

# The Consumer Welfare Effects of Online Ads: Evidence from a 9-Year Experiment

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with

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# Do online ads create utility or disutility?



Ads play an informational role, match buyers and sellers, reduce search costs (Stigler (1961))



Ads are annoying and impose cognitive costs (Goldstein et al. (2014), Goldfarb and Tucker (2011));

can reduce welfare if poorly targeted by exposing them to irrelevant or higher-priced products (Mustri, Acquisti et al. (2024))

# Measuring welfare effects of online ads

Ideal Experiment: Randomly switch ads on and off in the field, over a long period of time

- Field experiment to avoid hypothetical bias
- Long period since it can take a while for users to adjust their behavior

We stumbled upon this ideal experiment running in the wild by exploiting the holdout group of Facebook's A/B testing platform!

# A/B testing platforms: Holdout group

- Digital platforms such as Facebook run 1000s of A/B tests every day
- These A/B testing platforms have a holdout group (clean control group) where users are not exposed to any of the interventions
- This is to measure the cumulative impact of multiple experiments over the longer term
- For advertising-based platforms such as Facebook, this holdout group usually consists of a randomly selected group of users who never see any ads

# Our experiment

- Facebook's internal A/B testing platform launched in 2013, holdout group maintained continuously since then!
- 0.5% of all users (over 3 billion) randomly assigned to the holdout group and don't see ads (and they don't know this!)

# Our experiment

- Recruit a representative sample of 53,166 Facebook users across 13 countries (FB penetration ~ 60%) in 2022 (9 years later)
  - Control group (no-ads): N = 13,449
  - Treatment group (ads): N = 39,717
- Weights using rich information Meta has about its users to reduce bias from non-response, and differential Facebook use among different subpopulations
- Sample balanced across treatment and control groups (including tenure, indicating differential attrition is not a concern)
- Measure Facebook valuations using incentivized choice experiments
- Compare Facebook valuations between ads and no-ads groups
  - Any difference should reflect utility/ disutility of ads in the long term
  - Also look at time spent



Asad, you have an opportunity to receive a payment\* for sharing your opinion with us! Could you take a few minutes to answer a short survey?

\*Ends 3/21/22 at 11:59:59pm PST. Open to individuals who: (1) are legal residents of US, UK, FR, DE, ES, BE, RO, NO, IE, CA (excl. Quebec), KR, JP, ID, MX, TH; (2) 18+ and age of majority; (3) receive authorized invitation; & (4) are a registered Facebook user with valid email address & Internet access. Subject to full Terms and Conditions ([research.fb.com/dss-epr-survey-terms](https://research.fb.com/dss-epr-survey-terms)). Void where prohibited.

[Start Survey](#)

 Facebook Survey

**If you agree to participate, we may offer to pay you to stop using Facebook and to temporarily deactivate this Facebook account for one month.**

**If you temporarily deactivate, you could continue using Messenger, and nothing on your Facebook account would be deleted.\***

**In order to participate, please confirm that you agree to the terms and conditions.**

- I agree to the terms and conditions
- I do not agree to the terms and conditions

**\*You could reactivate your account at any time, but we would check that your account stays deactivated for the entire month before paying you. View full terms at [research.fb.com/dss-epr-survey-terms](https://research.fb.com/dss-epr-survey-terms) in a separate browser window.**

Ends 4/7/22 at 11:59:59pm PST. Open to individuals who: (1) are legal residents of US, UK, FR, DE, ES, BE, RO, NO, IE, CA (excl. Quebec), KR, JP, ID, MX, TH; (2) 18+ and age of majority; (3) receive authorized invitation; & (4) are a registered Facebook user with valid email address & Internet access. Subject to full Terms and Conditions. Void where prohibited.

