**MODELS WITHOUT FIXED EFFECTS**

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**Summary:**

**Results:** **Model 4a demonstrates that, real GDP and battle fatalities held constant, a 100% increase in passengers is associated with a 11.399% increase in nominal FDI the following year!**

**Methology:** The passengers coefficient is only significant when including logged real GDP as a covariate (as opposed to nominal or per capita). The coefficients on both real and nominal total GDP, when included (even with the per capita variable), are jointly significant with the other coefficients in the model. Because the passengers variable coefficient remains around the same value (between 0.9 and 0.12) regardless of the GDP measure we use, this could be a sign of robustness.

The real GDP variable may be best suited because it is not population-weighted (unlike per capita GDP) and best controls for the strength and size of the economy (better than nominal GDP).

Full details below:

**(1a) log(total FDI) ~ lag(percentage change in passengers flying in)**

```{r model.1a, message=TRUE, warning=TRUE}

model.1a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct), data = data)

summary(model.1a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct), data = data)

Residuals:

Min 1Q Median 3Q Max

-6.8541 -1.4732 -0.0488 1.6025 5.2452

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 25.891435 0.065193 397.152 <2e-16 \*\*\*

lag(passengers.in.change.pct) 0.001037 0.001043 0.994 0.321

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2.183 on 1121 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.0008802, Adjusted R-squared: -1.103e-05

F-statistic: 0.9876 on 1 and 1121 DF, p-value: 0.3205

Model 1a is the most basic model, and we see the coefficient of interest is not significant.

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**(2a) log(total FDI) ~ lag(percentage change in passengers flying in) + lag(log(ACLED battle deaths))**

```{r model.2a, message=TRUE, warning=TRUE}

model.2a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle), data = data)

summary(model.2a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle),

data = data)

Residuals:

Min 1Q Median 3Q Max

-6.4915 -1.4737 -0.0582 1.5988 5.1673

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 25.9692357 0.0716406 362.493 < 2e-16 \*\*\*

lag(passengers.in.change.pct) 0.0009614 0.0010408 0.924 0.35582

lag(log\_battle) -0.0830304 0.0320838 -2.588 0.00978 \*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2.178 on 1120 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.006819, Adjusted R-squared: 0.005046

F-statistic: 3.845 on 2 and 1120 DF, p-value: 0.02167

Model 2a adds battle deaths as a covariate. Passengers is still not significant, though the coefficients are all jointly significant at the 5% level.

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**(3a) log(total FDI) ~ lag(percentage change in passengers flying in) + lag(log(total GDP)) + lag(log(ACLED battle deaths))**

```{r model.3a, message=TRUE, warning=TRUE}

model.3a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) + lag(log\_GDP\_n), data = data)

summary(model.3a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) +

lag(log\_GDP\_n), data = data)

Residuals:

Min 1Q Median 3Q Max

-7.1334 -0.6282 0.0505 0.6034 6.0726

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 6.7499399 0.4648631 14.520 < 2e-16 \*\*\*

lag(passengers.in.change.pct) 0.0009603 0.0006531 1.470 0.142

lag(log\_battle) -0.1290737 0.0201628 -6.402 2.26e-10 \*\*\*

lag(log\_GDP\_n) 0.7784299 0.0187399 41.539 < 2e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.367 on 1119 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.6093, Adjusted R-squared: 0.6082

F-statistic: 581.7 on 3 and 1119 DF, p-value: < 2.2e-16

Model 3a adds nominal GDP as a covariate. Passengers is still not significant, though the coefficients are all highly jointly significant.

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**(4a) log(total FDI) ~ lag(percentage change in passengers flying in) + lag(log(ACLED battle deaths)) + lag(log(GDP in PPP terms))**

```{r model.4a, message=TRUE, warning=TRUE}

model.4a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) + lag(log\_GDP\_r), data = data)

summary(model.4a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) +

lag(log\_GDP\_r), data = data)

