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**Research Paper**

# Can tax evasion be reduced by fostering cashless payments? A systematic literature review

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## ABSTRACT

Tax evasion is a crucial issue worldwide. It is facilitated by the cash economy, as cash is untraceable and allows individuals to easily conceal the history of their transactions, thus facilitating underreporting. Conversely, cashless payments are traceable, which makes evasion more difficult. Despite increasing interest from policy makers, the literature on the impact of payment instruments on tax evasion is still scarce and fragmented. This paper therefore presents a systematic literature review on the topic. More specifically, we analyze 26 papers published in peer-reviewed journals, which document that cash has a positive impact on tax evasion and the shadow economy whereas card payments foster value added tax compliance. Other topics, such as the impact of digital wallets and central bank digital currencies on tax evasion, prove to be rather neglected. Finally, we discuss which policies can be introduced by policy makers to reduce tax evasion, and we provide suggestions for future research.

**Keywords:** tax evasion; cash; digital payments; mobile payments; literature review; shadow economy.

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## 1 INTRODUCTION

Tax evasion continues to occur and its incidence is substantial, making it a crucial issue worldwide (Organisation for Economic Co-operation and Development 2017). For instance, European Commission (2023) estimated that the overall value added tax (VAT) gap in the 27 countries of the European Union (EU) was €99.3 billion in 2020 alone (or 9.6% of total VAT liability).

There are two specific types of tax evasion that appear to be widespread (Organisation for Economic Co-operation and Development 2017):

(1) the underreporting of income through the artificial reduction of sales, and

(2) the overreporting of deductions via false invoicing.

These illicit behaviors are facilitated by the existence of the cash economy (Organisation for Economic Co-operation and Development 2017). Cash is fungible and untraceable, and thus it allows individuals to easily conceal the history of their transactions, thereby facilitating underreporting of revenues and, ultimately, tax evasion (Immordino and Russo 2018a; Organisation for Economic Co-operation and Development 2017). Conversely, cashless payments, by being traceable, make evasion more difficult (Immordino and Russo 2018a) and may increase the perceived probability of detection, thereby improving compliance (Madzharova 2020).

For this reason, policy makers are increasingly considering cashless payments as a tool to reduce tax evasion. For instance, in 2019, the Italian government devised the so-called Piano Italia Cashless (literally: Cashless Italy Plan), a package of incentives to foster cashless payments and deterrents to discourage the use of cash. Another example is Greece, which ranks third worst in the EU in terms of the VAT gap, but where finance minister Kostis Hatzidakis recently stated that increasing the share of digital transactions remains key to reducing tax evasion; a central tenet of the policy has been to oblige businesses to link point-of-sale (POS) systems to their cash registers. In the most recent development, as of May 1, 2024, taxis and outdoor market stalls (two cash-intensive sectors) also have to accept card payments. Plumbers, electricians, architects, doctors and lawyers are still excluded from the measures, at least for the time being (Varvitsioti 2024).

Despite this increasing interest from policy makers, the role of payment instruments as a determinant of tax evasion is still underexplored in the literature (Immordino and Russo 2018a). For instance, Burgstaller and Pfeil (2024) analyze the coordination mechanism of collaborative tax evasion, ie, the interaction of a buyer and a seller who can either declare the transaction (thereby complying to the tax norm) or collude to hide the operation and evade taxes. However, Burgstaller and Pfeil's analysis focuses solely on the interaction mechanism and pays no attention to the role of the payment method chosen for the transaction.

Moreover, the literature of interest is patchy: extant studies investigate the impact of payment instruments on tax evasion using a variety of methods in different contexts. Immordino and Russo (2018b), for example, develop a bargaining model of tax evasion in which a seller offers a discounted price to a buyer in exchange for a cash payment without a receipt. Another paper by the same authors (Immordino and Russo 2018a) is empirical in nature, and it examines the relationship between card payments and VAT evasion using European cross-country data. Hondroyiannis and Papaoikonomou (2017) also investigate the effect of card payments on VAT revenue performance, but they focus on Greece. Other authors have instead focused on the impact of cash (see, for example, Giammatteo *et al* 2022). Such a fragmented literature makes it challenging for both researchers and policy makers to build upon extant knowledge and take it forward.

Therefore our paper systematically reviews the literature on the impact of payment instruments on tax evasion, critically synthesizes it for future reference and suggests fruitful directions for future research. More specifically, from a total of 667 potentially relevant papers we selected and analyzed 26; these papers were published between 1998 and 2023, with a peak in the last two years.

The remainder of the paper is organized as follows. Section 2 presents related work that reviews the literature in our two areas of interest: tax evasion and payment instruments. Section 3 describes our research method and design. Section 4 explains the framework used to analyze and synthesize the literature. Section 5 presents our results, which are discussed in Section 6. Section 7 outlines our conclusions.

## 2 RELATED WORK

Our analysis contributes to two distinct fields of research on, respectively, tax evasion and payment instruments.

The literature on the first topic is quite abundant and dates back to the 1970s, starting with Allingham and Sandmo (1972), who proposed a model to analyze the individual taxpayer's decision on whether, and to what extent, to avoid income taxes by deliberate underreporting. The literature since then has been reviewed by several authors. Andreoni *et al* (1998) focused on personal income tax compliance, describing the main theoretical and empirical findings. Sandmo (2005) provided an overview of the main contributions to the theory of tax evasion, while Slemrod (2007) reviewed the literature on the magnitude, nature and determinants of tax evasion, with an emphasis on US income tax. More recently, Khlif and Achek (2015) analyzed the empirical research on the determinants of tax evasion worldwide. They found only six studies, which suggests that a theoretical debate is still in its infancy.

Taken together, these reviews show that previous research is mainly focused on income tax evasion and on the individual taxpayer's behavior, with no interaction

between agents and little attention paid to the payment method chosen for the transaction. The only (partial) exception is Immordino and Russo (2018b), who synthesize the literature on cooperative tax evasion (ie, evasion that stems from the collusion between a seller and a buyer). However, since their paper does not provide a literature review, it lacks a systematic search and, as a result, their synthesis is not comprehensive. Moreover, unlike our study, their focus is on the act of cooperating, rather than on the payment instrument used.

To turn to the topic of payment instruments, the first paper of interest is by Dahlberg *et al* (2008), who review the literature on mobile payment adoption. They develop a framework based on five competitive forces and four contingency factors, and they show that the literature up to 2006 was mainly focused on adoption by consumers and on security and trust matters, while social and cultural factors were overlooked and a comparison with more traditional means of payments was lacking. Dahlberg *et al* (2015) update the earlier review of Dahlberg *et al* (2008) and find that there had been little improvement since 2006, in that consumer adoption and technology aspects were still the most analyzed topics. Abdullah and Naved Khan (2021), for their part, present a bibliometric analysis of the research on mobile payment published between 2005 and 2020. They analyze 56 studies and show that since 2014 there has been an upward trend in the number of papers on the topic.

