 are for the Civilian Resident Population, and exclude the armed forces at home and abroad. (Historical Statistics, 1975, Series A8 and Stat. Abs., 2003, Table 2).

Figure 2: Linear Trend and Fluctuations in LN(Travelers) per 1,000 Population, 1852-1914



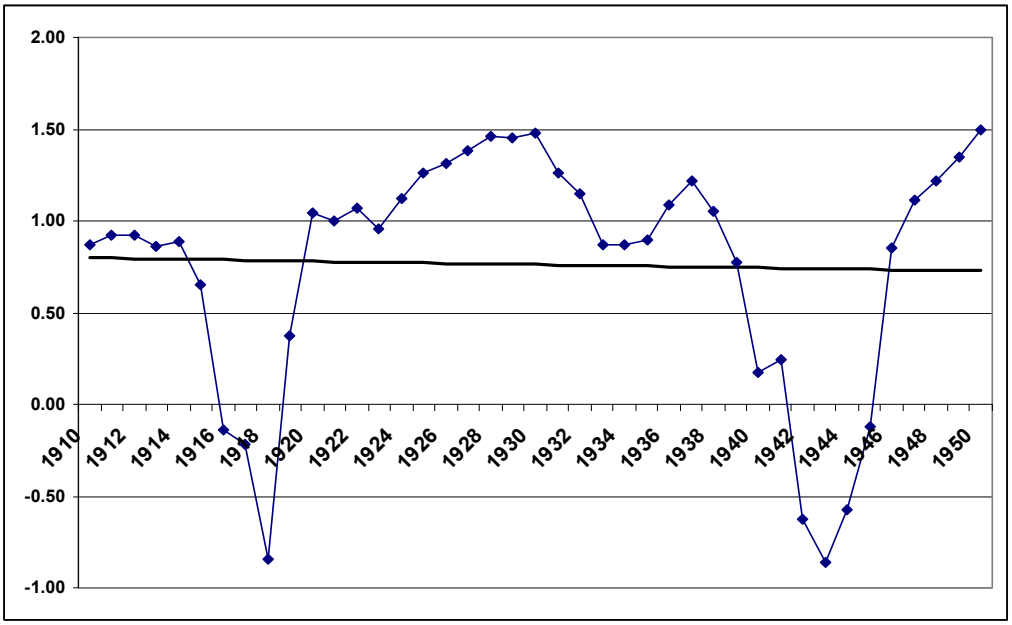
Sources: See Figure 1 and text

Figure 3: HP Trend and Fluctuations in LN(Travelers) per 1,000 Population, 1946-2000



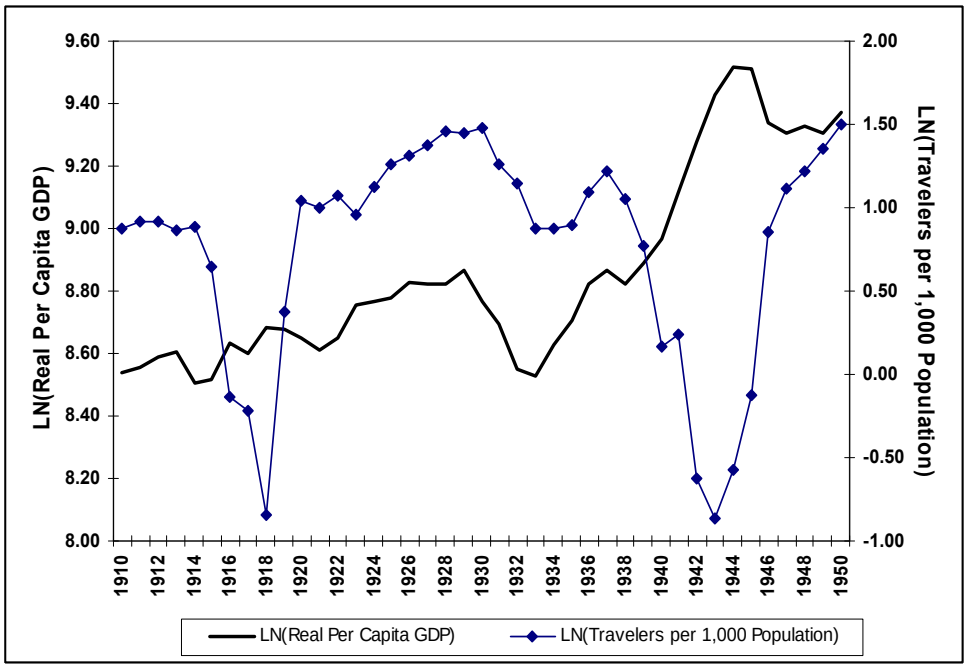
Sources: See Figure 1 and text

Figure 4: Linear Trend and Fluctuations in LN(Travelers) per 1,000 Population, 1910-1950



