

Tax Evasion of individual entrepreneurship and COVID-19: The Greek Experience

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Abstract:

The aim of this paper is to analyse the phenomenon of the shadow economy in the individual entrepreneurship sector of human-to-human services (H2H) during and after the period of the COVID-19 pandemic in Greece. The study demonstrates income concealment ranging from 41.46% to 59.14% in the individual entrepreneurship sector until 2017. In fact, until the emergence of the COVID-19 pandemic in 2019, the tax evasion rate reached 65%. However, since 2020, with the onset of the pandemic, there has been a reduction of 56% of the phenomenon in this sector. After the end of the pandemic, tax evasion continues to decline, approaching 52% in 2022, showing a steady downward trend.

This paper notes that individual entrepreneurship was not significantly affected in terms of income, which in 2020 reached €4.9 billion depicting an increase of 7% compared to 2019 (€4.6 billion), while in 2021 (€5.8 billion) and 2022 (€6.9 billion), when the economy starts to normalise after the end of the pandemic, the income increase from individual entrepreneurship soared to 19% and 17% respectively.

The survey also showed a significant decrease in the consumption of clothing and household durables in 2020, by 27.43% and 15.81% respectively, a significant decrease in entertainment expenditure by 27.43% and a significant decrease in transport expenditure by 16.81%. Households significantly reduce the resources allocated to hotels and restaurants by 36.48% in 2020. Finally, expenditure on food, housing, water and energy recorded a small change, showing a stable trend that was not significantly affected by the health crisis. However, after the end of the pandemic, total household consumption expenditure increased by 9.11%.

Keywords: Shadow Economy, Tax Evasion, Tax Authority, COVID-19

1. Introduction

Until the end of 2019, before the emergence of the Covid-19 pandemic, Greece was in the process of recovering from an unprecedented economic crisis that had a negative impact on all sectors of society. As a result of this economic crisis, governments were forced to implement severe austerity measures, leading to a significant reduction in public spending and government funding.

The COVID-19 pandemic, which began in the city of Wuhan in China, caused the deaths of millions of people worldwide as well as serious social, humanitarian and economic problems in many countries. On 11 March 2020, the World Health Organization (WHO) declared the spread of the SARS-CoV-2 virus responsible for COVID-19 a pandemic [17]. The pandemic emerged in Greece in the same month, with serious repercussions for a country that had just begun to recover from the economic crisis and memoranda. At the same time, it put further pressure on an already overburdened health system, which had been adversely affected by cuts made during the previous economic crisis.

Mankind faced difficult circumstances, especially at the beginning, with a virus that spread rapidly, had a high mortality rate, was constantly mutating and for a long time had no readily available medical technology resources to combat it. Social distancing and isolation were chosen as the main strategy for dealing with the pandemic. To limit the spread of the coronavirus, many countries adopted restrictive measures such as

general lockdowns, social isolation and the suspension of businesses, public services and schools (Bartsch et al., 2020).

This paper attempts to analyse the impact of the pandemic on the economy and shadow-economy concerning individual entrepreneurship and, in particular, on the services provided by sole proprietorships to simple entities, which researchers define as "Human to Human services" (H2H) in the sense of not being large legal entities. At the same time, the impact on the country's public finances and on citizens' consumption choices is also examined.

1.1 The Shadow economy

Researchers attempting to measure the size of the shadow economy are faced with the first and most difficult question of how to define it. As an indication, the international literature uses the following terms to describe the phenomenon of the shadow economy: irregular, informal, grey, secondary, dual, hidden, unrecorded, clandestine, concealed, occult, black, cash, twilight, moonlight, parallel, shadow, submerged, underground, subterranean (Frey & Schneider, 2000). Due to the complexity of the concept, there is no single definition. A common working definition includes all unrecorded economic activities that, if measured, would contribute to the officially calculated gross national product [7,8,9].