Finally, Khando *et al* (2023) analyze the literature on the emerging "digital" payment methods. They propose four categories: card payment, "e-payment" (essentially online payments), mobile payment and cryptocurrencies. They find that mobile payment is the most analyzed category, followed by e-payment. Khando *et al* also list the challenges faced by emerging payment technologies, which they classify into five themes: social, economic, technical, awareness and legal. Of these, technical challenges are the most analyzed, with 39% of the studies covering issues related to "privacy, security and lack of technical infrastructure" (Khando *et al* 2023, p. 17). This result confirms the findings of Dahlberg *et al* (2008, 2015). Interestingly, Khando *et al* include the impact of digital payments on taxation among their economic challenges.

Overall, what emerges from these review studies is that the extant literature is mainly focused on mobile payment, while other methods such as payment cards are largely neglected. Since card payments are the most frequently used cashless payment method at the POS (European Central Bank 2022), they deserve more attention. In addition, the current focus is on consumers' adoption and technological challenges, whereas the adoption by merchants and the impact on tax evasion are underexplored topics.

## 3 RESEARCH METHOD AND DESIGN

Systematic literature reviews (SLRs) are important for several reasons. They allow scholars to gain a better understanding of the state of research in a given field and to highlight possible patterns for the development of the field itself, thereby creating a road map or an agenda (Dahlberg *et al* 2008). This is particularly useful when the literature is fragmented, as is the case here. Also, by presenting a synthesis of existing findings, literature reviews not only prevent researchers from repeating work already done, but also highlight areas where new research is needed (Dahlberg *et al* 2008; Webster and Watson 2002). We resorted to an SLR because it enables us to present the reader with a comprehensive understanding of the foundational research in a particular field (Behera *et al* 2019), which suits the purposes of our paper.

Our analysis follows the guidelines provided by Tranfield *et al* (2003). Accordingly, we first identified the research objective ("To systematically review the literature on the impact of payment instruments on tax evasion, critically synthesize it for future reference, and suggest directions for future research") as well as the research question ("What is the impact of the use of different payment instruments on tax evasion?").

The second step was the systematic search, for which we identified the database(s), the query and the inclusion/exclusion criteria.

Scopus was deemed the most appropriate source for the domain of interest,[1] since it is the most comprehensive database in the field of business and management (and social sciences in general). Moreover, all journals in Scopus are reviewed yearly, thereby guaranteeing that high quality standards are maintained. To make sure that we did not miss any relevant contributions, we ran the same query in the Web of Science (WoS) database.[2]

After a preliminary analysis of the main contributions, we selected the keywords to look for in the papers' titles and abstracts, as well as in the keywords provided by the authors. The two main keywords were "tax" and "VAT". We added VAT because it is the main focus of papers that investigate the impact of payment instruments on tax evasion. Authors might thus simply refer to VAT without mentioning the word tax (see, for example, Hondroyiannis and Papaoikonomou 2017). Using the operator "W/n"[3] the two principal keywords were combined with the words "evasion", "compliance", "revenue" or "performance". We set $n = 2$ to ensure that we captured all documents where the selected keywords are separated by at most two words: not

[1] URL: www.elsevier.com/products/scopus.

[2] URL: www.webofscience.com/wos.

[3] For the WoS database we used the operator NEAR/n, which has the same meaning as W/n for Scopus. Both operators mean "within $n$", and allow us to find documents where the terms in the query are within a specified number of terms, $n$.

only "tax evasion" but also "evasion of tax". We decided against using the operator "AND" because such a query might return out-of-scope documents that do contain the desired combination of keywords but in completely unrelated sentences.

We decided to combine "tax" or "VAT" with not only "evasion" (the topic of direct interest) but also "compliance", so as to capture the opposite phenomenon as well (ie, the reduction of tax evasion). "Revenue" or "performance" was included, since the preliminary analysis had shown that some in-scope contributions focus specifically on the effect of digital payments on tax revenues or tax performance (see, for example, Hondroyiannis and Papaoikonomou 2017). "Fraud" was added as well, to include papers referring to tax fraud. On the other hand, we decided against including "avoidance", since this is a different phenomenon, beyond the scope of our analysis. Indeed, as stated by Sandmo (2005, p. 645), "the conceptual distinction between tax evasion and tax avoidance hinges on the legality of the taxpayer's actions". Tax evasion is a violation of the law, and individuals who engage in tax evasion worry about the possibility of being detected. But tax avoidance "is within the framework of the tax law". The individual who engages in tax avoidance exploits loopholes in the law and does not worry about being detected; "quite the contrary, it is often imperative that he makes a detailed statement about his transactions to ensure that he gets the tax reduction that he desires" (Sandmo 2005, p. 645). The preliminary analysis also showed that some authors refer to the shadow economy in general, without mentioning any terms related to the concept of tax evasion.[4] For this reason, we also included the keywords "shadow" or "underground", combined with the keywords "economy" or "sector" through the operator "W/2".

The part of the query just explained allows us to cover our first topic: tax evasion. These keywords were then further combined, by means of the operator "AND", with keywords meant to capture the topic of payment instruments, so as to unearth the literature that specifically investigates their effects on tax evasion. Obvious choices were "cash", "banknotes" and "cashless". We also included "currency demand" and "currency supply" because the preliminary analysis showed that some influential papers refer directly to currency demand (or supply) without mentioning "cash" or "banknotes" (see, for example, Rogoff 1998). Also, we added "digital", "electronic", "traceable" and "mobile", combined, through the operator "W/2", with the keyword "payment∗" (the asterisk allowing us to capture words that begin with "payment": both "payment" and "payments"). We also added "payment∗", "credit" or "debit", combined by "W/2" with "card∗", because authors may refer directly to

[4] This is because the concepts of tax evasion and shadow economy are related. Indeed, according to the taxonomy developed by Schneider and Enste (2000, pp. 79–80), "the shadow economy includes unreported income from the production of legal goods and services, either from monetary or barter transactions, hence all economic activities that would generally be taxable were they reported to the tax authorities".

the use of payment cards. Finally, we included keywords for other payment instruments that have received growing attention from the industry, such as digital wallets, cryptocurrencies and central bank digital currencies (CBDCs).