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# Incentivized choice experiment



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**Would you be willing to stop using Facebook for one month in exchange for \$40? You may be randomly chosen and offered \$40 to stop using Facebook based on your answer to this question.**

- No, I am not willing to stop using Facebook for one month in exchange for \$40
- Yes, I am willing to stop using Facebook for one month in exchange for \$40

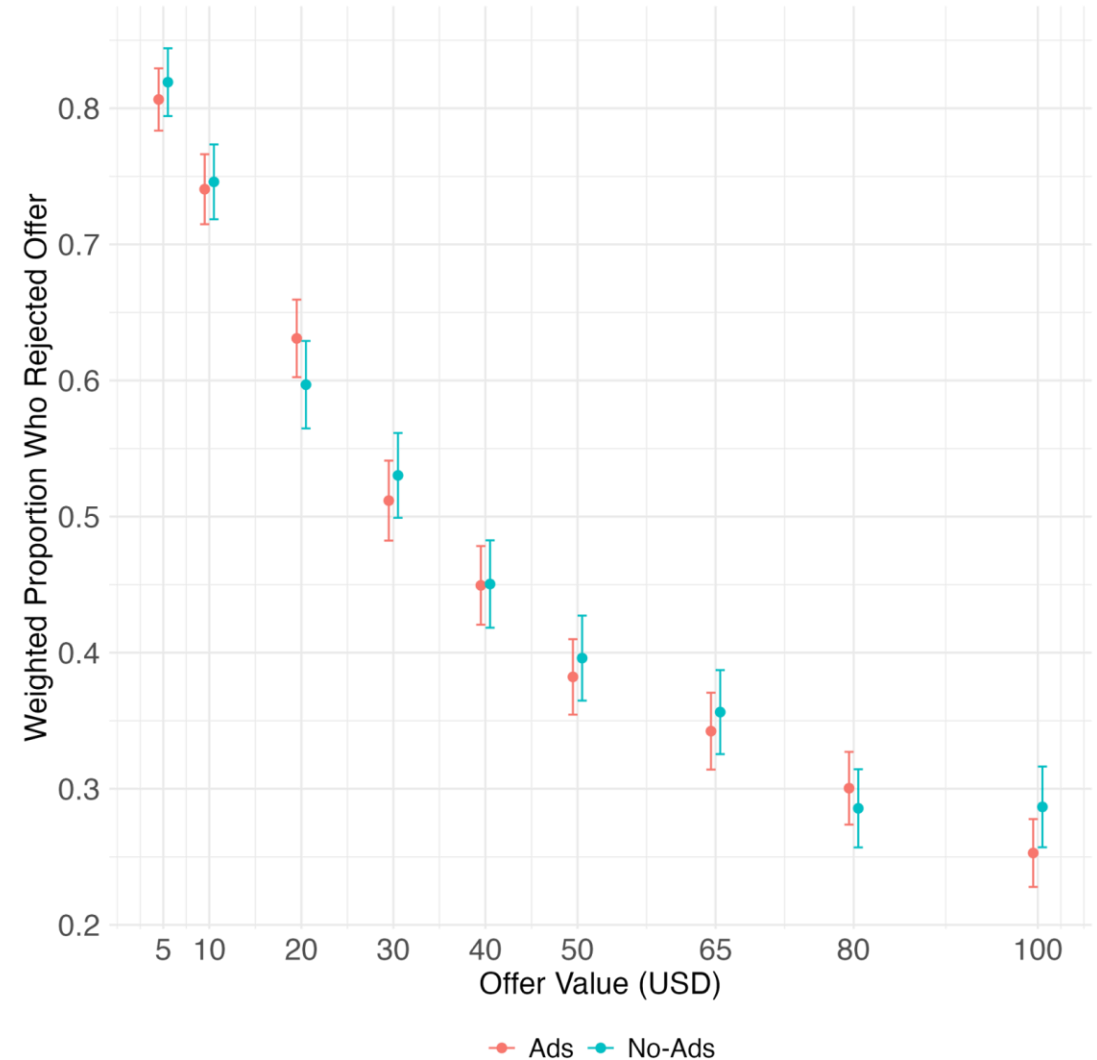
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# Results: Facebook valuations Ads vs. No-Ads

- 19% have a valuation < \$5 to give up Facebook for a month, 24% have a valuation > \$100
- Overall median monthly valuation across 13 countries: \$31