According to Feige (1989), the shadow economy includes all economic activities and income that are generated by, circumvent or otherwise evade government regulation, taxation or control. Tanzi (1999) notes that there are at least two definitions. The first refers to "production (or income) that eludes official statistics" and the other to "income that is not declared and not detected by the tax authorities" [7,16,12,13]

2. Theoretical Background

Since the shadow economy is not directly observable and measurable, various methods have been developed to assess it. These methods can be classified in different ways, such as distinguishing between methods using microeconomic data and methods based on macroeconomic variables, or with accounting and econometric methods [2,3,15].

Frey and Pommerehne (1984) make a distinction between direct and indirect methods. The direct method attempts to determine the size of the shadow economy by analysing the behaviour of tax payers [9]. The main direct methods are voluntary interviews, questionnaire surveys and tax audits. Indirect methods are based on the fact that although shadow economic activities are not directly visible and measurable, they affect all areas of economic life. Therefore, the degree or change in economic variables caused by the shadow economy is an indication of the size of the shadow economy. The main indirect methods that have been developed are described below.

- The method of income and expenditure deviation
- The method of the difference between the official and the actual labour force participation rate
- Monetary methods
- The constant rate of cash to repayable deposits method or the Gutmann method
- The transaction method or the Feige method
- The Tanzi method
- The high-denomination banknote circulation method
- The Electricity Consumption Method
- The determinants and indicators method

3. Research Methodology

3.1 Data and methods

All methods of estimating the shadow economy, especially the indirect ones, have been heavily criticised, mainly due to the difficulty of identifying the parameters used to define a phenomenon involving "an unknown number of units" for "an unknown extent of the phenomenon" known to the units involved [14,15]. In the current research in order to estimate tax evasion in the individual enterprises sector, the amounts declared by entities from business and/or self-employment activities in the income tax returns annually submitted to the tax authority are compared with the amounts declared by households in the Family Budget

Surveys as constituting their income from sole proprietorship and/or self-employment activities. A comparison is also attempted between the declared income of households whose income source is employment and pensions, mainly in order to identify under-reporting of employment.

Despite the potential weaknesses of such an approach, it is probably one of the most reliable underlying methods, through an indirect technical research effort. More specifically, the household income which is spontaneously and informally declared in the Family Budget Surveys to a non-audit agency, i.e. the Hellenic Statistical Authority, without carrying any penalties as regards the legitimacy of their answers, is compared to the income declared by taxpayers to the Tax Authority (on the basis of which they are taxed), where concealment or non-disclosure of shadow economy activities may carry tax benefits.

3.2 The Statistical Business Register (SBR)

The “Household Budget Survey (HBS)” is a national survey that collects information from a representative sample of households on their composition, the employment status of their members, their housing conditions and, most importantly, their living costs and income. The information collected on household expenditure is detailed. This means that information is not simply collected on the basic categories of expenditure such as food, clothing and footwear, health, etc., but that detailed information is collected on the individual categories of expenditure, e.g. white bread, fresh milk, fresh beef (foodstuffs), men's shoes, women's shoes (clothing and footwear), pharmaceutical products, medical laboratory services (health), and so on. The main purpose of the survey is to determine the consumption pattern of households for the revision of the consumer price index [4].

The international classifications used are the following:

- NUTS II regional classification,
- ISCED 2011 educational attainment
- ISCO 08 employment and occupations
- NACE Rev. 2 (since 2008) economic activities.

At the same time, there are specific sections in the HBS where respondents are asked about their income and its sources. In particular, the questionnaire distributed to households as part of the survey includes a specific section on average monthly household income, by urban, semi-urban and rural areas; average monthly household income by urban, semi-urban and rural areas; average monthly household income by urban, semi-urban and rural areas; country as a whole; and sources of income at a quarterly level. The main categories of household income sources as covered in the survey are the following:

Table 1: Main Sources of Income of Households Declared to the Tax Authority

Sources of income
<i>Income from employment</i>
<i>Income from self-employment</i>
<i>Income from Investments</i>
<i>Income from pensions</i>
<i>Income from spouse's pensions/benefits</i>
<i>Income from sickness benefits</i>
<i>Income from disability benefits/welfare</i>
<i>Income from education benefits</i>
<i>Income from unemployment benefits/welfare</i>
<i>Income from family allowances</i>
<i>Income from social welfare</i>
<i>Income from regular financial transfers from/to other households</i>
<i>Income from housing benefits</i>
<i>Other income</i>
<i>Imputed income and income in kind</i>

The sampling frame covers households throughout the country, regardless of their size or economic and social characteristics. A household is defined as a person living alone in a dwelling or a group of persons, whether related or not, living in the same dwelling. The people who make up the household are called household members. They usually live in the household or may be temporarily absent. Since 2008, for national needs (compilation of a more reliable consumer price index, production of comparable statistics for the needs of national accounts), it has been decided that the survey in Greece will be conducted annually and continuously, i.e. it should be of one year duration and carried out annually based on a sample of approximately 4,000 households. In 2014, the sample was increased to obtain more reliable results at regional level. Additional information on the conduct of the survey, statistical accuracy, etc. can be found in the annual quality survey reports on the ELSTAT website [5].

4. Research Findings

4.1 Estimation of tax evasion by sole proprietorships

In this section we attempt to estimate tax evasion from business activity by sole proprietorships of human to human (H2H) life services.

As mentioned above, the methodology used is based on the comparison of reported income figures between the tax authority and the Hellenic statistical authority.

In the current study, the amounts reported by all units from business activity in the income tax returns are compared with the amounts reported in the Household Budget Surveys (HBS) that constitute household income from business activity of sole proprietorships.

4.2 Methodology of processing Tax Authority data

4.2.1 Income from self-employment 2011-2022

The annual tax returns of individuals and sole proprietorships report income from self-employment and sole proprietorships that keep second-class records (Stasinopoulos, 2022b). Based on the data of the income tax returns, information was obtained on the total income of freelance activities, commercial sole proprietorships and agricultural enterprises declared to the tax authority (relevant tax codes 461-462-401-402-501-502).

Based on the data from the income tax returns, the total income of the freelance activities, commercial sole proprietorships and agricultural enterprises declared to the tax authority is shown in the table below:

Table 2: Declared Net Profits of Enterprises of sole proprietorships and self-employed professionals (excluding enterprises) to the Tax Authority (in thousand €)

Year	Total Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on the Tax Authority (Net Profits) (in €)
2011	11,134,230
2012	8,969,977
2013	6,372,411
2014	6,395,915
2015	5,926,990
2016	5,479,534
2017	4,832,066
2018	4,577,006
2019	4,604,718
2020	4,938,088

2021	5,880,231
2022	6,903,692
A.V. 2011-2022	6,334,572

(Source: IAPR,2025; The Authors)

4.2.2 Income of employees and pensioners 2011-2022

Based on the data of income tax returns of employees and pensioners and upon summation of the codes of the amounts corresponding to the income of employees, as shown in the table below:

Table 3: Total income from salaries and pensions based on tax authority data (in thousand €)

Year	Total Income from Pensions based on data from the Tax Authority (codes 303-304-321-322)	Total Income from Salaries based on data from the Tax Authority (in thousand €) (codes 301-302)	Total Income from Salaries & Pensions based on data from the Tax Authority (in thousand €) (codes 301-302-303-304-321-322)
2011	29,706,678	39,954,510	69,661,188
2012	29,273,724	34,407,182	63,680,906
2013	25,846,784	30,002,375	55,849,159
2014	25,572,967	30,356,523	55,929,490
2015	25,313,448	30,850,635	56,164,083
2016	25,209,129	31,587,164	56,796,293
2017	24,700,618	32,709,934	57,410,552
2018	24,224,500	34,203,101	58,427,601
2019	25,020,015	36,360,213	61,380,228
2020	24,249,702	34,365,180	58,614,882
2021	24,752,372	37,883,336	62,635,708
2022	24,619,008	42,025,438	66,644,446
A.V. 2011-2022	25,707,412	34,558,799	60,266,211