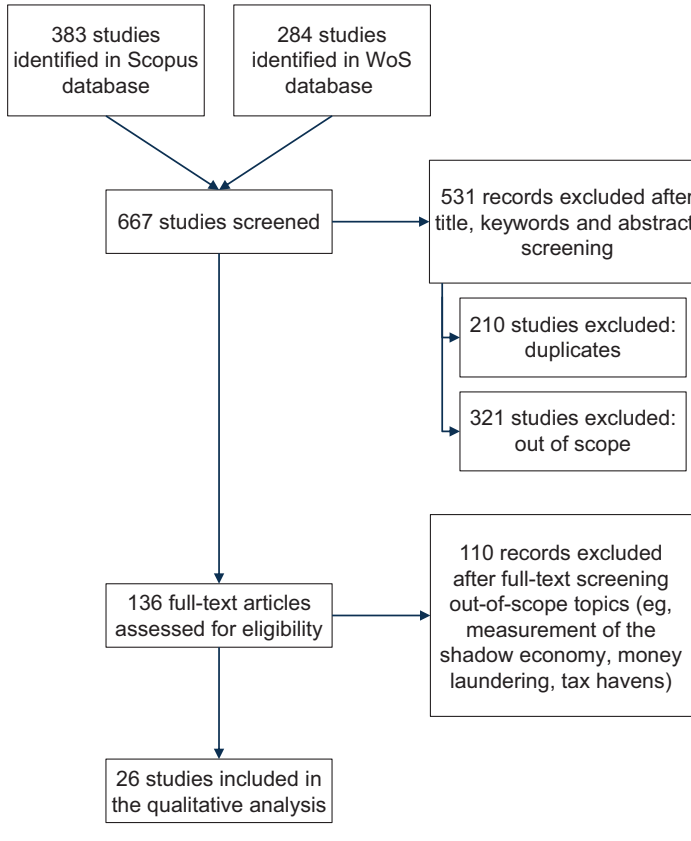
We set filters for language, selecting only documents written in English, since English is the lingua franca of the scientific community. Also, since the focus of our analysis is on the academic literature, we considered only peer-reviewed journal articles.

Further, we excluded all subject areas that we considered out of scope and maintained only those of interest. For the Scopus database, we maintained Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting, Engineering, Decision Sciences, and multidisciplinary. For the WoS database, we kept Economics, Business, Business Finance, Law, Management, Political Science, Public Administration and multidisciplinary. We opted for a broad scope to maximize the sensitivity of the search protocol and, in this way, avoid excluding potentially relevant papers. Finally, filters on year of publication were intentionally not included, since we are interested in all contributions regardless of the period of publication.

The resulting queries were run on January 4, 2024,[5] and returned 383 papers from Scopus and 284 from WoS. The selection of studies was performed in two stages, as shown in Figure 1. In the first stage, we excluded 210 duplicates and then analyzed title, keywords and abstract. There were 321 contributions considered out of scope and excluded (eg, papers analyzing taxation of multinational companies, carbon taxes or cyber crime). In the second stage, we analyzed the full text of the remaining 136 studies. We excluded 110 papers because they analyze out-of-scope topics such as money laundering, tax havens and the measurement of the shadow economy. Finally, the remaining 26 studies were analyzed and classified through the data extraction form (Tranfield *et al* 2003), which includes general information on the study (such as title, author(s), publication details) as well as features linked to the proposed framework (see Section 4) (eg, methods used and payment instrument(s) analyzed).

[5] For Scopus: TITLE-ABS-KEY ((((tax OR vat) W/2 (evasion OR compliance OR revenue OR performance OR fraud)) OR ((shadow OR underground) W/2 (economy OR sector))) AND (cash OR banknotes OR "currency demand" OR "currency supply" OR cashless OR ((digital OR electronic OR traceable OR mobile) W/2 payment∗) OR ((payment∗ OR credit OR debit) W/2 card∗) OR ((digital OR mobile) W/2 wallet∗) OR cryptocurrenc∗ OR cbdc OR "central bank digital currency" OR "central bank digital currencies")) AND (LIMIT-TO (SUBJAREA, "ECON") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "ENGI") OR LIMIT-TO (SUBJAREA, "DECI") OR LIMIT-TO (SUBJAREA, "MULT")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")).

**FIGURE 1** PRISMA chart based on the inclusion and exclusion criteria.

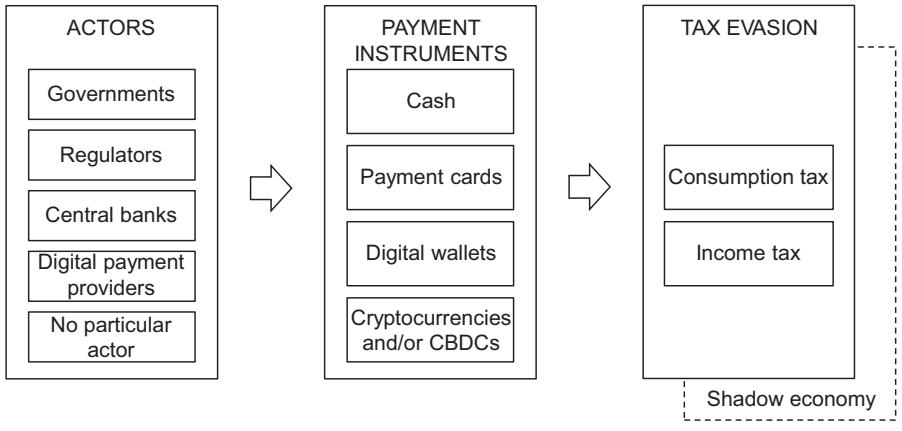



## 4 PROPOSED FRAMEWORK FOR THE SYSTEMATIC LITERATURE REVIEW

Figure 2 shows the framework we used to synthesize the selected studies, analyze their findings, identify gaps in the literature and provide suggestions for future research. As the arrows indicate, in the framework the causality goes from left to right. However, we will explain it in the other direction, starting from the central topic of the analysis (tax evasion), moving to the factors that can potentially affect it (payment instruments) and then to the actors that can promote or hinder their usage.

At the core of the framework is obviously the "target" of our analysis: tax evasion. In our analysis, we focus on taxation of business-to-consumer (B2C) transactions. In this context, if there is no trail of the transaction, the seller can hide it, thereby

**FIGURE 2** The proposed framework.




underreporting sales and, thus, revenues. This negatively affects both the indirect taxes on consumption, typically the VAT, and the direct taxes on the income of the seller, since lower reported revenue leads to lower reported income.[6] This is why the framework includes two categories for tax evasion: consumption tax and income tax. In the background there is a more general concept, the shadow economy, since unreported transactions contribute to its size.

We then added to the framework the most used payment methods worldwide, as possible determinants of tax evasion. To identify these, we used the 2023 Worldpay from FIS Global Payment Report (Worldpay 2023). According to this report, the most used payment methods were payment cards (divided into credit, debit and prepaid cards), digital wallets and cash. To this list, we added cryptocurrencies and CBDCs, which received growing attention, especially from central banks (Kwon *et al* 2022; Scarcella 2021).

Payment cards are defined by the European Central Bank as "payment instruments, which are based on the rules of a card scheme, used to withdraw or place cash and/or enable a transfer of value at the request of the payer (via the payee) or the payee in respect of an end-user account linked to the card".[7] Payment cards are issued by financial institutions typically associated with a global card scheme (eg, Mastercard,

[6] This reasoning applies to transactions made at both the POS and online. Remote sales make it difficult for the tax authority to determine the exact location of sales and consumption of goods and services, thereby leaving room for underreporting (Agrawal and Fox 2017; Bacache Beauvallet 2018). For this reason, we do not distinguish between in-store purchases and e-commerce.

