**1 Decile Regressions**

Text in the published paper:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total FDI for year *t* is regressed on the **total number** of passengers flying into a country year *t-1* (transformed by ln (1 + number) due to the magnitude of passengers) and split into 10 deciles to investigate the effects at different passenger levels and, in effect, country size and level of economic development. This is our simplest regression, and the reopening coefficient was significant at all deciles except for the first (Table 1, Model 1), showing that with the base relationship, the relationship between passengers flying into a country on US carriers and FDI in that country grows stronger as there are more passengers flying in. While not causal, and likely driven by higher GDP for the higher-tau observations, that FDI increases with the passenger numbers associated with airport reopening is suggestive that the effect is likely to be more important in relatively large, developed economies.  Total FDI (Y) is next regressed on the **percentage change** in passengers flying into the country (X, transformed by ln (X+1) due to the magnitude of many changes), again binned by decile to investigate the effects at different X levels. Significant but negative changes were observed for the high 70-90% of the X variable (Table 1, Model 2), but not much can be said until factors like battle fatalities (drawn from ACLED data from that same year and country) and real GDP (drawn from World Bank development indicators) are controlled. We do this next, finding that the significance disappears for the percentage increase in passengers coefficients, apart from the 50-60% decile (Table 1, Model 3). However, even this is unexciting since this decile captures an arbitrary segment of observations where there is a 0% increase in passengers, since the 0% increases span multiple deciles. The insignificant and inconsistent results do not provide much helpful insight, and must be deeply impacted by unobservables. Therefore, we turn to country fixed effects.  **Table 1**  **Decile OLS regressions of total FDI on quantity or percentage increase of passengers flying into a country on US Carriers, controlled by battle fatalities and GDP**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | tau | X1 = ln\_pass | coefficients1 | X1 = ln\_passengers\_pct | coefficients2 | coefficients3 (controlling for battle fatalities and real GDP) | | 0.1 | Intercept | 16.73\*\*\* | Intercept | 17.3\*\*\* | -5.669\*\*\* | | 0.1 | Coefficient | 0.1184\*\*\* | Coefficient | -0.0001517 | -0.0003817 | | 0.2 | Intercept | 17.76\*\*\* | Intercept | 18.48\*\*\* | -4.056\*\*\* | | 0.2 | Coefficient | 0.1377\*\*\* | Coefficient | 0.0005627 | -0.0002326 | | 0.3 | Intercept | 18.52\*\*\* | Intercept | 19.32\*\*\* | -3.333\*\*\* | | 0.3 | Coefficient | 0.145\*\*\* | Coefficient | 0.0002096 | 0.0002882 | | 0.4 | Intercept | 19.11\*\*\* | Intercept | 19.91\*\*\* | -2.774\*\*\* | | 0.4 | Coefficient | 0.1535\*\*\* | Coefficient | 0.0002852 | 0.0003522 | | 0.5 | Intercept | 19.61\*\*\* | Intercept | 20.47\*\*\* | -1.979\*\*\* | | 0.5 | Coefficient | 0.1785\*\*\* | Coefficient | -2.466e-05 | 0.0002172 | | 0.6 | Intercept | 19.96\*\*\* | Intercept | 21.05\*\*\* | -1.344\*\*\* | | 0.6 | Coefficient | 0.2031\*\*\* | Coefficient | -1.647e-05 | 0.0003315\* | | 0.7 | Intercept | 20.41\*\*\* | Intercept | 21.72\*\*\* | -0.8454\*\*\* | | 0.7 | Coefficient | 0.2116\*\*\* | Coefficient | -0.0001547 | 0.0001971 | | 0.8 | Intercept | 20.93\*\*\* | Intercept | 22.69\*\*\* | -0.257 | | 0.8 | Coefficient | 0.216\*\*\* | Coefficient | -0.0007065\*\* | 3.038e-05 | | 0.9 | Intercept | 21.53\*\*\* | Intercept | 23.87\*\*\* | -0.2281 | | 0.9 | Coefficient | 0.2216\*\*\* | Coefficient | -0.0009211\*\* | -3.828e-05 | | 1 | Intercept | 25.7\*\*\* | Intercept | 27.33\*\*\* | 15.94\*\*\* | | 1 | Coefficient | 0.1106 | Coefficient | -0.002846 | -0.002022 | | \* Note the grayed out cells, where the deciles correspond with 0 values that span multiple deciles, compromising our inference from these statistics as they are drawn from arbitrary subsets.   1. Log+1 total FDI on log+1 total passengers flying into the country on US carriers. 2. Log+1 total FDI on percent change in passengers flying into the country on US carriers. 3. Log+1 total FDI on percent change of passengers flying into the country on US carriers, controlled by real GDP and log+1 battle fatalities. | | | | | |   All the former regressions are run again, but with country fixed effects which allows us to study trends only within the country itself, removing many unobservable confounding effects. For the first regression, we see amazingly that the coefficient is positive and significant on logged total passengers for the 30-80% deciles, slowly decreasing with greater quantities of total passengers (Table 2, Model 1). This suggests that as total passengers increase from 0, there are positive impacts on FDI, even when controlling for a country’s unique circumstances with fixed effects. For the final decile, at the extremely high levels of total