(Source: IAPR,2025; The Authors)

4.2.3 Comparison of data

Based on the Household Budget Surveys (HBS), the business income of the self-employed and sole proprietors is shown in the following table:

Table 4: Total Gross Revenues from Freelance Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on Household Budget Surveys-(HBS) (in thousand €)

Year	Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on Household Budget Surveys-(HBS)	Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships based on Household Budget Surveys-(HBS)	Total Gross Revenues from Agricultural Enterprises based on Household Budget Surveys-(HBS)
2011	20,635,931	18,317,880	2,318,051
2012	15,323,872	13,242,587	2,081,284
2013	12,742,418	10,214,992	2,527,425
2014	12,221,925	9,867,032	2,354,893
2015	12,701,387	10,271,471	2,429,916
2016	11,446,741	9,462,449	1,984,292
2017	11,825,956	9,833,505	1,992,451
2018	12,654,493	10,610,204	2,044,289
2019	12,986,798	11,068,266	1,918,532

2020	11,237,075	9,198,328	2,038,747
2021	12,303,846	10,188,359	2,115,487
2022	14,469,831	11,977,465	2,492,366
A.V. 2011-2022	13,379,189	11,187,712	2,191,478

(Source: ELSTAT, 2025, The Authors)

Correspondingly, the amounts declared from business activity in the tax returns to the tax authority are shown in the following table:

Table 5: Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on the Tax Authority (in thousand €)

Year	Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on the Tax Authority (in €)	Diff (%)	Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships based on the Tax Authority (in €)	Total Gross Revenues from Agricultural Enterprises based on the Tax Authority (in €)
2011	11,134,230		9,912,815	1,221,415
2012	8,969,977	-19%	7,799,420	1,170,557
2013	6,372,411	-29%	5,253,583	1,118,828
2014	6,395,915	0%	5,020,472	1,375,443
2015	5,926,990	-7%	4,676,830	1,250,160
2016	5,479,534	-8%	3,895,364	1,584,170
2017	4,832,066	-12%	3,443,641	1,388,425
2018	4,577,006	-5%	3,325,594	1,251,412
2019	4,604,718	1%	3,375,718	1,229,000
2020	4,938,088	7%	3,510,522	1,427,566
2021	5,880,231	19%	4,316,973	1,563,258
2022	6,903,692	17%	5,130,217	1,773,475
A.V. 2011-2022	6,334,572	-	4,971,762	1,362,809

(Source: IAPR,2025;The Authors)

The first apparent observation is that sole proprietorship was not significantly affected in terms of income, as in 2020 (4.9 billion €) it showed an increase of 7% compared to 2019 (4.6 billion €), while in 2021 (5.8 billion €) and in 2022 (6.9 billion €), when the normalisation from the pandemic began, the increase in income jumped to 19% and 17% respectively.

Table 5 shows the business income of all self-employed individuals and sole proprietorships based on the HBS compared to the amounts reported as they appear in the tax returns of these entities to the tax authorities.

Table 6: Difference between the amounts Declared to the Tax Authority and the amounts recorded by the Household Budget Survey-(HBS) concerning the total Income from Self-employed, Individual Commercial Enterprises and Agricultural Enterprises concerning the period 2011-2022 (in thousand €)

Year	Tax Authority (in thousand €)	HBS (in thousand €)	Diff (in thousand €)	Concealment Percentage (%)	GDP (in €)
2011	11,134,230	20,635,931	-9,501,701	-46.04%	203,474,989
2012	8,969,977	15,323,872	-6,353,895	-41.46%	185,899,164
2013	6,372,411	12,742,418	-6,370,007	-49.99%	178,113,897

