Marriage Equality and the Transnational Flow of Skilled Labor: The Impact of Same-Sex Marriage Legalization in the US on the Inflow of Skilled Labor

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Online Appendix.

Pre-treatment parallel trend assumption

We use the following event study analysis to test our parallel trends assumption.

$$Y_{s,t} = \theta_t + \eta_s + \sum_{l=-6}^{6} D_{st}^{l} \mu_l + \epsilon_{s,t}$$

Where D_{st}^{l} is a binary variable that is 1 in year l from the year of marriage equality in country s. μ_l is the effect in period l. All the estimated coefficient before same-sex marriage legalization are not statistically significant from zero, showing pre-treatment parallel trends.

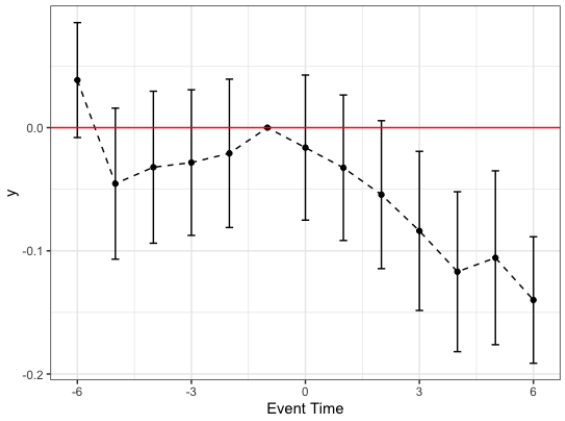

Figure A1. Event Study with country and year fixed effects

The Callaway and Sant'Anna $ATT_{g,t}$

The average treatment effects on the treated group are calculated for each year and each group separately. The figure below shows the estimated $ATT_{g,t}$ before and after treatment. The figure below show the values for the treated groups only after treatment. The vertical line marks the US recognition of same sex marriages, which included foreign marriage certificates. This allowed individuals on H1B visas to sponsor their same-sex spouse's visa.

Two-Fixed effects Model

The estimated values for the the the two-way fixed effect. The estimated results are shown in the Table C1.

$Y_{s,t} = \sum_j \beta_{j1}\, Legalization_{s,t,j} + \sum_j \beta_{j2}\, Legalization2013_{s,t,j} + \theta_t + \eta_s + Country_s * Year_t + \epsilon_{s,t}$

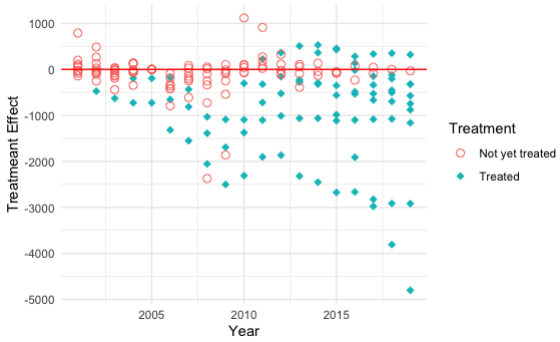

FIGURE B1. $ATT_{g,t}$ FOR THE TREATED COUNTRIES BEFORE AND AFTER TREATMENT

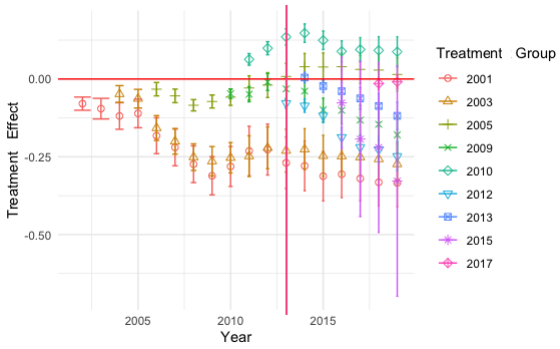

FIGURE B2. ENTER CAPTION

IV. Same-sex marriage legalization in EU countries

Table IV.1, shows the year of same-sex marriage legalization passed and the years they took effect. For some countries, legislation came into effect in year following the policy change being approved by the government. We use the year of the policy taking effect as the treatment start time in our analysis, not the time the policy was approved by the governing systems. The time difference can pose a violation of one of our identifying assumption, which is the limited anticipation assumption. We discuss the validity our this assumption in the next section.