[7] URL: www.ecb.europa.eu/services/glossary/html/glossp.en.html.

Visa or UnionPay). Cards can be credit, debit or prepaid. Credit cards enable cardholders to make purchases by accessing credit provided by a financial institution or by deferring the charging of expenses to a given date (usually until the middle or end of the month), while payments made using debit cards are debited directly from the account that the consumer has at a financial institution. Prepaid cards are funded once or reloaded with credit by the cardholder, who can then make payments. In 2022, payment cards accounted for 51% of global POS transaction value (Worldpay 2023).

Digital wallets are "apps that securely store payment credentials, allowing consumers to pay for goods and services virtually everywhere commerce takes place" (ie, both online and in-store) (Worldpay 2023, p. 181). Examples are Alipay, Apple Pay, Google Pay, PayPal and Samsung Pay. In 2022, digital wallets represented 32% of the transaction value at the POS, or approximately US$15.1 trillion (Worldpay 2023). Since digital wallets are apps that are most frequently installed on a smartphone, they are also referred to as mobile payments.

Cash refers to physical currency (ie, banknotes and coins). In 2022, cash represented about 16% of global POS transaction value (Worldpay 2023).

The use of payment instruments at the POS differs substantially across geographical areas. For instance, cash is still widespread in the Middle East and African markets and in Latin America, where it accounted for 43% and 31%, respectively, of POS transaction value in 2022. On the other hand, payment cards are very popular in North America and Europe with, respectively, about 75% and 65% of POS transaction value. Digital wallets are the preferred payment method in the Asia-Pacific market, both at the POS and for e-commerce. They account for 47% of the value transacted at the POS and 69% of the value transacted online. Card payments are the preferred online payment method in both North America and Europe, where they represented 51% and 41%, respectively, of the total value transacted online in 2022 (Worldpay 2023).

As mentioned, we also included cryptocurrencies and CBDCs in our framework. A cryptocurrency system can be defined as a system for the issuance of tokens that can "be used as a general or limited-purpose medium of exchange" (Pernice and Scott 2021, p. 1). In such a system, cryptography is used to replace trust in institutions (Pernice and Scott 2021). The "cryptocurrencies and CBDC" category includes "private cryptocurrencies such as Bitcoin and Ethereum, stablecoins such as Tether and USD Coin, and crypto-linked cards such as the BitPay Mastercard" (Worldpay 2023, p. 181). The use of cryptocurrencies as a payment method is still low: in 2022, they accounted for less than 0.2% of the total value transacted online globally (Worldpay 2023). Nevertheless, the diffusion of crypto-backed cards and crypto payment gateways is increasing the ability of consumers to pay by means of cryptocurrencies (Worldpay 2023). Finally, CBDCs are defined by the European Central Bank and by the Federal Reserve as a form of central bank money that exists only in a

digital form. Several countries are exploring the possibility of developing their own CBDC (Cotugno *et al* 2024). For instance, the Bank of Korea is working on CBDC experiments (Bae 2022). Nigeria and China are in a more advanced phase. The People's Bank of China continues to expand tests of the e-CNY, the Chinese CBDC, and reports that it was used to transact US$14 billion in 2022, which is nevertheless still a relatively small amount compared with the size of the Chinese economy (Worldpay 2023). Similarly, the Central Bank of Nigeria launched the eNaira, the Nigerian digital legal tender, in 2021, but in this case too, adoption by consumers is still low (Worldpay 2023).

Our framework in Figure 2 allows us to map and analyze the literature on the impact of the different payment methods on tax evasion, so as to, ultimately, determine which actions or policy measures might be taken. However, it is important to identify not only the actions that can be taken but also the actors that could take them. We therefore include in the framework the players that can foster or reduce the adoption of a given payment method. The identified actors are governments, regulators, central banks and digital payment providers. We also include the category "no particular actor" to accommodate papers that do not provide policy implications and thus do not target any specific actor.

"Governments" refers to the authority that governs a given country and can introduce policies. "Regulators" refers to the body responsible for proposing and making laws concerning the payments sector. Examples of players in this category are supervisory authorities or, for the EU, the European Parliament or the European Commission. Central banks are public institutions that manage the currency of a country (or group of countries) and control the money supply (ie, the amount of money in circulation) (European Central Bank 2015). Finally, digital payment providers refer to the "private" actors that supply a cashless payment instrument (eg, banks or fintech companies). All mentioned actors can affect the adoption of payment instruments, each in their own way. As already mentioned, governments can provide tax incentives to promote digital payments or introduce a threshold above which cash cannot be used for transactions; regulators could create a favorable regulatory framework for traceable payments; and, finally, central banks and digital payment providers can decide upon the characteristics of their instrument(s). For instance, central banks could change the denomination of banknotes, and providers could introduce rewards for regular users.

## 5 RESULTS

### 5.1 Descriptive findings

As explained in Section 3, we ultimately selected 26 papers for further analysis. Figure 3 shows that these were published between 1998 and 2023. Research in this

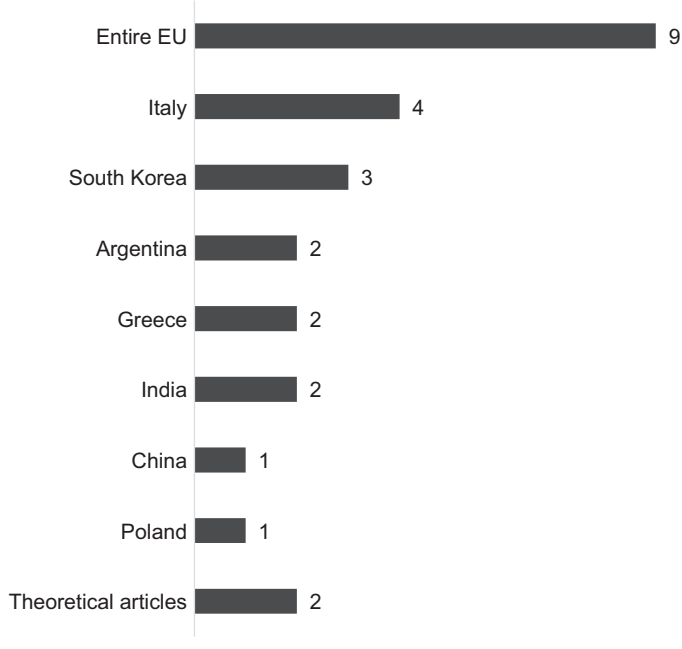
**FIGURE 3** Distribution of the papers throughout the years.


field thus started in the late 1990s, with a debate on the reduction of the use of cash (see Section 5.2.3); this field then became increasingly popular from 2017.