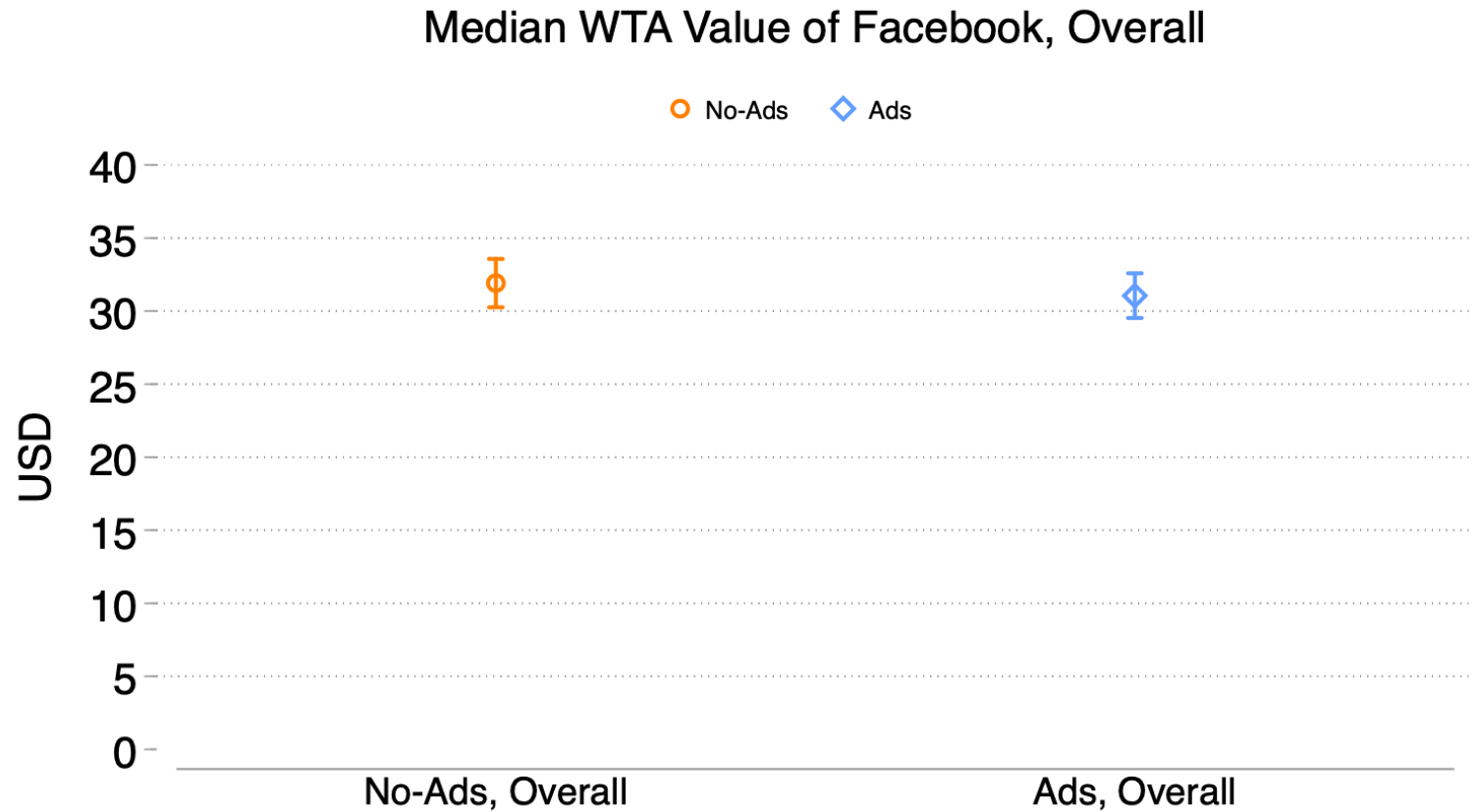
# No significant differences in valuations!

