ONLINE APPENDIX

Growth, Adoption, and Use of Mobile E-Commerce

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This online appendix contains some additional details (in Appendix A) about the derivations and sources behind numbers mentioned in the text, and presents (in Appendix B) additional analysis comparing purchasing propensity following mobile adoption to purchasing propensity following spikes in monthly activity unrelated to mobile technology (we refer to this analysis in Section III of the main text).

Appendix A. Details about derivations and sources

Introduction

1. eBay's U.S. gross merchandising volume, $26.4 billion, is reported in the January 16, 2013 eBay, Inc. financial release, which can be found at http://investor.ebayinc.com/releasedetail.cfm?ReleaseID=733959

The Growth of Mobile

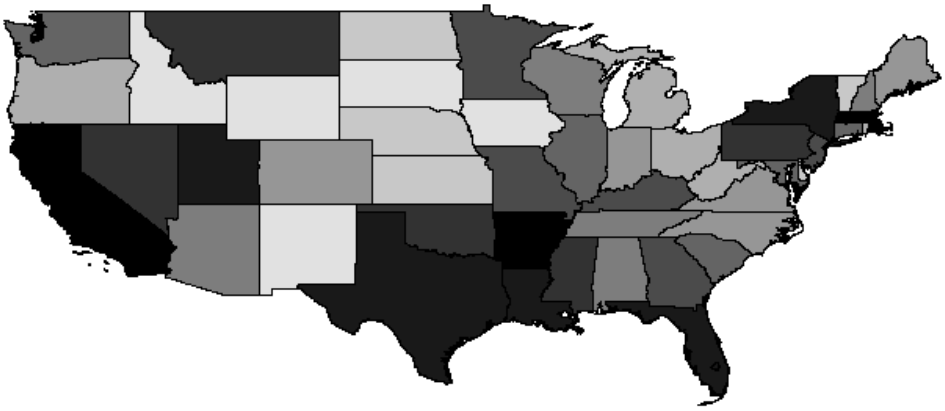
1. "… increasing by a factor of ten (April 2010 to April 2013)" refers to the growth in mobile purchase share documented in Figure 1.
2. "By June 2013, more than a third of eBay's active users (in a given month) were mobile adopters. Moreover, the adoption rate (the number of new adopters in a month over the number of users yet to adopt), had increased to over 7% in early 2013." We calculate this adoption rate for each month by dividing the number of new adopters (those making a purchase using a mobile app for the first time) by the total number of active non-mobile buyers in the previous month. In January 2013, this rate increased to 7.02%.

Who are the Early Adopters?

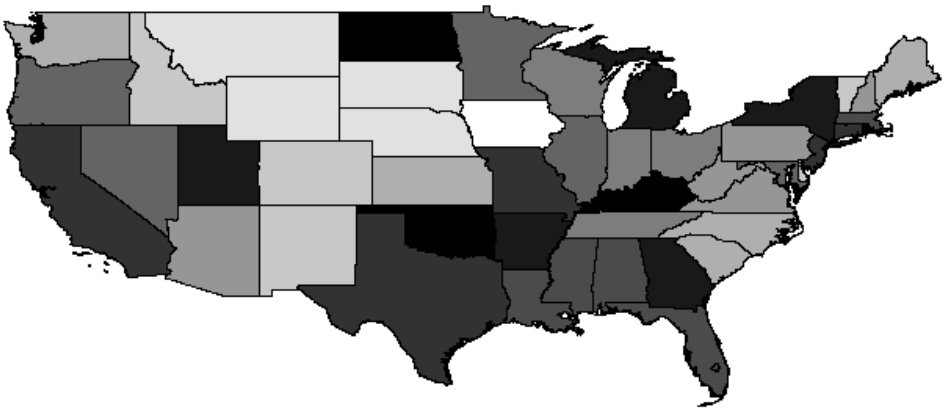
1. "In the online appendix we repeat this exercise for earlier years and show higher mobile share in other states, such as California and Massachusetts, presumably due to higher intensity to adopt new technologies in those state."