In terms of geographical setting (Figure 4), the most investigated area is the EU as a whole, with nine papers.[8] Next is Italy, with four contributions. This interest in Italy stems from policies implemented by its governments over the years, most notably on the cash threshold (see Section 5.2.2 for details). South Korea follows, with three papers analyzing the Tax Incentives for Electronically Traceable Payments (TIETP) policy, introduced in 1999 (see Section 5.2.2 for details). Other countries of interest are Greece and India, with two papers each. As will be shown in Section 5.2.2, in 2015 the Greek government imposed capital controls (including cash restrictions) to prevent a banking crisis (Danchev *et al* 2020). In India, on November 8, 2016, the government unexpectedly announced that the two largest banknotes would no longer be legal tender (Bajaj and Damodaran 2022; Das *et al* 2023), a policy that has been dubbed "demonetization" (again, see Section 5.2.2 for details).

[8] Hondroyiannis and Papaoikonomou (2020) use data for the euro area. Madzharova (2020) analyzes the EU minus Croatia, Cyprus, Luxembourg and Malta.

**FIGURE 4** Distribution of the papers according to the geographical context.




As explained in Section 4, we categorized papers according to the aspects of tax evasion they focus on, the payment instruments they analyze and the actors they target. Obviously, several papers fall into more than one category, as they, for instance, analyze more than just one payment instrument. To present the results in an orderly fashion, we resorted to the concept matrix, as suggested by Webster and Watson (2002). Table A1 in Appendix A (online) shows the results for tax evasion, with the papers listed first in chronological order, and then in alphabetical order for those within the same year. The most analyzed topic is the consumption tax (in most cases, the VAT), followed by the income tax. The shadow economy is analyzed by seven papers. Table A2 (Appendix A online) shows the results for payment instruments. The most analyzed methods are payment cards (16 papers) and cash (9 papers), while digital wallets and cryptocurrencies and CBDCs are, for now, still relatively unexplored topics (with 4 contributions each). Table A3 (online) displays the results for actors. Governments are the most targeted actors (19 papers), followed by central banks (8 papers), regulators (6 papers) and digital payment providers (3 papers). Three contributions do not provide policy or managerial implications, and hence they do not target a specific actor.

**TABLE 1** Concept matrix for the combination of tax evasion and payment instruments.

| | Cash | Payment cards | Digital wallets | Cryptocurrencies and CBDCs |
|---|---|---|---|---|
| **Consumption tax** | 5 | 13 | 3 | 4 |
| **Income tax** | 3 | 3 | 1 | 2 |
| **Shadow economy** | 4 | 3 | 2 | — |

The grand total exceeds the number of papers studied (26) because a single paper may analyze more than one category of tax evasion and more than one payment instrument. See Appendix C (online) for a list of the references. *Source:* authors' own elaboration of the concept matrix proposed by Webster and Watson (2002).

**TABLE 2** Concept matrix for the combination of actors and payment instruments.

| | Cash | Payment cards | Digital wallets | Cryptocurrencies and CBDCs |
|---|---|---|---|---|
| **Governments** | 7 | 14 | 3 | — |
| **Regulators** | 1 | 1 | — | 4 |
| **Central banks** | 3 | 1 | — | 4 |
| **Digital payment providers** | — | 3 | — | — |
| **No particular actor** | — | 3 | — | — |

The grand total exceeds the number of papers studied (26) because a single paper may analyze more than one actor and more than one payment instrument. See Appendix D (online) for a list of the references. *Source:* authors' own elaboration of the concept matrix proposed by Webster and Watson (2002).

Finally, Tables 1 and 2 show the intersection between, respectively, the tax evasion and payment instrument categories, and the actors and payment instrument categories.

## 5.2 Themes identified

Upon analyzing the 26 selected papers by means of the framework in Figure 2, four main themes emerged (given in order of extent of attention):

(1) the impact of payment methods on tax performance,

(2) the effectiveness of policies,

(3) cash substitution, and

(4) the design of CBDCs.

Table B1 (see Appendix B online) shows the distribution of the papers across the four themes, together with a description of the methods as well as the main variables

of interest (when applicable). Papers are again presented in chronological and then alphabetical order, starting with the most popular theme.

In the remainder of this section, we discuss the themes one by one, from largest to smallest extent.

### 5.2.1 The impact of payment methods on tax performance

Ten papers analyze the impact of different payment methods on tax performance. Most of these contributions are aimed at assessing the impact of card payments on VAT evasion. Indeed, seven out of ten specifically analyze VAT evasion, with two additional papers examining tax evasion in general (ie, both VAT and income tax). Also, nine out of ten investigate the impact of card payments. Of these, three also consider cash, and one also digital wallets.

On the level of individual papers, the following remarks can be made. Immordino and Russo (2018a) use instrumental variable regressions to assess the impact of cash and credit/debit cards on VAT evasion in the EU, for which they rely on the VAT gap estimates published by European Commission (2014). Similarly, Alognon *et al* (2021) use instrumental variables regression and fixed-effect panel regression to analyze the impact of cash and payment cards on VAT evasion in the EU, measured as

(1) the VAT gap,

(2) the VAT gap over gross domestic product (GDP), and

(3) the VAT gap over the VAT Total Tax Liability (VTTL).

Both Alognon *et al* (2021) and Immordino and Russo (2018a) find that a higher usage of card payments is associated with lower VAT evasion.

Other authors instead focus on the impact of payment instruments on VAT revenues. For example, Hondroyiannis and Papaoikonomou (2017) analyze the effect of card payments on VAT revenues in Greece. In a subsequent paper (Hondroyiannis and Papaoikonomou 2020) they extend the framework to the 19 euro area member states. Both papers find a positive relation between card usage and VAT revenues.

A peculiar case is Giammatteo *et al* (2022), who, unlike the aforementioned authors, focus on the role of cash in fostering the shadow economy in Italy. They measure the shadow economy as the ratio of undeclared value added over total value added, using data from Istat, the Italian statistical agency. Cash use is proxied by the share of both cash withdrawals and deposits over total transactions made at Italian banks. Using an instrumental variable approach, they find that an increase in cash transactions translates, ceteris paribus, into a higher share of the shadow economy. Giammatteo *et al* go on to evaluate the effects of raising the cash threshold, as

the Italian government did in 2016 (from €1000 to €3000). Through a difference-in-difference approach, they find that this change had the effect of increasing the share of unreported value added. They therefore argue that a lower threshold for cash transactions is an effective policy to hinder tax evasion.

In line with the results in Figure 2, in terms of geographical setting, eight contributions out of the ten analyze either the EU in its entirety or individual EU countries; namely, Greece (Hondroyiannis and Papaoikonomou 2017) and Italy (Giammatteo *et al* 2022). Only two papers have a different geographical scope, and both focus on Argentina. Mitchell and Scott (2019) posit that Argentina is an interesting case because, starting from 2001, it experienced an increase in VAT revenues, despite developments (such as slow economic growth, stagnant household consumption and low commodity prices after 2010) that should have translated into a lower VAT-to-GDP ratio. They use time series ordinary least squares regressions to show that the increasing share of the population that is banked, the rising number of cards owned per capita and the growth in the number and value of card transactions per capita all had a positive impact on the VAT-to-GDP ratio. In turn, these factors were positively affected by government policies; examples are restrictions on the amount of cash that could be withdrawn from automated teller machines at any time, and the requirement that antipoverty cash benefits, public pension checks and paychecks of public employees be transferred directly into the bank accounts of the beneficiaries (Mitchell and Scott 2019). This helped raise the share of the banked population and, in turn, nurtured the ownership of credit and debit cards. Retailers also played a role by incentivizing consumers to use cards instead of cash, for security reasons (Mitchell and Scott 2019).