Control (no-ads) WTA = \$31.95

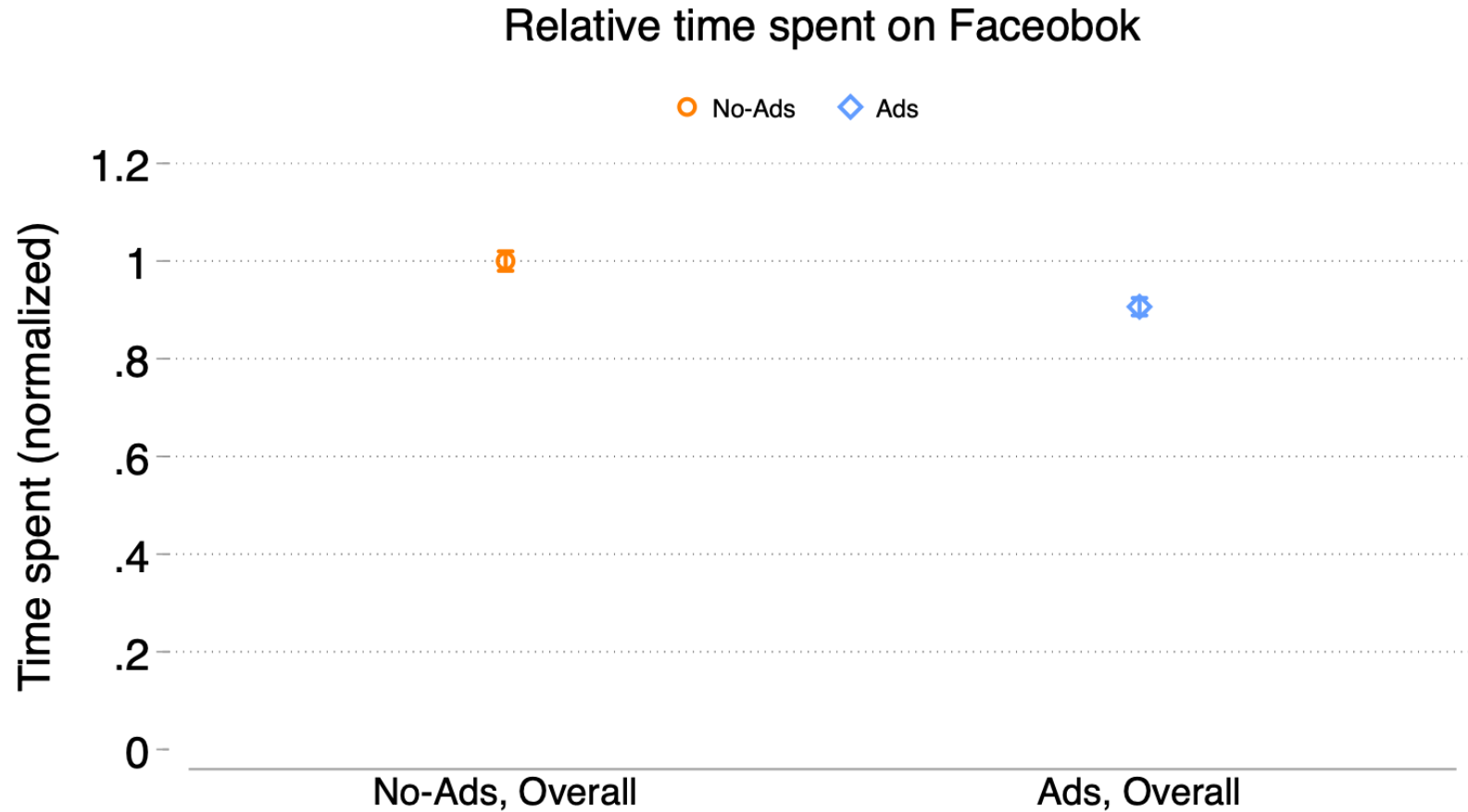
Treatment (ads) WTA = \$31.04

Difference = -0.9 [-3.06, 1.25]

Minimum detectable difference =  
\$3.18/month (~10% of FB value)