   Below we present parallel heat maps for earlier years:

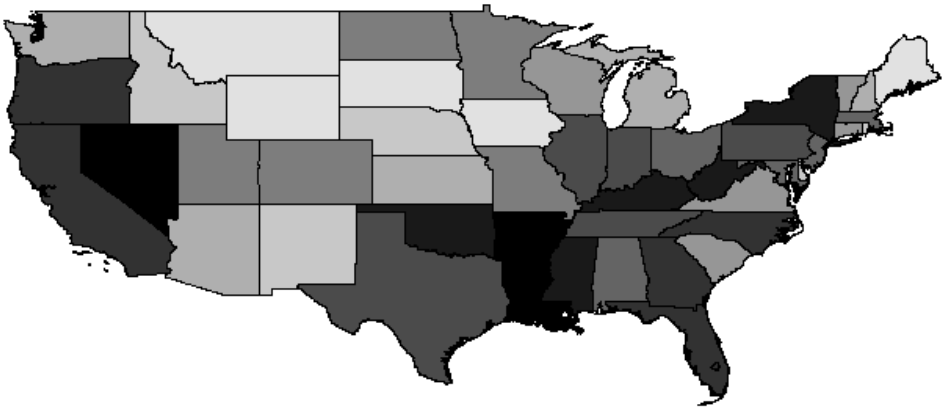
2008



2009



2010



2011

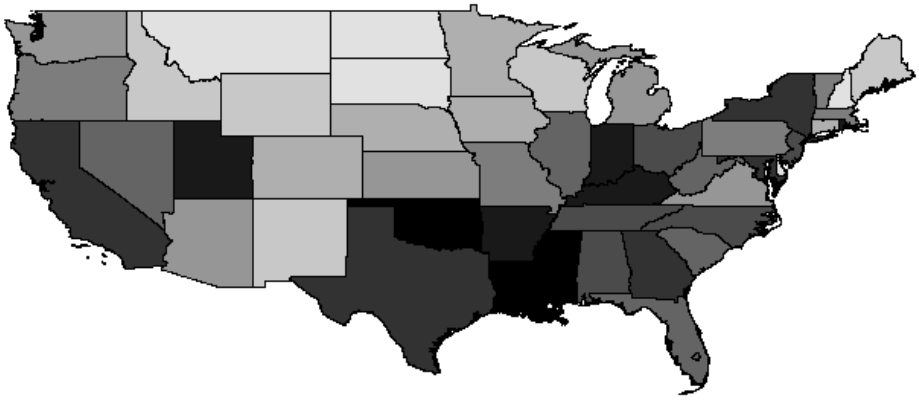


Figure A1: Geographic Intensity of Mobile Commerce, 2008-2011

2. "Indeed, once normalized by the number of cell phone users who are subscribed to a data plan in each state as of the end of 2011, the North-South mobile use pattern is not as sharp." To account for variation in cell phone plan take-up across states, we use data from the Federal Communication Commission's Sixteenth Mobile Wireless Competition Report, released March 21, 2013. In table B-5, the report lists the number of subscribers in each state with data plans for full internet access as of December 31, 2012. Subscriber counts for states with fewer than 200,000 subscribers (Montana and South Dakota), however, are not reported to "maintain firm confidentiality." We assign these states 200,000 subscribers each. We then compute eBay mobile GMV per wireless subscriber for each state and produce a heat map similar to Figure 3. Each color corresponds to a decile of the mobile GMV per subscriber distribution, with darker colors signifying greater mobile commerce volume per subscriber.