2014	6,395,915	12,221,925	-5,826,010	-47.67%	176,071,843
2015	5,926,990	12,701,387	-6,774,397	-53.34%	175,362,878
2016	5,479,534	11,446,741	-5,967,207	-52.13%	174,448,185
2017	4,832,066	11,825,956	-6,993,890	-59.14%	177,378,457
2018	4,577,006	12,654,493	-8,077,487	-63.83%	180,615,656
2019	4,604,718	12,986,798	-8,382,080	-64.54%	185,181,215
2020	4,938,088	11,237,075	-6,298,987	-56.06%	167,539,518
2021	5,880,231	12,303,846	-6,423,615	-52.21%	184,574,585
2022	6,903,692	14,469,831	-7,566,139	-52.29%	207,854,185
A.V. 2011-2022	6,334,572	13,379,189	-7,044,618	-53.23%	183,042,881

(Source:ELSTAT, 2025, IAPR,2025; The Authors)

Therefore, a comparison of the above amounts reveals a significant discrepancy between the amounts declared to the tax authorities and the corresponding amounts of income declared by the self-employed sector in the Household Budget Surveys (HBS). The estimated income concealment ranges from 41.46% to 59.14%, with an average of 53.23% over the period 2011-2022.

Thus, until the occurrence of the Covid-19 pandemic, there is an increasing trend of income concealment in the self-employed and sole proprietorships, reaching 65% in 2019.

From 2020 and on, however, there is a decline of 56%. It should be noted that the decline continues after the end of the pandemic, approaching 52% in 2022.

4.2.4 Declared income of employees and pensioners

By comparing the respective income amounts of employees and pensioners, the deviations are, as expected, much smaller and do not exceed, on average, the order of **6.84%**. Excluding possible statistical discrepancies, this may be because employees and pensioners engage in parallel activities without declaring the amounts received, or due to the income from third sources (e.g. rents, agricultural holdings of family plots, etc.) and/or to under-declaration of work (unrecorded overtime, etc.).

This is to be expected, as the possibilities for tax evasion are lower for employees and pensioners, although phenomena of undeclared work can also be identified in these categories (income from undeclared rent, second undeclared jobs, etc.). The above finding is a strong indication that the methodology used in this survey has been carried out with a high degree of reliability and is within reasonable scientific limits.

Table 7: Comparison of the Declared Income of Employees and Pensioners between Tax Authority & the Household Budget Survey-(HBS)- (in thousand €)

Year	Total Income from Salaries & Pensions based on data from the Tax Authority (in thousand €)	Diff (%)	Total Income from Salaries & Pensions based on data from HBS (in thousand €)	Percentage of amounts declared to the Tax Authority (in thousand €)
2011	69,661,188	-	66,636,003	93.16%
2012	63,680,906	-9%	62,773,272	
2013	55,849,159	-12%	52,433,684	
2014	55,929,490	0%	51,498,215	
2015	56,164,083	0%	50,790,704	
2016	56,796,293	1%	52,219,542	
2017	57,410,552	1%	52,715,267	
2018	58,427,601	2%	53,848,635	
2019	61,380,228	5%	54,350,251	

2020	58,614,882	-5%	54,339,350
2021	62,635,708	7%	58,716,502
2022	66,644,446	6%	63,401,697
A.V. 2011-2022	60,266,211		56,143,594

(Source:ELSTAT,2025, IAPR,2025;The Authors)

Regarding the emergence of the pandemic, critical conclusions can be reached. It appears that the level of salaries of employees and pensioners during the health crisis, based on data from the Tax Administration, slightly decreased in 2020 (from €61.3 billion in 2019 to €58.4 billion), but bounced back after 2021 (to €62.6 billion) and even exceeded the level prior to 2018 (€58.6 billion).

Both the tax authority and the HBS data show that wage and salary income decreased by 5%, but increased by 7% and 6% respectively from 2021 onwards. It should be noted that during the pandemic, the social welfare net functioned properly by protecting and preventing layoffs, as well as by providing government subsidies to companies and workers.

4.2.5 Development of business activity before and after the Covid-19 period

The following tables show the financial results of business activity.