Finally, and more recently, Pedroni (2023) analyzes the impact of the Covid-19 pandemic on the informality of firms in Argentina. Firm informality is defined as comprising both unregistered businesses and registered businesses that underreport revenues. Pedroni uses semistructured interviews with retailers, from which it emerged that, compared with cash and digital wallets, card payments make it more difficult to underreport revenues.

### *5.2.2 The effectiveness of policies*

With nine papers, the effectiveness of policies is the second-most numerous category. To be clear: papers in this category are not focused on a specific aspect of tax evasion, or on a specific payment instrument.

Three papers analyze the TIETP policy implemented in South Korea. In 1999 the National Tax Service introduced income tax deduction for consumers who used credit and debit cards for their purchases (Lee and Swenson 2019; Sung *et al* 2017). Initially, the deduction rates were 10% for both credit and debit card expenditure.

The rates were gradually increased, reaching 15% and 30% for credit and debit card payments, respectively, in 2013. Also, in 2005, the scope of the TIETP was extended to cash transactions (Sung *et al* 2017). Consumers who preferred to pay in cash could ask the retailer to issue an electronically traceable cash receipt (CPR). In this process, first the consumer is identified through their phone number, their ID number or their credit or debit card number, and then the cash receipt is issued through the retailer's payment terminal (Lee and Swenson 2019; Sung *et al* 2017). As with card payments, data is automatically sent to the National Tax Service, without the need for the consumer to keep the receipt (Sung *et al* 2017).

In our sample, the first analysis of these measures is by Sung *et al* (2017), who use counterfactual analysis to estimate the effect of the TIETP in terms of, on the one hand, the increase in income tax revenue and, on the other, the amount of tax revenue forgone to finance the TIETP incentives. Sung *et al* show that the policy was effective in curbing underreporting in sectors where cash was predominant. They also investigate the impact on tax equality and find that the policy helped broaden the tax base. At the same time, because of the progressive tax structure, higher tax relief was given to higher-income earners. But Sung *et al* show that the broadening effect was larger than that of tax relief, so that, overall, the TIETP did improve income redistribution. Binh *et al* (2018), for their part, focus on the effect of stimulating card payments and CPRs on the shadow economy; they show that both initiatives reduced its size. Finally, Lee and Swenson (2019) develop an analysis to assess whether the policy was effective and determine whether there were any collateral effects. Using a difference-in-difference approach, they show that the policy successfully decreased tax evasion and was also cost-effective. However, they also find that the TIETP had collateral effects, such as higher prices in the retail sector and firms exiting the market due to a higher tax burden. Lee and Swenson suggest that countries should consider implementing a similar policy to curb tax evasion, provided that they have a sufficiently developed technology infrastructure. Governments should also consider mechanisms to offset possible side effects.

Two papers focus on India's demonetization experiment. As mentioned in Section 5.1, on November 8, 2016, the two largest denomination notes unexpectedly ceased to be legal tender (Bajaj and Damodaran 2022; Das *et al* 2023), and citizens could return the old notes only until the end of 2016. As the notes represented 86% of the value of currency in circulation (Das *et al* 2023), it was imperative that they were replaced by new ones, but the remonetization process was slow (Bajaj and Damodaran 2022). In view of the limited supply, restrictions on cash withdrawals were introduced, which lasted until 2017 (Das *et al* 2023). Demonetization thus drastically reduced the availability of cash in India (Das *et al* 2023), providing an interesting case to study.

Bajaj and Damodaran (2022) analyze the effects of consumer payment choices on the shadow economy. They show that India's shadow economy temporarily shrank after the demonetization, also as a consequence of a switch to cashless payment instruments. Das *et al* (2023) show that the demonetization led to an increase in the sales reported to the tax authority by firms, and to higher tax payments. Interestingly, demonetization hit different local areas in different ways, depending on the presence of "currency chests" (Das *et al* 2023). Currency chests are branches of commercial banks that distribute the new currency received from the central bank. Access to new notes was easier in areas with such branches, which, as a result, experienced a milder effect of the demonetization. Das *et al* exploit this difference to argue that the increase in tax compliance was also due to an increase in cashless payments. They show that areas where the demonetization shock was greater experienced a more pronounced growth in cashless payments and argue that this suggests that demonetization led to higher tax payments through the increase in cashless payments. Their conclusion is in line with the findings by Bajaj and Damodaran (2022). However, they were not able to test for this mechanism directly.

Two papers in our sample (Rainone 2023; Russo 2022) utilize the Italian case. Italy is particularly interesting because of the introduction of several policies to reduce cash usage and foster digital payments, with the ultimate goal of curbing tax evasion. Specifically, Russo (2022) focuses on a law that sets the maximum amount above which cash cannot be used in payments, making it mandatory to settle the transaction with cashless methods such as payment cards. This "cash threshold" was introduced in 1991, when it was set at 20 million lire, equivalent to €10 329. Since then, the threshold has been changed 12 times: lowered or increased depending on the political party in charge (Russo 2022). The cash threshold is a heavily debated political topic in Italy. It is strongly promoted by political parties whose electorate is mainly composed of employees, whereas it is ostracized by parties supported by professionals, shop owners and, more broadly, individuals who are not subjected to tax withholding (Russo 2022). Starting from January 1, 2023, the cash threshold was set at €5000.

Russo (2022) uses a difference-in-difference model to show that a cash threshold is effective in reducing cash income and cash in circulation in the economy. He does not directly analyze the effect on tax evasion but builds on the literature to argue that since cash usage hinders tax collection, its reduction (brought about by the cash threshold) should ultimately increase tax revenues. Rainone (2023), for his part, uses a fixed-effects panel regression to analyze the impact on the demand for cash of two policies to fight tax evasion:

(1) allowing the tax authority to access taxpayers' bank data; and

(2) changing the cash threshold.

He finds that both policies had a significant impact on cash holdings overall. However, just like Russo (2022), Rainone does not measure the effect of the policies on tax evasion directly.

Greece represents another interesting case. In 2015, capital controls were introduced to prevent a crisis of the banking system (Danchev *et al* 2020). What is interesting for our analysis is that the policies included restrictions on cash withdrawals (Hondroyiannis and Papaoikonomou 2017) as well as incentives to promote digital payments, such as a tax break conditional on the use of digital payments, a lottery linked to card payments, the mandatory acceptance of digital payments for business and a lowering of the cash threshold from €1500 to €500 (Danchev *et al* 2020). Danchev *et al* show that these policies were effective in promoting the use of cards. They also find that the uptake of card payments had a positive impact on VAT revenue.