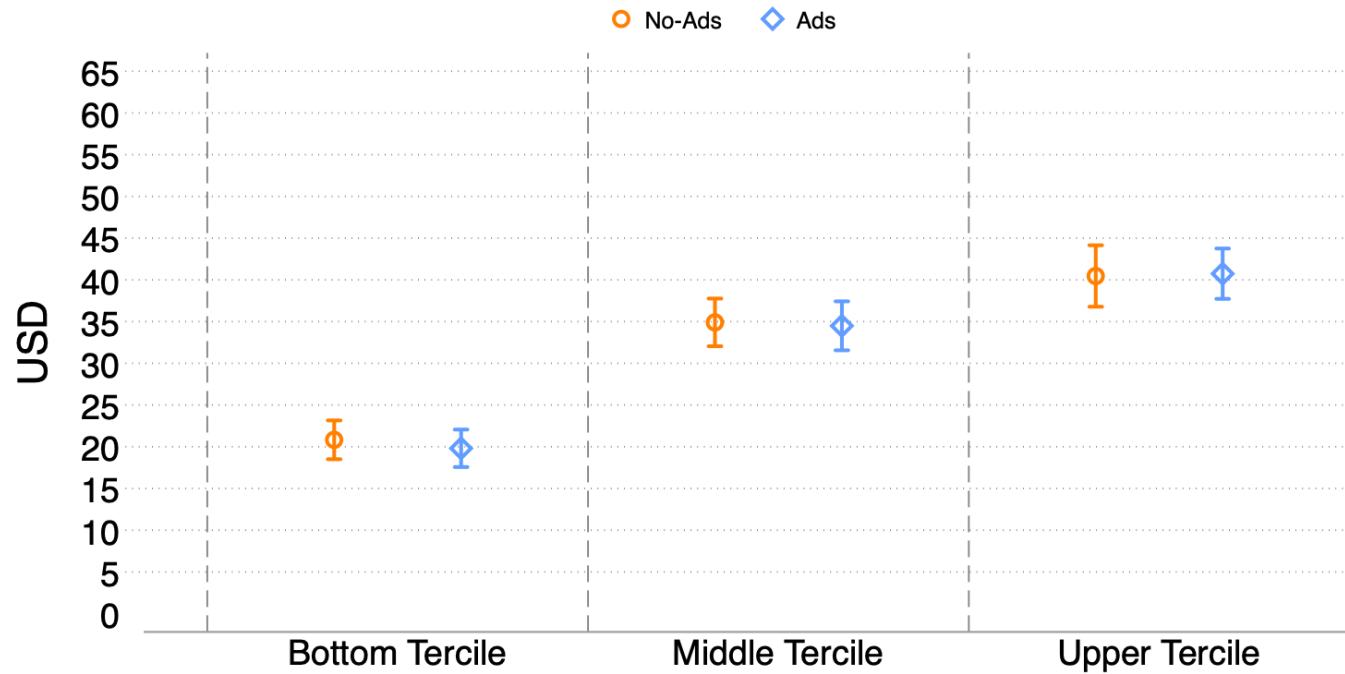


# Users in the ads group spend 9.4% less time



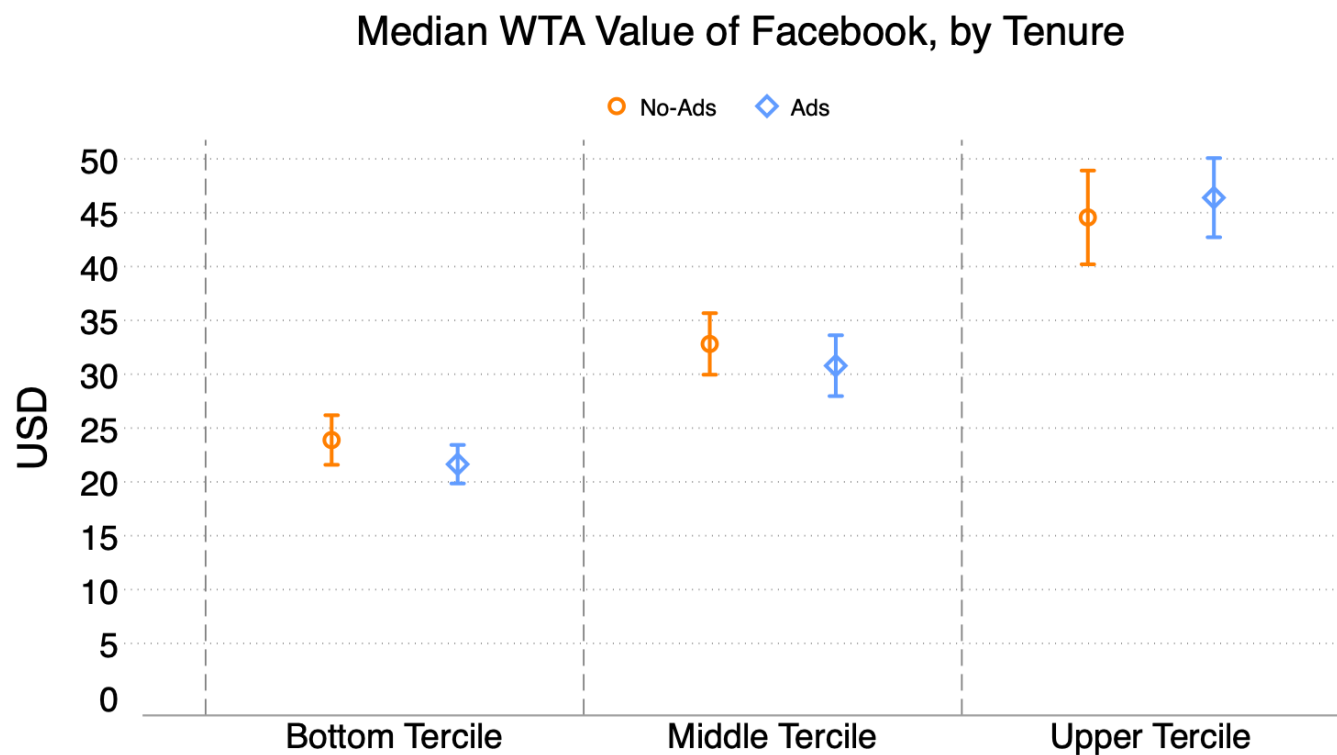
# Heterogeneity: Time spent

Median WTA Value of Facebook, by Time Spent



		95% CI		
Bottom TS Tercile	No-Ads (C)	<b>20.96</b>	18.75	23.16
	Ads (T)	<b>19.86</b>	17.81	21.91
	Delta (T-C)	<b>-1.10</b>	-4.10	1.91
Middle TS Tercile	No-Ads (C)	<b>34.78</b>	31.59	37.98
	Ads (T)	<b>34.40</b>	31.62	37.18
	Delta (T-C)	<b>-0.38</b>	-4.66	3.90
Upper TS Tercile	No-Ads (C)	<b>40.47</b>	37.22	43.72
	Ads (T)	<b>40.75</b>	37.73	43.76
	Delta (T-C)	<b>0.28</b>	-4.10	4.67