Table 8: Declared Gross Revenues (Turnover) and Net Profits of Enterprises (excluding sole proprietorships/self-employed) to the Tax Authority (in thousand €)

Year	Number of Entities	Diff (%)	Total Gross Revenues of Legal Entities –Enterprises (in €) (code_015)	Diff (%)	Total Net Profits of Legal Entities (in €) (code_001)	Diff (%)
2011	213,423	-	193,967,409	-	7,250,349,240	-
2012	203,443	-5%	219,835,115	13%	6,675,173	-8%
2013	198,060	-3%	203,025,454	-8%	6,215,935	-7%
2014	246,749	25%	236,527,769	17%	10,116,305	63%
2015	251,417	2%	239,730,721	1%	11,771,960	16%
2016	257,452	2%	241,279,334	1%	12,127,604	3%
2017	255,018	-1%	254,562,634	6%	13,368,741	10%
2018	268,752	5%	267,148,776	5%	13,817,106	3%
2019	279,684	4%	264,740,028	-1%	14,607,120	6%
2020	296,741	6%	251,656,403	-5%	14,202,659	-3%
2021	311,292	5%	312,545,600	24%	17,946,044	26%
2022	333,588	7%	424,860,435	36%	25,169,705	40%
A.V. 2011-2022	259,635		259,156,640		12,772,392	

(Source: IAPR,2025; The Authors)

An initial observation is that there is a 5% decrease in the gross revenues of legal entities in 2020 (from €264 billion in 2019 to €251.6 billion in 2020), with a corresponding 3% decrease in their profitability in 2020 (from €14.6 billion in 2019 to €14.2 billion). By contrast, in 2021 and 2022 profitability increased to 26% (17.9 billion euro) and 40% (25.1 billion euro) respectively.

Table 9: Declared Gross Revenues (Turnover) and Net Profits of Enterprises of sole proprietorships and self-employed professionals (excluding enterprises) to the Tax Authority (in thousand €)

Year	Number of Entities	Diff (%)	Total Gross Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on the Tax Authority (in €) (ΚΩΔ 425-426-475-	Diff (%)	Total Revenues from Liberal Professions, Commercial Sole Proprietorships and Agricultural Enterprises based on the Tax Authority	Diff (%)
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			476-517-518)		(Net Profits) (in €)	
2011	701,715	-	50,613,397	-	8,263,345	-
2012	621,400	- 11%	43,485,218	-14%	6,419,785	-22%
2013	485,697	- 22%	40,043,202	-8%	4,980,946	-22%
2014	850,963	75%	43,771,776	9%	6,212,138	25%
2015	831,414	-2%	43,449,304	-1%	5,818,450	-6%
2016	928,450	12%	43,720,827	1%	5,407,791	-7%
2017	894,454	-4%	43,389,514	-1%	4,791,688	-11%
2018	874,497	-2%	44,064,122	2%	4,575,849	-5%
2019	866,901	-1%	45,332,565	3%	4,655,162	2%
2020	865,857	0%	41,197,492	-9%	4,986,098	7%
2021	933,188	8%	48,302,705	17%	6,051,313	21%
2022	1,216,233	30%	56,021,287	16%	7,029,032	16%
A.V.2011-2022	839,231		45,282,617		5,765,966	

(Source:IAPR,2025;The Authors)

Whereas in the previous section we observed that self-employment is not significantly affected in terms of income, gross earnings show a significant decrease of 9% (from €45.3 billion to €41.1 billion). In 2021 and 2022, gross earnings increased by 17% (€48.3 billion) and 16% (€56.02 billion) respectively.