Residuals:

Min 1Q Median 3Q Max

-7.3609 -0.6621 0.0309 0.6651 6.0310

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 6.3324980 0.5055528 12.526 <2e-16 \*\*\*

lag(passengers.in.change.pct) 0.0011399 0.0006778 1.682 0.0929 .

lag(log\_battle) -0.1881351 0.0210678 -8.930 <2e-16 \*\*\*

lag(log\_GDP\_r) 0.7783859 0.0199542 39.009 <2e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.418 on 1119 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.5791, Adjusted R-squared: 0.578

F-statistic: 513.3 on 3 and 1119 DF, p-value: < 2.2e-16

Instead of nominal GDP, Model 4a adds real GDP as a covariate. The coefficients are all highly jointly significant, as before. However, the passengers variable is newly significant at the 10% level. This change is likely because controlling for the real value of the local currency and domestic product the year before helps to explain much of the variation in FDI the following year.

**Model 4a demonstrates that, other factors held constant, a 1% increase in passengers from one year is associated with a 0.0011399% increase (+0.114%) in nominal FDI the following year.**

Scaling up, this means a 100% increase in passengers is associated with a 11.399% increase in nominal FDI the following year!

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**(5a) log(total FDI) ~ lag(percentage change in passengers flying in) + lag(log(total GDP)) + lag(log(ACLED battle deaths)) + lag(log(GDP per capita, PPP))**

```{r model.5a, message=TRUE, warning=TRUE}

model.5a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) + lag(log\_GDP\_r\_pc), data = data)

summary(model.5a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) +

lag(log\_GDP\_r\_pc), data = data)

Residuals:

Min 1Q Median 3Q Max

-6.3845 -1.2619 0.0566 1.2996 5.5140

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.577e+01 5.523e-01 28.547 < 2e-16 \*\*\*

lag(passengers.in.change.pct) 7.570e-04 9.101e-04 0.832 0.406

lag(log\_battle) 1.461e-01 3.064e-02 4.768 2.1e-06 \*\*\*

lag(log\_GDP\_r\_pc) 1.058e+00 5.688e-02 18.597 < 2e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.904 on 1119 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.2413, Adjusted R-squared: 0.2393

F-statistic: 118.6 on 3 and 1119 DF, p-value: < 2.2e-16

Including per capita real GDP instead makes the passengers variable insignificant again.

Does this effect carry over when we run it with nominal GDP on top of per capita real GDP?

```{r model.6a, message=TRUE, warning=TRUE}

model.6a <- lm(log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) + lag(log\_GDP\_r\_pc) + lag(log\_GDP\_n), data = data)

summary(model.6a)

```

Call:

lm(formula = log\_FDI\_n ~ lag(passengers.in.change.pct) + lag(log\_battle) +

lag(log\_GDP\_r\_pc) + lag(log\_GDP\_n), data = data)

Residuals:

Min 1Q Median 3Q Max

-7.1319 -0.6050 0.0377 0.6450 5.7346

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 5.9390671 0.4923013 12.064 < 2e-16 \*\*\*

lag(passengers.in.change.pct) 0.0009173 0.0006472 1.417 0.156624

lag(log\_battle) -0.0776896 0.0228124 -3.406 0.000684 \*\*\*

lag(log\_GDP\_r\_pc) 0.2224371 0.0476722 4.666 3.44e-06 \*\*\*

lag(log\_GDP\_n) 0.7243587 0.0218878 33.094 < 2e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.354 on 1118 degrees of freedom

(67 observations deleted due to missingness)

Multiple R-squared: 0.6167, Adjusted R-squared: 0.6154

F-statistic: 449.8 on 4 and 1118 DF, p-value: < 2.2e-16

Yes. Perhaps controlling for per capita GDP soaks up much of the variation regarding total FDI because it is a population-weighted variable? Maybe the real GDP variable is best because it is not population-weighted and best controls for the strength and size of the economy.