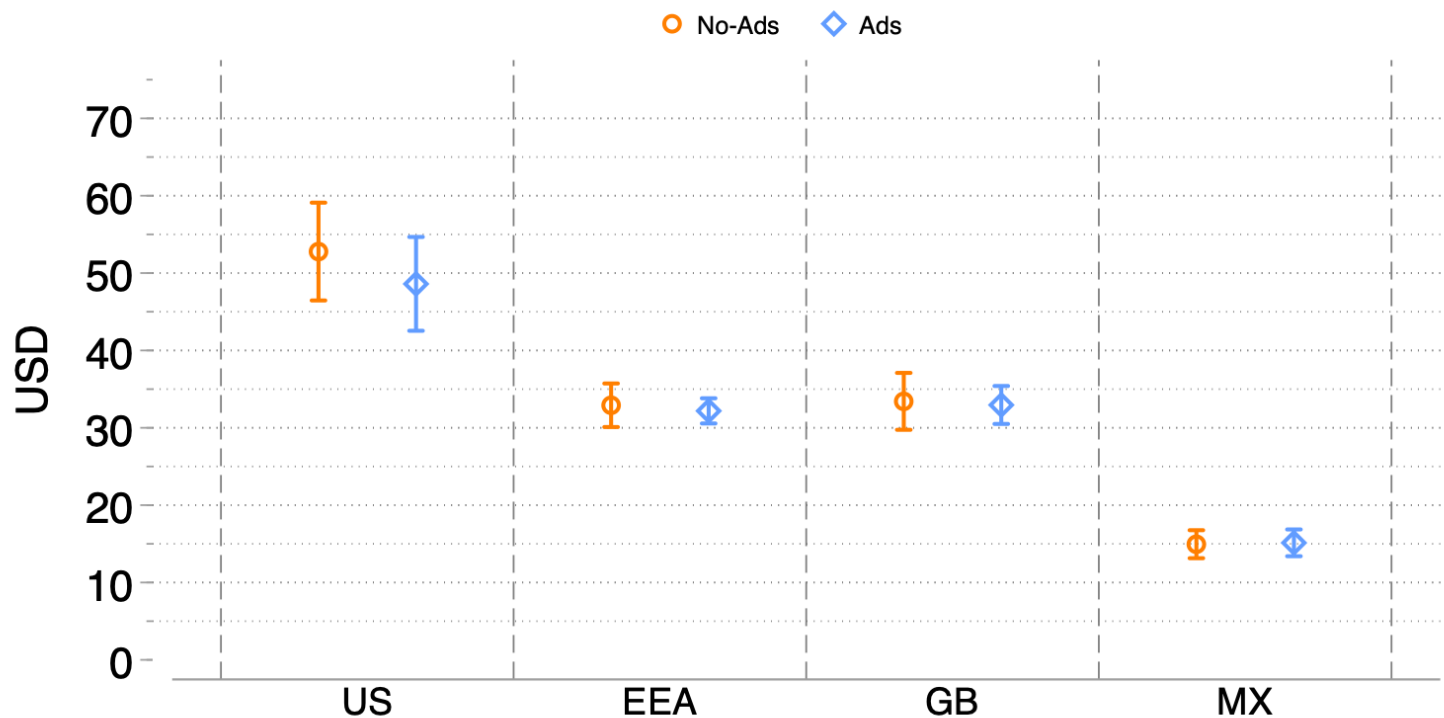
# Heterogeneity: Tenure on FB



		95% CI		
Bottom Tenure Tercile	No-Ads (C)	<b>23.92</b>	21.66	26.18
	Ads (T)	<b>21.64</b>	19.79	23.48
	Delta (T-C)	<b>-2.29</b>	-5.25	0.68
Middle Tenure Tercile	No-Ads (C)	<b>32.78</b>	29.95	35.61
	Ads (T)	<b>30.71</b>	27.90	33.52
	Delta (T-C)	<b>-2.08</b>	-6.16	2.01
Upper Tenure Tercile	No-Ads (C)	<b>44.65</b>	40.62	48.68
	Ads (T)	<b>46.29</b>	42.36	50.22
	Delta (T-C)	<b>1.64</b>	-4.04	7.31

# Heterogeneity: Region

Median WTA Value of Facebook, By Country/Region



95% CI

US	No-Ads (C)	<b>52.90</b>	47.08	58.73
	Ads (T)	<b>48.53</b>	42.89	54.16
	Delta (T-C)	<b>-4.38</b>	-12.82	4.07
EEA	No-Ads (C)	<b>32.95</b>	29.94	35.97
	Ads (T)	<b>32.23</b>	30.72	33.73
	Delta (T-C)	<b>-0.73</b>	-4.06	2.60
GB	No-Ads (C)	<b>33.57</b>	29.91	37.23
	Ads (T)	<b>32.98</b>	30.74	35.22
	Delta (T-C)	<b>-0.59</b>	-4.85	3.66
MX	No-Ads (C)	<b>14.95</b>	13.29	16.61
	Ads (T)	<b>15.10</b>	13.42	16.79
	Delta (T-C)	<b>0.15</b>	-2.26	2.57

# Conclusion

- Lot of policy debate on costs and benefits of ads, limited research estimating \$\$ of disutility of ads -> here we estimate disutility of ads in the field over the long term
- This study: only measures direct welfare effects on consumers, for full welfare analysis should also look at:
  - Consumers clicking on an ad and purchasing a product
  - Welfare to advertisers
  - Welfare to the platform
- Future work: Explore mechanism
  - No significant results because of benefits canceling costs?

# Thank you

The Consumer Welfare Effects of Online Ads: Evidence from a 9-Year Experiment:

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4877025](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4877025)