Sources: See Figure 1 and text

Figure 5: Per Capita Real GDP and Travel During the Transitional Period, 1910-1950



Sources: See Figure 1, Table 1 and text

Figure 6A – Comparison of Actual and Fitted Data, Model 1: 1852-1914

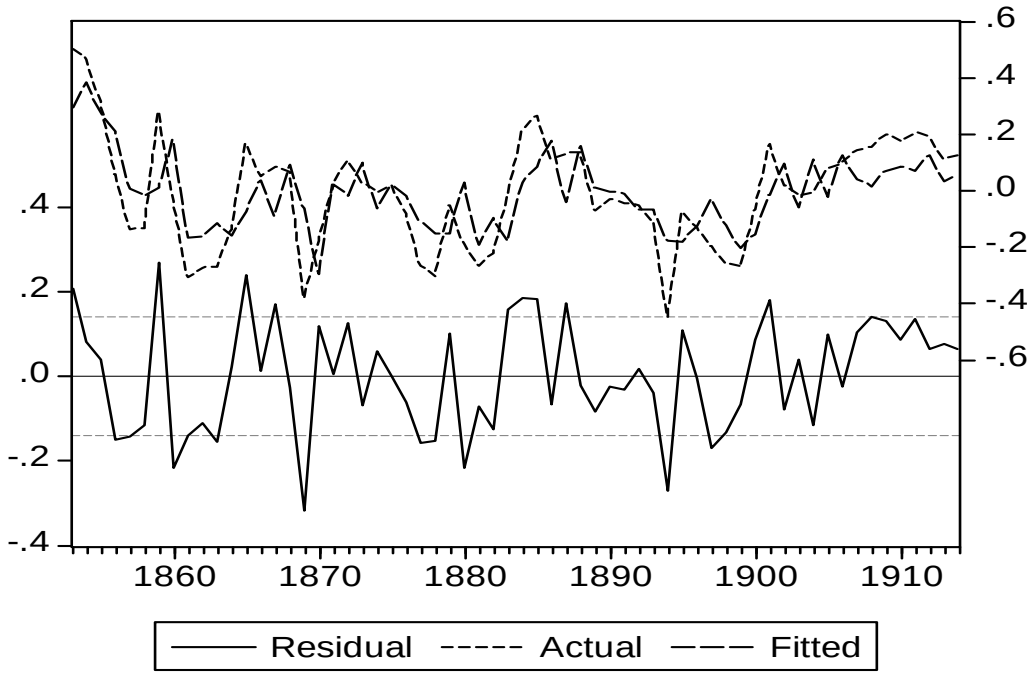


Figure 6B - Comparison of Actual and Fitted Data, Model 2: 1852-1914

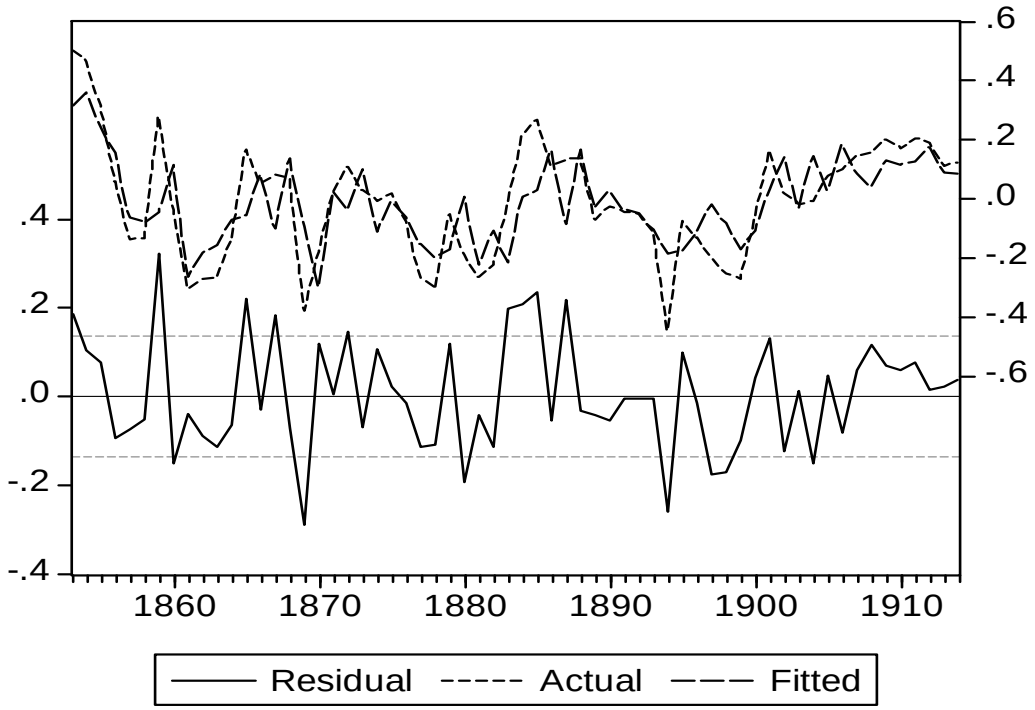


Figure 7A - Comparison of Actual and Fitted Data, Model 3: 1946-2000

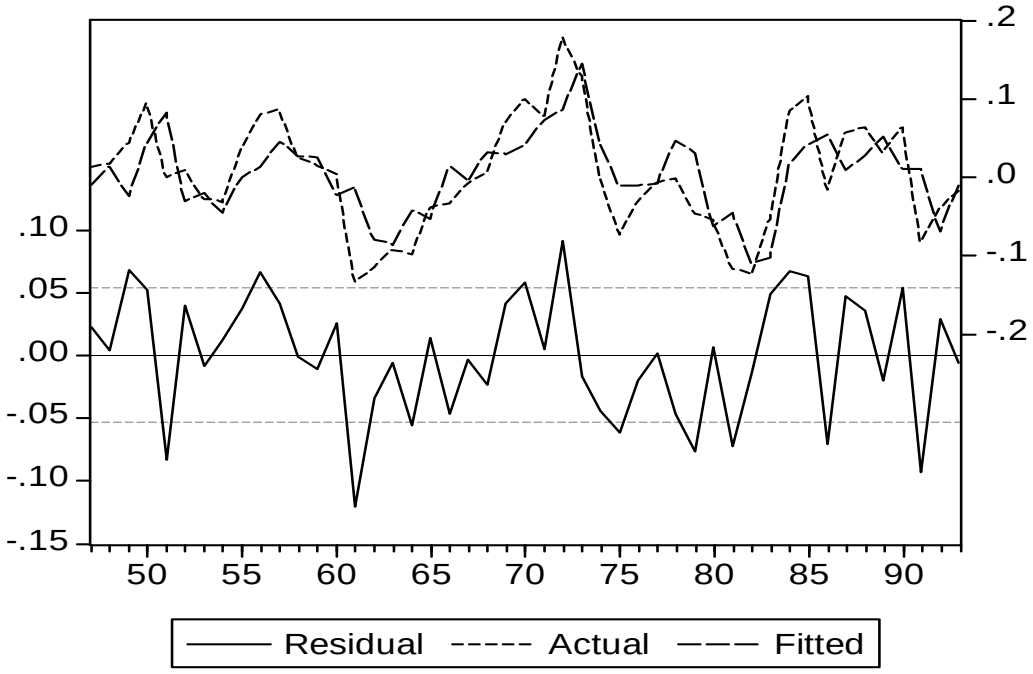


Figure 7B – Comparison of Actual and Fitted Data, Model 4: 1946-2000

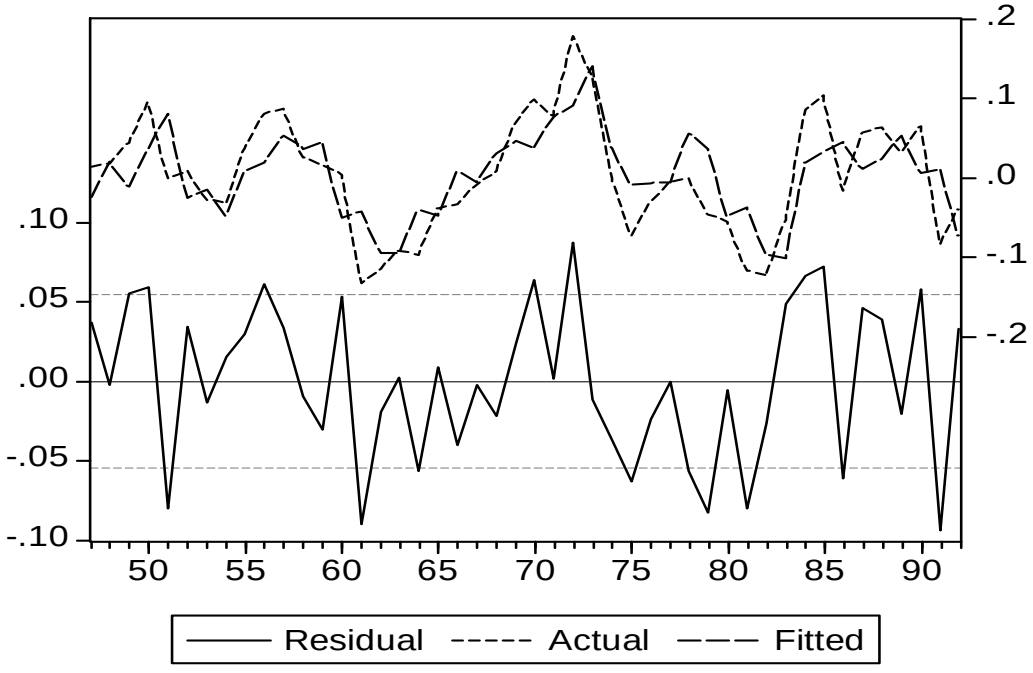


Table 1: Summary Statistics

	1852-1914		1946-2000		1910-1950		1820-1999	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
ΔLN(Travelers per 1,000 population)	0.01	0.16	0.09	0.14	0.02	0.38	0.03	0.27
LN(Travelers per 1,000 population)	0.24	0.37	3.04	1.04	0.76	0.66	0.85	1.75
Travelers per 1,000 population	1.36	0.52	31.84	25.09	2.52	1.16	10.49	19.59
ΔLN(Ocean Fares)	-0.01	0.22						
LN(Ocean Fares)	7.13	0.25						
Ocean Fares	1,285.23	326.35						
ΔLN(Air Fare)			-0.04	0.05				
LN(Air Fare)			6.96	0.47				
Air Fare			1,179.60	586.02				
ΔLN(Airline Capacity)			0.04	0.07				