passengers, the sign flips to negative, suggesting that FDI decreases as passengers increase under these extreme conditions. When regressing on percent change in passengers flying into the country instead of levels, the positive coefficients are maintained for both the 20-30% decile (where passengers are flying into the country less than in the previous year, there is an associated decrease in FDI), and the 70-90% deciles (where passengers are increasing, there is an increase in FDI). We also view the same extreme effect of the 90-100% decile exhibiting a significant negative coefficient. Once controlling for logged battle fatalities and real GDP, the coefficient becomes less stable, though overall aligns with the positive and significant effects at the 10-20% and 60-70% deciles, while the sign is negative for the 70-80% and 90-100% deciles.  **Table 2**  **Decile OLS regressions of total FDI on quantity or percentage increase of passengers flying into a country on US Carriers with country fixed effects, controlled by battle fatalities and GDP**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | tau | X1 = ln\_pass | coefficients1 | X1 = ln\_passengers\_pct | coefficients2 | coefficients3 (controlling for battle fatalities and real GDP) | | 0.1 | Intercept | 17.29\*\*\* | Intercept | 17.59\*\*\* | -44.65\*\*\* | | 0.1 | Coefficient | 0.04103. | Coefficient | 0.0001334 | 0.0001585 | | 0.2 | Intercept | 1.71\*\*\* | Intercept | 1.192\*\*\* | -0.04635\* | | 0.2 | Coefficient | 2.986\*\*\* | Coefficient | 2.687\*\*\* | 2.492\*\*\* | | 0.3 | Intercept | 3.024\*\*\* | Intercept | 2.877\*\*\* | 4.328\*\*\* | | 0.3 | Coefficient | 0.2275 | Coefficient | 0.4055 | -1.268\*\* | | 0.4 | Intercept | 3.677\*\*\* | Intercept | 3.905\*\*\* | 1.438\*\* | | 0.4 | Coefficient | 1.079\*\* | Coefficient | 0.8366\* | 9.489\*\*\* | | 0.5 | Intercept | -0.7087 | Intercept | -0.4543 | -1.876\*\*\* | | 0.5 | Coefficient | 5.255\*\*\* | Coefficient | 5.511\*\*\* | 3.313\*\*\* | | 0.6 | Intercept | 2.142. | Intercept | 2.338. | 6.792\*\*\* | | 0.6 | Coefficient | 3.384\*\*\* | Coefficient | 2.938\*\* | -0.3849 | | 0.7 | Intercept | 0.3096 | Intercept | 0.4025 | -2.293. | | 0.7 | Coefficient | 1.732\* | Coefficient | 0.5916 | 1.9\*\*\* | | 0.8 | Intercept | 0.5476 | Intercept | 0.7441. | 0.5529 | | 0.8 | Coefficient | 1.305\*\* | Coefficient | 1.006\* | -2.401\*\* | | 0.9 | Intercept | 5.821\*\*\* | Intercept | 6.041\*\*\* | 7.602\*\*\* | | 0.9 | Coefficient | -0.5722 | Coefficient | -0.3862 | 0.3356 | | 1 | Intercept | -0.6547 | Intercept | -0.9533 | 1.389\* | | 1 | Coefficient | -2.307\*\* | Coefficient | -2.085\* | 7.307\*\*\* | | \* Note the grayed out cells, where the deciles correspond with 0 values that span multiple deciles, compromising our inference from these statistics as they are drawn from arbitrary subsets.   1. Log+1 total FDI on log+1 total passengers flying into the country on US carriers, with country fixed effects 2. Log+1 total FDI on percent change in passengers flying into the country on US carriers, with country fixed effects. 3. Log+1 total FDI on percent change in passengers flying into the country on US carriers, controlled by GDP and battle fatalities, with country fixed effects. | | | | | |   **Table 3**  **Decile Cutoffs for each passenger variable**   |  |  |  | | --- | --- | --- | |  | Cutoff |  | | Tau | ln\_pass | change in passengers | | 0 | 0 | -100 | | 0.1 | 0 | -9.6140327 | | 0.2 | 0 | -1.7103153 | | 0.3 | 0 | 0 | | 0.4 | 0 | 0 | | 0.5 | 9.36938527 | 0 | | 0.6 | 11.1521668 | 0 | | 0.7 | 12.2057163 | 3.98798571 | | 0.8 | 12.9901106 | 8.37975936 | | 0.9 | 13.8801571 | 16.8554797 |   In sum, there is a clear link between passenger numbers or growth and FDI when controlling for unobservables in country fixed effects, even while controlling for conflict intensity and real GDP. However, since airlines have an incentive to increase flights to countries with surging economies (and hence greater FDI), the question of correlation rather than causation remains open. |

Replication notes:

1. I ran many more specifications of the model during the initial stages, but chose 5 specifications for the paper.
2. Country fixed effect coefficients available upon running the code.
3. Guide to the plots
   * Table 1: Without country fixed effects
     + Log+1 total FDI on log+1 total passengers flying into the country on US carriers (plot A)
     + Log+1 total FDI on percent change in passengers flying into the country on US carriers (plot F)
     + Log+1 total FDI on percent change of passengers flying into the country on US carriers, controlled by real GDP and log+1 battle fatalities (plot D)
   * Table 2: Country Fixed Effects
     + Log+1 total FDI on log+1 total passengers flying into the country on US carriers, with country fixed effects. (plot C)
     + Log+1 total FDI on percent change in passengers flying into the country on US carriers, with country fixed effects. (plot B)
     + Log+1 total FDI on percent change in passengers flying into the country on US carriers, controlled by GDP and battle fatalities, with country fixed effects (plot 5)