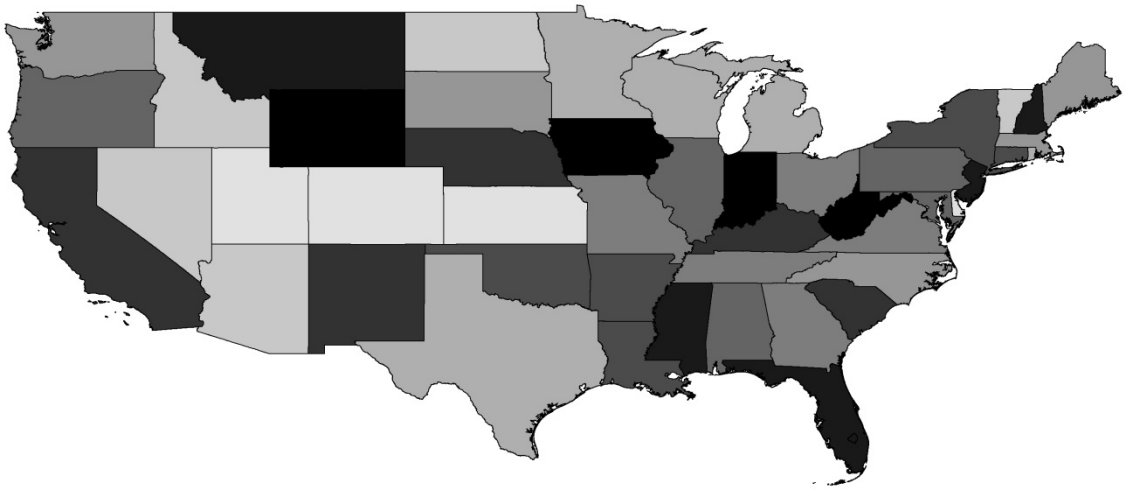


Figure A2: Geographic Intensity of Mobile Commerce Relative to Mobile Use

Effects of Mobile Adoption

1. “Indeed, as we report in more detail in the online appendix, this pattern of eBay use appears very similar for other eBay users who exhibit sharp (non-mobile) spikes in their eBay activity: their subsequent activity declines but remains greater than a year earlier.” See analysis in Appendix B below.

The Nature of Mobile Use

1. “The share of “Daily Deals” purchases out of total purchases is similar (0.6% for mobile vs. 0.5% for non-mobile).” We calculate these percentages using a one percent sample of eBay users in 2012. We classify a product as a “Daily Deal” only while the deal is active and the product is displayed in the Daily Deals category.
2. “For example, on the core site 2.2% of item views result in a purchase, while on mobile the purchase rate is less than one percent.” To calculate these statistics, we limit our one percent sample of users to anyone who made a purchase in 2012. Then, we divide the total number of 2012 mobile (core) purchases by 2012 mobile (core) item views. Limiting the sample users who have made a purchase ensures that the item view counts are not skewed by bots or website crawlers, which may affect the two platforms differently. Moreover, defining the purchase rate as purchases per search or purchases per unique item view does not significantly change the magnitude of the difference across platforms.

Appendix B: Comparing mobile adoption to non-mobile activity spikes

Figure 4 shows that mobile adopters make more purchases, on average, in the months following adoption than in the months preceding adoption. As mentioned in the text, it may be the case that any increase in eBay user activity results in greater purchasing in subsequent months, even if the increase has nothing to do with mobile adoption. If this is true, more purchases after mobile adoption may simply be due to the fact that mobile adoption is correlated with spikes in purchasing propensity.

To explore this issue, we ask how many purchases non-adopters make in months following purchasing spikes similar to those we observe when users adopt mobile technology. We define such a “purchasing spike” at the buyer level as the number of purchases in a month divided by the average of monthly purchases over the previous six months. Figure 4 shows that the average purchasing spike at adoption across all 2012 adopters was nearly 7.2. Intuitively, we want to learn how much a non-mobile user would purchase, on average, after a similar seven-fold increase in monthly purchases.

To do so, we first assign weights to a set of non-adopters so that their "purchasing spike" distribution more closely resembles the adoption month distribution. For each month in 2012, we compute the deciles (and repeat the analysis using quartiles) of the purchasing spike distribution of mobile adopters at the month of adoption. For our counterfactual group, we identify non-adopters who made a purchase in that month and first browsed eBay at least six months earlier. We then compute the shares of non-adopters whose purchases relative to their six-month trailing average fall within each decile of the adopter distribution. Each non-adopter is then assigned a weight that is inversely proportional to the number of non-adopters who fall in the same decile, so each decile obtains an equal weight (even of the non-adopters are not distributed evenly across deciles).