LN(Airline Capacity)			4.81	0.62				
Airline Capacity			143.60	70.34				
ΔLN(Ship Speed)	0.01	0.02						
LN(Ship Speed)	2.90	0.24						
Ship Speed	18.62	4.44						
ΔLN(Steamship Share of Shipping)	0.03	0.09						
LN(Steamship Share of Shipping)	3.58	0.56						
Steamship Share of Shipping	41.39	20.19						
ΔLN(Air Speed)			0.02	0.04				
LN(Air Speed)			5.93	0.35				
Air Speed			398.94	118.01				
ΔLN(Per Capita Real GDP)	0.01	0.05	0.02	0.04	0.02	0.08		
LN(Per Capita Real GDP)	8.16	0.32	9.86	0.34	8.86	0.31		
Per Capita Real GDP	3,665.19	1,160.84	20,305.31	6,727.59	7,393.46	2,571.08		
LN(Exchange Rate, $/£)	-1.63	0.14			-1.47	0.12	-1.34	0.41
Exchange Rate, $/£	0.20	0.02			0.23	0.03	0.29	0.14
LN(Exchange Rate, $/ff)			1.55	0.36				
Exchange Rate, $/ff			4.95	1.44				

Notes and Sources for Table 1:

Travelers per 1,000 population: Brandon Dupont, Alka Gandhi and Thomas Weiss, "The American Invasion of Europe: The Long Term Rise in Overseas Travel, 1820-1999," Appendix Table 1. For population, the figures for 1820 to 1929 are from Historical Statistics, 1975, Series A7: Total Resident Population (and included armed forces residing in the U.S.). The figures for 1930 to 2001 are for the Civilian Resident Population, and exclude the armed forces at home and abroad. (Historical Statistics, 1975, Series A8 and Stat. Abs., 2003, Table 2).

Ocean Fares: Expressed in 2000 dollars. First-class ocean fares for passengers who embarked at New York and disembarked at Liverpool or Glasgow. Fares were drawn from advertised fares from a number of different shipping lines. In cases where more than one first-class fare was advertised, the fares were averaged.

Air Fares: Implied by the Average Passenger Revenue per Passenger Mile for a roundtrip between New York and London. Susan Carter, et al, *Historical Statistics of the United States,* Series Df1129.

Airline Capacity: *Historical Statistics of the United States,* Table Df1137: Average available seats on scheduled international air travel.

Ship Speed: Average speed on best record eastbound ocean crossing, URL: http://www.greatoceanliners.net/index2.html

Steamship Share of Shipping: Calculated from *Historical Statistics of the United States,* Total gross tonnage for documented steam powered merchant vessels (Series Df581) as a percentage of combined gross tonnage for documented steam and sail powered merchant vessels (Series Df581 + Series Df586).

