

## *Executive Summary*

# **E-Privacy Provisions and Venture Capital Investments in the EU**

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In the digital economy, many firms create value for consumers by collecting and parsing data that are then used, directly or indirectly, to offer new and superior services to them. However, the collection of user data has also raised concerns among European Union (EU) public policy makers about user privacy. In an effort to address such concerns, the EU enacted the Privacy and Electronic Communications Directive (2002/58/EC) (the “EU e-Privacy Directive”) in 2002, which was amended in 2006 (Directive 2006/24/EC) and in 2009 (Directive 2009/136/EC). This directive regulates, among other issues, the treatment of traffic data, the confidentiality of users’ information, unsolicited email, and the treatment of cookies (pieces of data sent from a website

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and stored on the user's computer while the user is browsing to collect user data, allowing for fine-grained segmentation and targeting).

However, concerns have been voiced that restricting the ability of firms to collect and use data may unintentionally hurt revenue opportunities for firms in the digital sector and, by implication, reduce investment in digital industries. These concerns especially apply to firms that rely on the collection and parsing of large amounts of user data as a critical component of their business models, such as online news, online advertising, and cloud computing. For example, since a major stream of revenue for online news companies comes from advertising shown to consumers, policies which limit the effectiveness of firms' ability to use data potentially harm online news providers by decreasing the precision with which relevant ads are displayed to consumers, thereby decreasing conversion rates. This negative outcome for online news companies may have a cascading effect on the online advertising sector as depressed revenues for ads may lead to declining investment in online advertising technologies. Companies in the cloud computing sector which provide analytics services may have to deal with the more burdensome regulation with regard to using cookies to collect and process user data. In addition, firms serving telecommunications customers have to deal with requirements relating to data security and data breach notifications. These policies may lead firms to invest disproportionately into complying with governmental guidelines, decreasing their profitability and distracting management from a focus on innovation. Lack of profitability and industry growth could thus diminish VC investment into the cloud computing sector.

Note also that since EU Directives, such as the e-Privacy Directive, are implemented via a diverse set of differing country-specific laws (with different implementation timelines), companies

which operate across national jurisdictions in any of the three sectors are likely affected by more complicated compliance requirements.

In this paper, we empirically examine whether changes to EU e-privacy law as prescribed by the EU e-Privacy Directive were associated with a change in the level of VC investment in the EU relative to the US. Building on Lerner (2012),<sup>2</sup> which studied the effects of the EU e-Privacy Directive on VC investment in online advertising, we focus on three sectors that are likely to be affected by such changes in legislation: online news, online advertising, and cloud computing. Specifically, we explore whether VC investment in these three sectors relative to overall VC investment in IT diverged between the EU and the U.S. after the passage of the EU e-Privacy Directive in 2002.

Data on deal-level VC investment between 1998 and 2013 from the Thomson ONE database form the basis of our empirical analysis. We use a standard difference-in-differences approach to measure whether the level of VC investment in the EU into companies that focus on online advertising, online news, and cloud computing changed after the EU e-Privacy Directive was enacted in 2002 (and amended in 2006 and 2009), relative to corresponding types of investments in the U.S. We use the U.S. as a benchmark because it has no overarching federal-level privacy laws, in contrast to the EU.

Our main specification is an Ordinary Least Squares (OLS) model. We use as our dependent variable the ratio of VC investment in the respective sector(s) relative to all IT VC investment (excluding IT investment in the three sectors) in each quarter (from 1998Q1 to 2013Q4) and for each region (the EU and U.S.) The key explanatory variables in our estimation

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<sup>2</sup> Lerner, Josh, “The Impact of Privacy Policy Changes on Venture Capital Investment in Online Advertising Companies,” (2012).

are an indicator for the EU region, an indicator for the period after the directive was passed in July 2002, and their interaction. Control variables include quarterly GDP growth, the quarterly percentage change in the number of internet users in the region, year fixed effects, and a linear quarter trend.

Our results suggest that in the EU, VC investments into online news, online advertising, and cloud computing increased at a slower pace than in the U.S. after the passage of the 2002 EU e-Privacy Directive, after controlling for several drivers of VC investments into firms in these industries. We report a range of robustness checks that generally confirm our results, including an estimation covering a shorter time period (1998Q1 - 2006Q4) to reduce the possibility that different recent technology trends in the EU and U.S., for example with respect to the adoption of smartphones and of ad blockers, influence our results.

Specifically, our estimation results imply that VC investment across these three industries was between 58 to 75 percent (or \$62 million to \$125 million) lower in aggregate each year than it would have been if the EU and U.S. had maintained similar trends in investment after 2002Q2. Table 1 below summarizes the estimates across industries. Note that factors other than the introduction of the EU e-Privacy Directive might also be driving the effect. The available data do not allow us to pin down the effect of the EU e-Privacy Directive separately from other contributing factors.

**Table 1: Implied VC Investment and Percentage Difference in VC Investment in EU**

<b>Time Period</b>	<b>Implied Results</b>	(1)	(2)	(3)	(4)
		<b>Aggregate</b>	<b>Online News</b>	<b>Online Advertising</b>	<b>Cloud Computing</b>
2002Q3 -	Implied Annual Difference in EU Sector Investment (\$ Millions)	-\$125.3	-\$14.3	-\$25.1	-\$88.2
2013Q4	Implied Percentage Difference in Investment	-57.6%	-49.3%	-48.2%	-63.2%
2002Q3 -	Implied Annual Difference in EU Sector Investment (\$ Millions)	-\$61.9	-\$5.3	-\$10.3	-\$46.5
2006Q4	Implied Percentage Difference in Investment	-75.4%	-35.3%	-70.1%	-88.3%

**Note:** “Aggregate” refers to the results across all three sectors including online news, online advertising, and cloud computing.

**Sources:**

[1] Venture Capital (VC) Investment Data from Thomson ONE.

[2] GDP Data from OECD.

[3] Internet Usage Data from World Bank.

More broadly, our results are in line with a view that there may be a trade-off between tighter privacy policies and VC investment. This is important as research shows a positive empirical relationship between VC investment and both job creation and innovation.<sup>3</sup>

In addition to the existing Directives, discussions are ongoing within the EU to further regulate e-Privacy. Specifically, legislation such as the proposal for Regulation on Privacy and Electronic Communications contains provisions that may further limit firms’ access to and processing of user data. To the extent that these rules tighten restrictions on data use, it seems plausible that they may affect the profitability of firms in our three focal sectors, which in turn is likely to negatively affect VC investment in Europe.

<sup>3</sup> Lerner, Josh, *The Architecture of Innovation*, Boston: Harvard Business School Press, 2012; Puri, Manju and Zarutskie, Rebecca, “On the Lifecycle Dynamics of Venture-Capital-and-Non-Venture-Capital-Financed Firms,” *EFA 2007 Ljubljana Meetings Paper; US Census Bureau Center for Economic Studies Paper No. CES-WP-08-13* (June 2010); Hellman, Thomas & Puri, Manju, “The Interaction between Product Market and Financing Strategy: The Role of Venture Capital,” *The Review of Financial Studies* 13, no. 4 (2000).