Finally, Sarnowski and Selera (2022) discuss the measures introduced over the years in Poland to foster cashless payments and reduce the use of cash. They focus on the VAT refund granted to taxpayers who use cashless payment instruments. They show that the success of the policy implemented in Poland is due to the attractive tax incentives, and predominantly to the automatic verification of the criteria to be met. More specifically, taxpayers are not required to prove their compliance with the required criteria, but rather the verification is left to the tax authority, which also bears the risks relating to settlements.

### *5.2.3 Cash substitution*

Four papers in our sample focus on the disadvantages of cash and on the benefits that can be derived from its reduction in the economy. Rogoff (1998) analyzes the currency supply in member countries of the Organisation for Economic Co-operation and Development (OECD) and shows that a large share of cash is held in the shadow economy. Similarly, Ardizzi *et al* (2014) exploit the quantity of cash in circulation to measure the shadow economy in Italy. Their paper is interesting for our analysis because of the policy implications: Ardizzi *et al* suggest that reducing the use of cash is likely to curb the shadow economy.

The remaining two papers analyze the impact on tax evasion in general. Immordino and Russo (2018b) propose a bargaining model of cooperative tax evasion to investigate the effect of a tax on cash withdrawals (TCW) and of a tax rebate that is conditional on presenting a payment receipt. For the purpose of our analysis, we focus on the effect of the first, since the tax rebate does not depend on the payment method chosen by the buyer. Immordino and Russo point out that a TCW is problematic for several reasons. First of all, it reduces tax evasion only if the tax rate is high enough. However, if this rate is higher than the cost of hoarding cash, the tax might

backfire and foster the cash economy instead. Also, a TCW represents an additional cost for honest taxpayers, who should then be compensated. Immordino and Russo therefore do not suggest the introduction of such a policy. Kwon *et al* (2022), for their part, propose a dual-currency model to analyze the effect of the substitution of cash with a CBDC. They show that the introduction of a CBDC with a positive interest rate can reduce tax evasion, and thus improve welfare, provided that seigniorage transfer from the central bank to the fiscal authority is restricted.

### *5.2.4 The design of central bank digital currencies*

Recently, scholars have started to investigate the potential impact of CBDC designs on tax evasion. As shown in Table B1 (see Appendix B online), 3 out of the 26 papers in our database fall in this category.

For one, Scarcella (2021) qualitatively discusses the potential benefits and risks of a CBDC and also highlights the key concerns policy makers should take into account when designing the instrument, such as privacy and digital literacy. Jozipovic *et al* (2022) discuss the impact of CBDCs and cryptoassets from a tax assessment perspective. Their paper focuses on the anonymity of CBDCs, to determine to what extent and for which type of transactions anonymity should be granted. Finally, Ren *et al* (2023) also focus on the anonymity of CBCDs, but their paper is empirical in nature. Specifically, they propose a new monetarist model to assess the impact of the introduction of a "managed anonymous" CBDC on social welfare and taxation in China. Managed anonymity refers to the fact that a CBDC can have different degrees of anonymity, depending on how it is designed. It can offer high anonymity, similar to physical cash, or it can have a lower degree of anonymity and thus be more like bank instruments (Ren *et al* 2023). Ren *et al* argue that an anonymous CBDC can increase individual welfare in the official economy but that the benefits in terms of both aggregate welfare and tax revenues are relatively small; conversely, a CBDC with a lower degree of anonymity could improve tax revenues and aggregate welfare.

## 6 DISCUSSION

In this section, we discuss the results of our analysis based on the framework in Figure 2. Just as in our research framework, we start by presenting the evidence on the impact of cash on the different categories of tax evasion. Subsequently, we move to payment cards, digital wallets, and cryptocurrencies and CBDCs. Finally, we discuss the role of the different actors.

On the one hand, this approach allows us to cover the payment instruments that might have an impact on tax evasion, highlighting the gaps in the literature and formulating paths for future research. On the other hand, by mapping the actors that can play an active role, we provide practical recommendations.

## 6.1 The impact of cash

Cash is analyzed by 9 of the 26 selected papers. Of these, 6 analyze only cash, while the remaining 3 also analyze payment cards.

Overall, the literature provides evidence on the positive impact of cash usage on tax evasion (Alognon *et al* 2021; Immordino and Russo 2018a) and on the shadow economy (Ardizzi *et al* 2014; Giammatteo *et al* 2022; Rogoff 1998). The only exception is Zhang *et al* (2019), who do not find a statistically significant relation between cash usage and tax revenues. However, unlike the other authors, who measure tax evasion or the shadow economy as a share of GDP, Zhang *et al* (2019) look at the annual percentage change in total tax revenues. They do find a positive relation between direct debits and tax revenue increase for eurozone countries. Therefore, they suggest that "electronic payment system[s] might have a higher stimulating and facilitating effect on the economy activities or play a role in exposing or transforming shadow economy" (Zhang *et al* 2019, p. 15).

Over the years, a number of authors have proposed, and analyzed, different policies to reduce the use of cash. Rogoff (1998) recommends that the European Central Bank remove large-denomination banknotes from the economy, a suggestion already made in a paper that is not part of our sample (Van Hove and Vuchelen 1996). Another policy that has been analyzed is the introduction of a cash threshold. Several authors have shown that such a threshold is effective in reducing cash usage (Giammatteo *et al* 2022; Rainone 2023; Russo 2022), although only Giammatteo *et al* directly analyze its effect on tax evasion (see Sections 5.2.1 and 5.2.2). Finally, both Ardizzi *et al* (2014) and Immordino and Russo (2018b) discuss the introduction of a TCW. They both conclude that such a policy is challenging to implement and might even backfire.

Where future research is concerned, additional evidence on the effects of policies aimed at reducing cash usage would be welcome. Cash thresholds have been introduced in other countries besides Italy, such as Belgium, France and Portugal (see Russo 2022). It would be interesting to evaluate the effects in these countries too, and compare them with the Italian case. Also, the papers presented above focus mainly on developed economies. Another possible direction for future research would thus be to investigate the impact of cash in developing countries.

## 6.2 The impact of payment cards

Of the 26 selected papers, 16 address the effects of payment cards (Table A2; see Appendix A online). Of these, 9 analyze cards only, while the remaining 7 investigate other instruments as well, such as digital wallets (4 papers) and cash (3 papers).

In all, a fair number of policies have been investigated through different methods, thereby providing useful evidence for policy makers. For one, the literature is

uniform in stating that card payments have a positive impact on VAT compliance (Alognon *et al* 2021; Holá *et al* 2022; Hondroyiannis and Papaoikonomou 2020; Immordino and Russo 2018a; Madzharova 2020).