Air Speed: *Historical Statistics of the United States,* Table Df1126-1138: Scheduled international air transportation-aircraft, passengers, cargo, mileage flown, and other characteristics: 1927-1996.

Real GDP per capita: Expressed in 2000 dollars. Louis D. Johnston and Samuel H. Williamson, "The Annual Real and Nominal GDP for the United States, 1790 - Present." Economic History Services, October 2005, URL: http://www.eh.net/hmit/gdp/

Dollar Pound Exchange Rate: Lawrence H. Officer, "Exchange rate between the United States dollar and the British pound, 1791-2004." Economic History Services, EH.Net, 2004. URL: http://www.eh.net/hmit/exchangerates/pound.php.

Dollar/French Franc Exchange: Data for the French Franc/Dollar exchange rate are those in "consistent currency units" from Susan Carter, et al, *Historical Statistics of the United States,* Cambridge University Press, Vol. 5, Series Ee665.

Table 2: Regression Results (Dependent variable = Travel Fluctuations)

	1852-1914		1946-2000		1910-1950		1820-2000	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	-0.051	-0.577*	0.123	0.108	0.405	0.054	0.202**	0.206**
	(0.172)	(0.325)	(0.111)	(0.120)	(0.598)	(0.539)	(0.097)	(0.095)
Dependent Variable, t-1	0.824***	0.859***	0.661***	0.630***	0.524***	0.553***	0.743***	0.756***
	(0.097)	(0.084)	(0.123)	(0.129)	(0.100)	(0.089)	(0.055)	(0.054)
(ln(Ocean Fares))	-0.227***	-0.234***						
	(0.079)	(0.073)						
(ln(Air Fares))			-0.360*	-0.409*				
			(0.207)	(0.216)				
ln(Airline Capacity)				0.066				
				(0.128)				
ln(Ship Speed)		0.111**						
		(0.052)						
(ln(Steam Share of Shipping))		0.080						
		(0.182)						
(ln(Air Speed))				-0.326				
				(0.280)				
(ln(Per Capita GDP))	0.278	0.597	0.672*	0.583		-2.032***		-0.726*
	(0.475)	(0.378)	(0.360)	(0.376)		(0.612)		(0.417)
ln(Exchange Rate ($/£))	-0.027	-0.148	0.057	0.036	0.146	-0.100	0.130*	0.123*
	(0.107)	(0.130)	(0.050)	(0.062)	(0.408)	(0.368)	(0.068)	(0.067)
ln(Exchange Rate ($/ff))			-0.065	-0.062				
			(0.049)	(0.052)				
Civil War	-0.050	-0.038					0.153	0.156
	(0.063)	(0.058)					(0.142)	(0.140)
World War I					-0.697***	-0.686***	-0.572***	-0.568***
					(0.161)	(0.142)	(0.140)	(0.137)
World War II					-0.770***	-0.506***	-0.566***	-0.474***
					(0.194)	(0.190)	(0.161)	(0.166)
Korean War			-0.041	-0.045			-0.151	-0.118
			(0.034)	(0.035)			(0.153)	(0.151)
Vietnam War			0.023	0.017			0.056	0.053
			(0.022)	(0.024)			(0.106)	(0.103)
R-squared	0.546	0.583	0.517	0.535	0.822	0.865	0.877	0.882
Adj. R-squared	0.496	0.521	0.430	0.419	0.801	0.845	0.872	0.876
F-Statistic	11.005	9.277	5.965	4.610	40.345	43.501	151.073	138.698
Prob(F-Stat)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes to Table 2:

The War dummy variable takes on a value of 1 in the years 1861-64 (The American Civil War), 1914-18 (World War I), 1939-45 (World War II), 1950-1953 (the Korean War) and 1964-1975 (the Vietnam War beginning with the Gulf of Tonkin). All other variables are defined in the notes to Table 1.

Statistically significant at the *10%, **5% and ***1% levels

Table 3:

Unusually Large Deviations in Travel
Percentage points above/below trend in predicted and actual values of Travelers per 1,000 Population

	Predicted	Actual
1859	28 percent above	4 percent below
1865	16.7 percent above	5 percent below
1869	9 percent below	38 percent below
1883	21 precent below	2 percent below
1884	1 percent above	21 percent above
1885	3 percent above	27 percent above
1887	8.5 percent below	13 percent above
1894	18.5 percent below	44 percent below
1951	8 percent above	<1 percent below
1961	4 percent below	13 percent below
1972	9 percent above	18 percent above
1979	3.6 percent above	4.6 percent below
1991	1.1 percent above	8.3 percent below

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