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# Internet usage and the shadow economy: Evidence from panel data

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### ABSTRACT

The enormous spread of the internet in the last 20 years has been having various economic consequences. In this paper I ask whether the spread of the internet aided or abetted the shadow economy. To this end, using a panel data of 152 countries over 9 years from 1999 to 2007, I examine the empirical relationship between the degree of internet usage and the size of the shadow economy. Panel and cross-section estimation results indicate that the association between internet usage and shadow economy size strongly interacts with GDP per-capita. I also suggest and then empirically test an economic mechanism to account for this observation.

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## 1. Introduction

The enormous spread of the internet in the last 20 years has been having various economic consequences. These effects on the economy span a wide range of areas from technological productivity to foreign direct investment or from inflation to political economy issues. To name a few, Sussman (2000) investigated the effect of the internet spread on press freedom. Freund and Weinhold (2000, 2004) examined the relationship between internet usage and international trade and found that ‘the internet stimulates trade’. Similarly, Choi (2003, 2010) and Choi and Yi (2005, 2009) looked at the effects of internet usage on foreign direct investment, service trade, inflation and economic growth

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in various panels of countries and found evidence toward the existence of significant economic effects of the internet. In another paper [Naude and Saayman \(2005\)](#) showed internet usage as one of the main determinants of tourist arrivals. Finally, in a more recent paper, [Goel et al. \(2012\)](#) study the effect of the internet on corruption and their empirical analysis shows that with its news-disseminating capacity (see [Sussman, 2000](#); [Katz and Rice, 2002](#), for this) the internet increases corruption awareness and therefore deters corruption.

From a broader perspective, the spread of internet usage is part of the Information and Communication Technologies (ICT) revolution. The development in ICT has a substantial positive impact on various economic outcomes ([Noh and Yoo, 2008](#)). Productivity increase ([Oliner and Sichel, 2000, 2003](#); [Varian et al., 2002](#); [Dewan and Riggins, 2005](#)), inflation reduction ([Choi and Yi, 2005](#)), a higher volume of trade ([Freund and Weinhold, 2000, 2004](#)), and higher economic growth ([Roller and Waverman, 2001](#); [Choi and Yi, 2009](#)) are among these positive outcomes. In this regard, [Indjikian and Siegel \(2005\)](#) provide an excellent survey on the economic effects of the spread of ICT in developing economies.

Notwithstanding the increasing focus on the economic aspects of internet usage, the impact of the internet on various economic, political and social variables is still an under-investigated field of research.

Yet another largely under-explored economic phenomenon is the prevalence of the shadow economy – sometimes also titled informal, underground, black or hidden economy – across the national economies in the world, which definitely poses serious economic, social and political challenges. Partly thanks to the recently developed and widely accepted methods (see [Schneider and Enste, 2000](#); [Schneider, 2005, 2007](#); [Schneider et al., 2010](#); or [Elgin and Oztunali, 2012](#), for different methodologies) to estimate its size, increasing attention is paid to the economic causes and consequences of informality. As the size of the shadow economy is significantly affected by variations in economic, political and social variables, the relationship between internet usage and the shadow economy is very much worth studying.

Aiming to combine these two streams of literature on internet usage and informality, in this paper I ask whether the spread of the internet aided or abetted the shadow economy. To this end, using a panel data of 152 countries over the 1999–2007 period, I examine the empirical relationship between the degree of internet usage and the size of the shadow economy. Panel estimation results indicate that the association between internet usage and the size of the shadow economy strongly interacts with GDP per capita. Specifically, internet usage and the size of the informal sector are negatively correlated with each other; however, as GDP per capita increases, this negative correlation is reduced. Moreover, at higher GDP per capita levels, it can even become positive. As I will show in the following sections of the paper, this result is robust to different econometric specifications, inclusion of various control variables, use of different internet usage statistics and focusing on different regional subsets of the data. Once having established such an association between internet usage and the size of the informal sector, I also suggest and then empirically test an economic mechanism to account for this observation. The theoretical framework I build argues that a varying degree of internet usage potentially creates two effects on the size of the informal sector through two distinct causes of informality. One of these two effects works through changing productivity and another through taxes. Accordingly, one should expect that increasing (decreasing) internet usage should be associated with increasing (decreasing) productivity and increasing (decreasing) taxes. As productivity is negatively and taxes are positively correlated with the size of the informal sector, internet usage has the potential to create two opposing effects on informality. Moreover, the empirical analysis I perform also shows that the effect of internet usage on informality through productivity is more pronounced in countries with lower GDP per capita, whereas the effect through taxes is stronger in richer countries. This mechanism establishes an explanation for why the association between internet usage and the size of the informal sector interacts with GDP per capita.

The rest of the paper is organized as follows. In the next section, I construct a theoretical framework to hypothesize how the relationship between internet usage and the shadow economy manifests itself in the data. Then, in Section 3, I present the data along with empirical results. Finally, in Section 4, I provide some concluding remarks and a discussion.

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