What is missing, by and large, is an analysis of the impact of card payments on income tax evasion. Indeed (as explained in Section 4) unreported transactions may lead not only to VAT evasion but also to income tax evasion, because lower reported revenues lead to lower reported income. Zhang *et al* (2019) investigate the impact on the annual growth in tax revenues in general, finding no significant effect of card payments. Sung *et al* (2017) examine the impact of the TIETP on income tax revenues, but their analysis is focused only on South Korea. Hence, future research might want to devote more attention to the impact of card payments on income taxation. For example, Hondroyiannis and Papaoikonomou (2020) point out that, where VAT revenues are concerned, the benefits of a higher use of card payments are greater in countries where the level of self-employment is above average. It would be interesting to have this confirmed for income tax revenues.

Another suggestion for future research is to study the drivers of the adoption of card payments by consumers and merchants. Indeed, while there is academic evidence suggesting that card payments should be promoted, there is little research on how adoption could be stimulated, unlike for digital or mobile wallets. Better insights into the drivers of adoption could improve the effectiveness of government policies.

### 6.3 The impact of digital wallets

Only four papers in our sample analyze the impact of digital wallets, and then usually together with card payments. This is the case, for example, in the analysis of India's demonetization experiment by Bajaj and Damodaran (2022) and Das *et al* (2023). Similarly, Sarnowski and Selera (2022) use the term "cashless payments" to refer to both cards and digital wallets.

Research on the impact of digital wallets alone is scarce. The only exception is Pedroni (2023), who (as mentioned in Section 5.1) uses semistructured interviews with retailers to investigate the impact of the Covid-19 pandemic on the informality of firms in Argentina. Pedroni finds that digital wallets have a lower perceived degree of fiscal control compared with card payments. In fact, the extent of control can differ depending on the technology used. There are digital wallets based on near-field communication technology (eg, Apple Pay or Google Pay) and wallets based on other technologies, such as geolocation or QR codes (eg, PayPal) (Innovative Payments Observatory 2022). The first type piggybacks on a card scheme and allows consumers to make payments by bringing their smartphone close to a card reader. Since such payments are card based, they are comparable with card payments in terms of traceability. The empirical results on the impact of card payments can thus

probably be extended to this type of wallet. The second type of wallets are based on account-to-account payments, which do not rely on traditional card schemes. Their traceability characteristics may thus differ from card-based payments, thereby requiring ad hoc investigation, as shown by Pedroni (2023).

In short, the benefits of a higher adoption of mobile payments for the fight against tax evasion should be further investigated. The suggestion for future research is to analyze the impact on taxation of digital wallets, especially those that are not card based.

## 6.4 The impact of cryptocurrencies and CBDCs

The literature on the impact of cryptocurrencies and CBDCs so far consists of four papers (Jozipovic *et al* 2022; Kwon *et al* 2022; Ren *et al* 2023; Scarcella 2021). These papers are univocal in stating that CBDCs can have a negative impact on tax evasion, and could therefore be used to fight it. However, this negative impact depends heavily on the degree of anonymity with which the CBDC is designed. CBDCs could grant full anonymity, partial anonymity (eg, toward third parties but not the authorities) or conditional anonymity (ie, anonymity that can be lifted only in cases determined by law; eg, under court order) (Agur *et al* 2020; Ren *et al* 2023; Scarcella 2021). It is evident that the degree of anonymity affects the ability of the tax authority to trace payments with CBDCs and, consequently, the ability of merchants to hide such transactions.

Further, Scarcella (2021) shows that there are other aspects that should be taken into account, such as privacy protection and digital literacy.

Therefore, the suggestion for future research is to investigate the impact different designs of a CBDC can have on tax evasion. This is a particularly urgent topic because discussions on the design of CBDCs and their (possible) adoption by central banks are ongoing.

## 6.5 The role of the actors

In order to be able to provide practical recommendations, we also analyzed which actors could take the actions recommended in the literature.

The most targeted actor (see Table A3 in Appendix A online) is government, which can/should act to reduce tax evasion according to 19 contributions. Governments are mainly asked to design policies that make cash more costly and difficult to use (eg, by introducing cash thresholds) (Ardizzi *et al* 2014; Rogoff 1998; Russo 2022). Note in this respect that, on May 31, 2024, the EU introduced an EU-wide cash threshold of €10 000, with the main goal being to reduce money laundering. The regulation will apply from July 10, 2027 (European Union 2024, Article 86).

Governments are also advised to promote the use of alternative instruments, such as payment cards (Ardizzi *et al* 2014; Danchev *et al* 2020; Immordino and Russo 2018a,b). Digital payment providers could also contribute to reducing tax evasion by fostering the use of cashless instruments by their customers. They could, for instance, introduce rebates based on the volume of transactions made (Immordino and Russo 2018a).

Cash usage could also be hindered by central banks, which have been recommended to remove large-denomination banknotes from circulation (Rogoff 1998). Moreover, both central banks and regulators are asked to set the stage for a careful design and management of CBDCs. In particular, they are advised to take several aspects into consideration, from the degree of anonymity (Jozipovic *et al* 2022; Ren *et al* 2023), to privacy and data protection (Jozipovic *et al* 2022; Scarcella 2021) and the issue of the digital divide (Scarcella 2021).

## 7 CONCLUSIONS AND RESEARCH LIMITATIONS

Tax evasion is an urgent issue worldwide. Because payment methods differ in their degree of traceability, they may either facilitate or hamper tax evasion. However, despite the potential importance of this topic, the literature is scarce and not homogeneous. For this reason, we applied an SLR to critically review the literature on the impact of payment instruments on tax evasion.

Our analysis has a few limitations. First, we limited the scope of our search to academic papers, and we did not consider reports published by, for instance, central banks or financial institutions. However, it might be of value to include this type of contributions as well. Second, we did not include checks, direct debits and bank transfers in our framework because their use in B2C transactions is very low (Worldpay 2023).

Our analysis provides an overview of the literature on the impact of payment methods on tax evasion. We analyzed 26 papers published in peer-reviewed journals, finding that the literature is univocal in stating that cash has a positive impact on tax evasion and the shadow economy, while card payments have a positive impact on VAT compliance. However, there are several gaps that future research could address. One example is the impact of card payments on income taxation, which has been rather neglected in the literature. Also, researchers have only just started to investigate the effects of the use of digital wallets. The traceability of transactions differs according to the type of digital wallet used; hence, our suggestion for future research is to analyze this difference, focusing on wallets that are not card based. Moreover, CBDCs are gaining the attention of central banks. Given that CBDCs can be designed with different degrees of anonymity and that the discussion on their design and (possible)

adoption is still ongoing, it is particularly urgent to investigate their potential impact on tax evasion.

Finally, to provide practical recommendations, we also mapped which actors could take the actions suggested by the literature. We showed that the most important players for the issue at hand are governments, which are asked to introduce policies that make cash more difficult to use and/or foster the use of cashless methods. Other actors that can play a relevant role are regulators and central banks, in particular with regards to the positioning of physical cash and, looking ahead, the design of CBDCs.

## DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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