V. Robustness

A. *Limited Treatment Anticipation assumption*

In our primary analysis, our estimator assumes limited treatment anticipation, which is represented by the following assumption:

$$E[Y_t(g)|G_g = 1] = E[Y_t(0)|G_g = 1] \text{a.s. for all } g \in \mathcal{G}, t \in \{1, ..., \mathcal{T}\} \text{ such that } t < g - \delta \text{ and } \delta \geq 0.$$

Here, G represents the period when a unit first becomes treated. Despite the presence of anticipation in some of our treated groups, which can be attributed to the time differences between the passing of legislation and its implementation, our estimation remains identified under this assumption. There are two key reasons for this. Firstly, we know the value of δ that would satisfy the assumption, which is at the most 3. Secondly, we do not anticipate

any observable changes in admission during anticipation years. To verify our assumption, we repeated our analysis with the treatment commencing at the time the policy was passed, rather than when it came into effect, as shown in Figure V.1. The overall result indicate a decrease (-0.0647), and statistical significance (with 95% confidence) . When we examined groups of countries with anticipation periods between the years the legislation passed and the year it took effect, we observed that the effect estimates were statistically insignificant and close to zero.

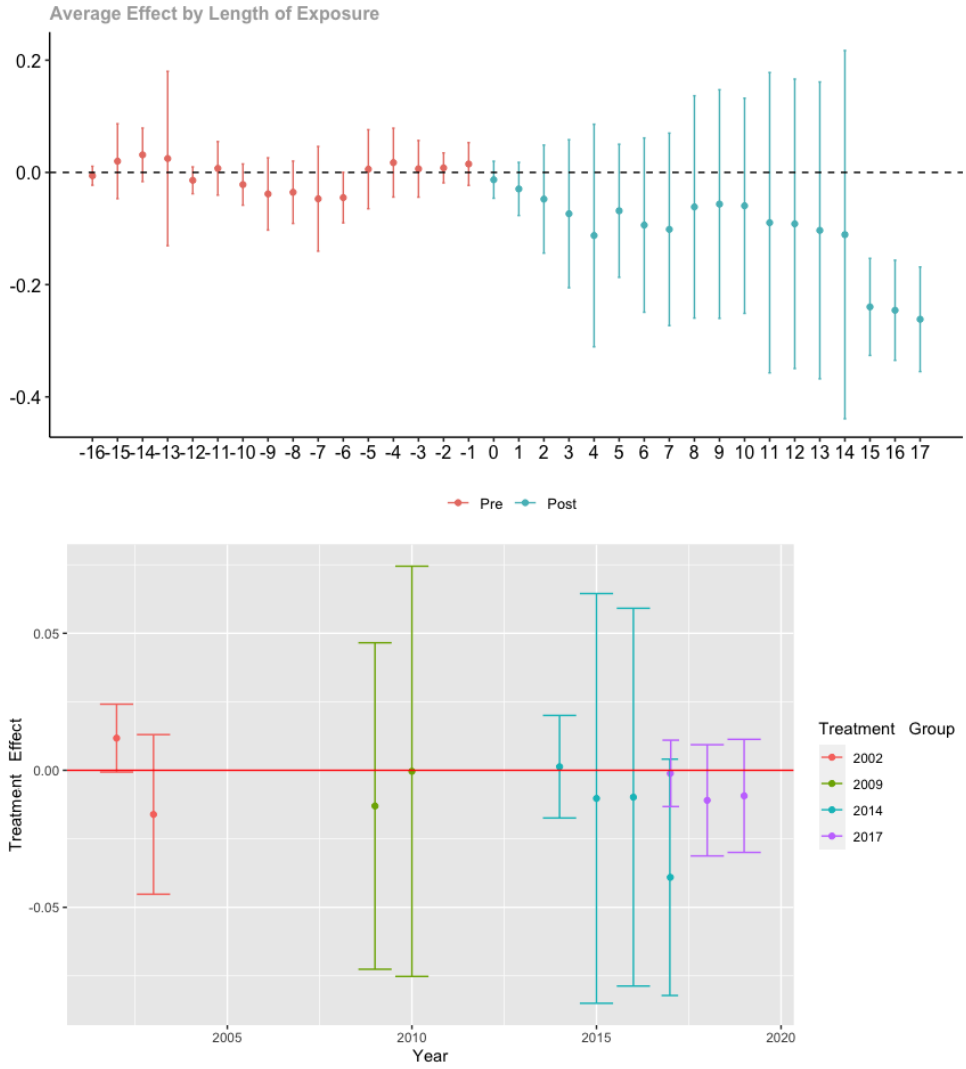

Figure V.1. Results with Treatment Time on Legislation Passing

B. *Placebo test with B1 and B2 visas*

To ensure that our findings are not merely a consequence of general travel trends or a placebo effect, we also analyze the effect on admissions of visitor visas B1 and B2. The primary distinction between these two visas lies in the purpose of the visit, with B1 intended for work and B2 for tourism. In our analysis, we find no significant effect, as depicted in Figure V.2 and Figure V.3.