Using these weights, we compute the weighted average monthly purchases for non-adopters in each month. To aggregate across months, we weight each month by the share of 2012 mobile adopters in that month. Figure A3 shows the comparison, superimposing the consumption path of the average re-weighted non-adopter onto Figure 4.

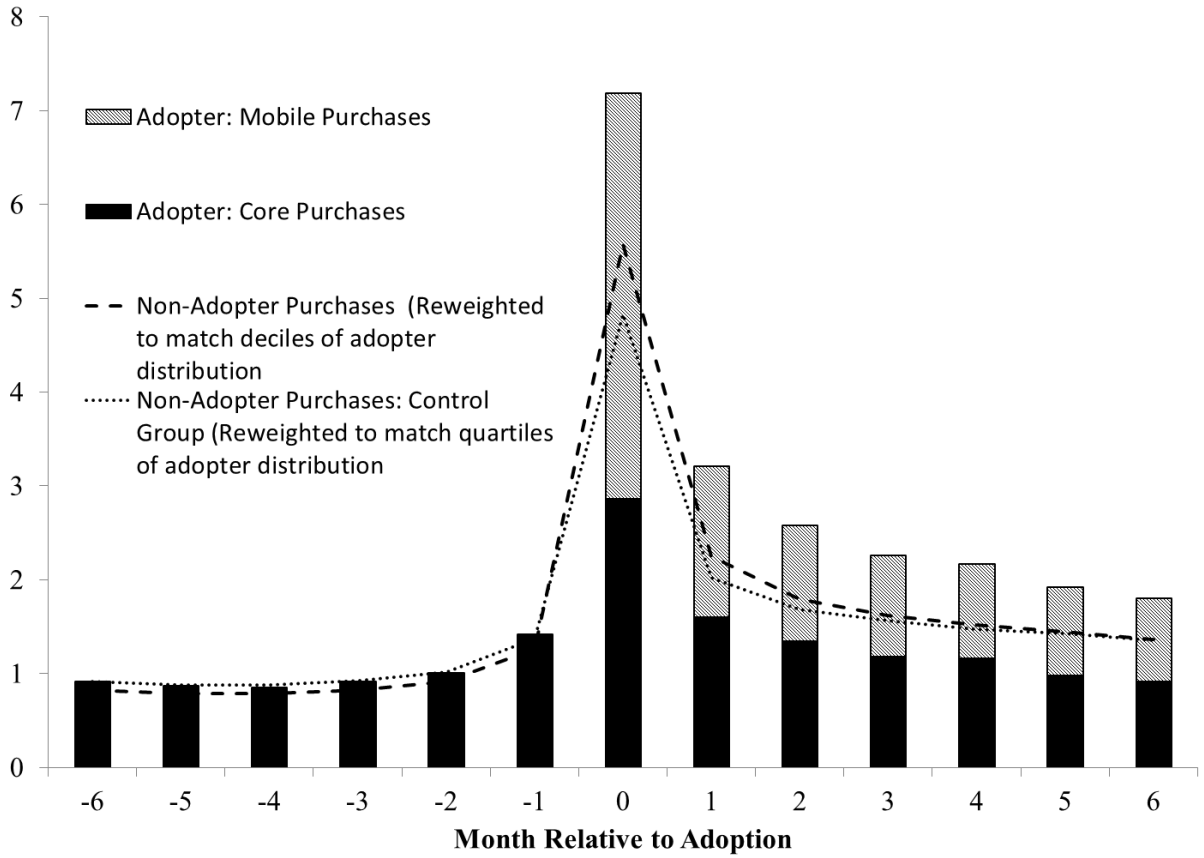


Figure A3: Normalized monthly purchases for adopters and non-adopter counterfactual group