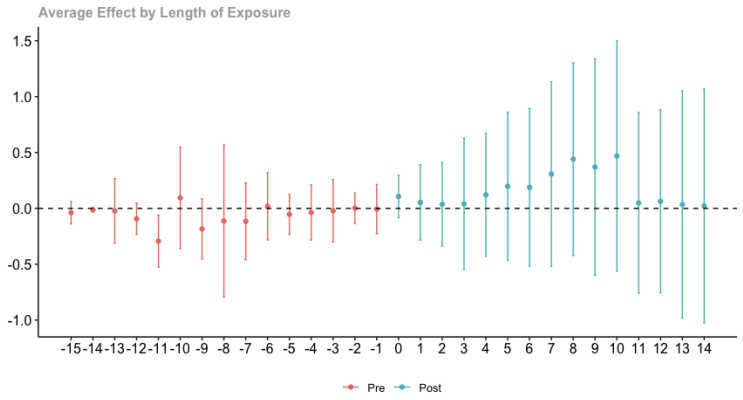

FIGURE V.2. THE EFFECT OF MARRIAGE EQUALITY ON BUSINESS VISITOR VISA B1 ADMISSION

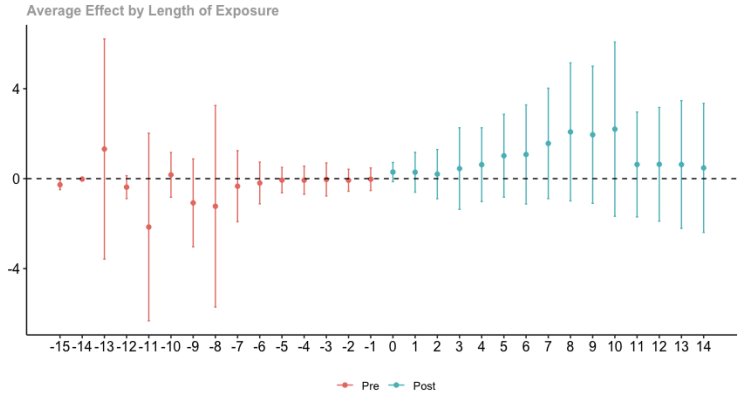

FIGURE V.3. THE EFFECT OF MARRIAGE EQUALITY ON TOURIST VISITOR VISA B2 ADMISSION PER 1000 OF LABOR FORCE

C. Results without normalizing the number of admissions

The final check we conduct pertains to the effect of normalizing admissions by the labor force population. We employ the same estimation strategy on the number of admissions while controlling for the labor force population. The results reveal a statistically significant average treatment effect of -1085.715 (statistically significant with 95% confidence). The event study shows a significant decrease in years 4, 6, 7, 8, 10, and after year 14, as illustrated in the figure V.4. The point estimates indicate a more pronounced effect with the passage of time since the enactment of marriage equality. For instance, there is a decrease of 472 admissions in year 4, 995 in year 10, and 2000 in year 16 following the introduction of marriage equality.

Table C1—Two-way fixed effects results

	Dependent variable:	
	H1B	
	(1)	(2)
Year1-2	−197.622*	-209.632
	(119.113)	(134.432)
Year 3-4	−300.829**	−304.172*
	(143.288)	(179.349)
Year 5-6	−591.303***	−627.729***
	(173.096)	(241.145)
Year 7+	−475.981***	−511.127*
	(170.595)	(290.613)
Year 1-2 after 2013	597.400***	585.315***
	(155.047)	(162.321)
Year 3-4 after 2013	655.180***	634.352***
	(176.197)	(188.065)
Year 5-6 after 2013	549.443***	558.873**
	(205.200)	(222.416)
Year 7 + after 2013	321.617**	222.328
	(148.667)	(182.965)
Observations	540	540
$year^2$		yes
R^2	0.990	0.991
Adjusted R^2	0.989	0.989
Residual Std. Error	332.504 (df = 459)	328.593 (df = 433)
F Statistic	587.502*** (df = 80; 459)	454.364*** (df = 106; 433)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table IV.1—EU Countries Marriage Equality History

Country	Year Policy Took Effect	Year of the Policy Change
Netherlands	2001	2000
Belgium	2003	2002
Spain	2005	2005
Sweden	2009	2009
Portugal	2010	2009
Denmark	2012	2012
France	2013	2013
Ireland	2015	2015
Luxembourg	2015	2014
Finland	2017	2014
Germany	2017	2017
Malta	2017	2017
Austria	2019	2017

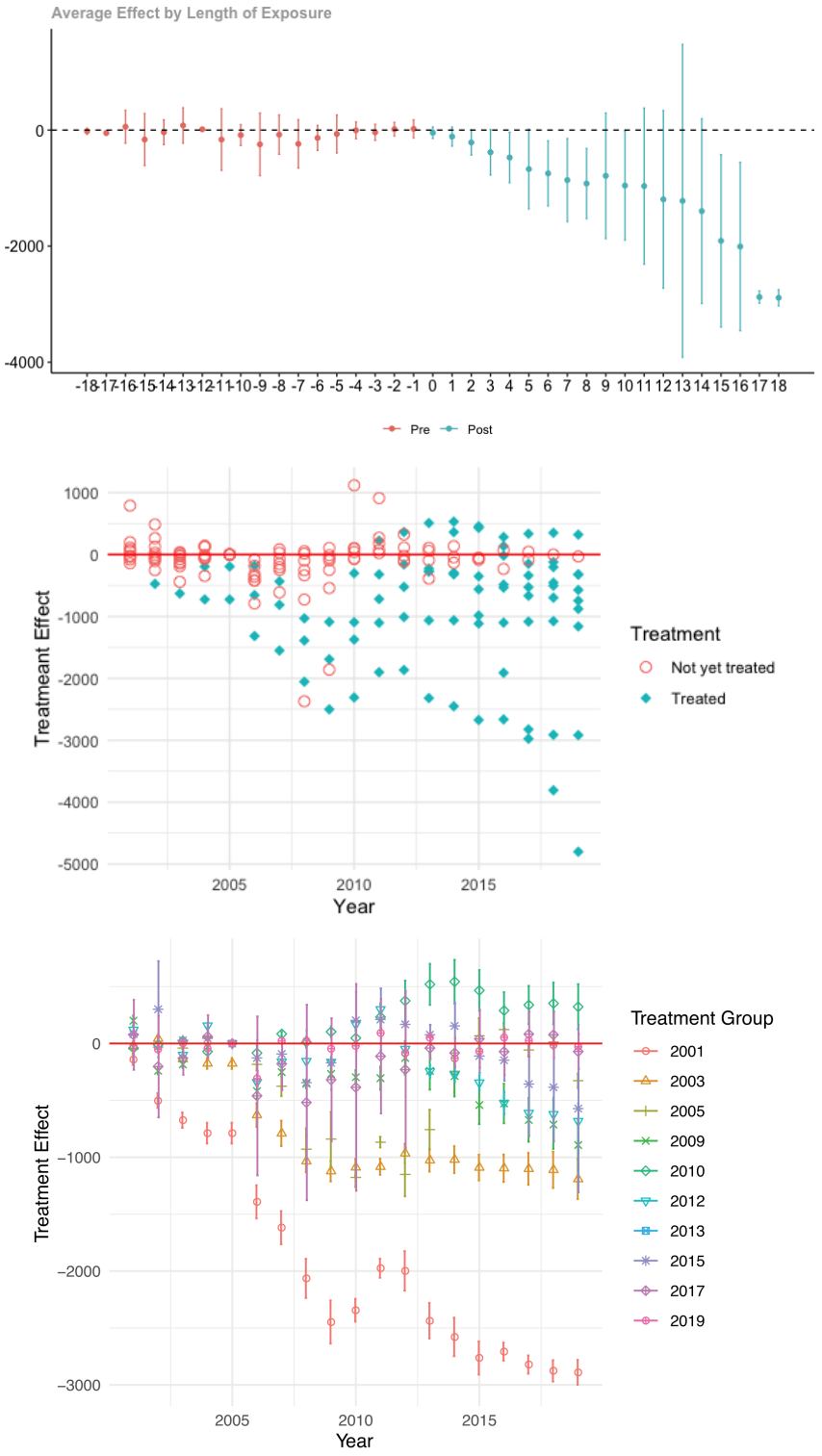

FIGURE V.4. THE EFFECT OF MARRIAGE EQUALITY ON THE TOTAL NUMBER OF H1B VISA ADMISSION