The aggregate financial results of all enterprises in the Greek economy are shown in the table below:

Table 10: Declared Gross Revenues (Turnover) and Net Profits of Enterprises including sole proprietorships/self-employed and all Legal Entities to the Tax Authority-(in thousand €)

Year	Number of Entities	Diff (%)	Total Gross Revenues	Diff (%)	Net Profits	Diff (%)
2011	915,138	-	244,580,806	-	15,513,695	-
2012	824,843	-10%	263,320,334	8%	13,094,959	-16%
2013	683,757	-17%	243,068,657	-8%	11,196,881	-14%
2014	1,097,712	61%	280,299,546	15%	16,328,444	46%
2015	1,082,831	-1%	283,180,026	1%	17,590,411	8%
2016	1,185,902	10%	285,000,161	1%	17,535,396	0%
2017	1,149,472	-3%	297,952,148	5%	18,160,430	4%
2018	1,143,249	-1%	311,212,898	4%	18,392,955	1%
2019	1,146,585	0%	310,072,593	0%	19,262,282	5%
2020	1,162,598	1%	292,853,896	-6%	19,188,757	0%
2021	1,244,480	7%	360,848,305	23%	23,997,358	25%
2022	1,549,821	25%	480,881,723	33%	32,198,738	34%
A.V.2011-2022	1,098,866		304,439,258		18,538,359	

(Source: IAPR,2025; The Authors)

4.3 Fiscal imbalances and the impact of tax evasion on H2H services

4.3.1 Loss of government revenue due to tax evasion in H2H services

In this section the loss of government revenue due to tax evasion is calculated, i.e. the amount of tax that evades government authorities and is consistent with the concept of government revenue (tax evasion or, alternatively, the burden on taxpayers). It should be noted that the income tax - individual enterprises and freelance professions - is calculated by the tax authority on the basis of the amount of income per income tax scale, using a progressive rate each time. For example, the first €20,000 is taxed at a rate of 22%, the subsequent amounts at a different progressive rate, and so on. For the income tax - of the above-mentioned entities - from the year 2014 until year 2019, the tax rate amounted to 22% which corresponds to €20,000 (Stasinopoulos, 2022).

Therefore, this section attempts to determine the loss of state revenue from the "H2H Life Services". The revenues in this case (from a fiscal point of view) are mainly derived from income tax and VAT, which are the focus of this study.

This makes it difficult to calculate the exact amount of lost state revenues from income tax. This task becomes even more difficult if one takes into account the fact that the business sector under consideration includes not only sole proprietorships and freelance professions, but also legal entities, which are subject to different (proportional) tax rates from time to time.

The following table shows the special weighting according to Stasinopoulos (2002a; 2002b):

Table 11: Estimated Weighted Average Income Tax & VAT (%) -Enterprises including sole proprietorships/self-employed and all Legal Entities to the Tax Authority

N/A	Year	Estimated Weighted Average Income Tax %	Estimated Weighted Average VAT (All Entities)
1	Sole proprietorships/self-employed Enterprises	22.00%	17.55%
2	All Legal Entities	26.32%	
3	Total	24.56%	

(Source: Stasinopoulos, 2002b)

As one can discern from the table below, the total annual average loss of income tax revenue to the Greek state from business activity of the above sectors alone was estimated to amount at least to €1.4 billion in 2020, and the total annual loss of value added tax revenue was estimated to amount to €1.1 billion.

Table 12: Estimation of Tax Evasion of sole proprietorships and self-employed professionals 2011-2022 (in thousand €)

Year	Tax Authority (in thousand €)	Household Budget Survey- (HBS) (in thousand €)	Diff (in thousand €)	Loss of Tax Income 22%	Loss of VAT «H2H Life Services» 17,55%	Total Loss of Tax	GDP	%
2011	11,134,230	20,635,931	9,501,701	2,090,374	1,667,549	3,757,923	203,474,989	1.85%
2012	8,969,977	15,323,872	6,353,895	1,397,857	1,115,109	2,512,965	185,899,164	1.35%
2013	6,372,411	12,742,418	6,370,007	1,401,402	1,117,936	2,519,338	178,113,897	1.41%
2014	6,395,915	12,221,925	5,826,010	1,281,722	1,022,465	2,304,187	176,071,843	1.31%
2015	5,926,990	12,701,387	6,774,397	1,490,367	1,188,907	2,679,274	175,362,878	1.53%
2016	5,479,534	11,446,741	5,967,207	1,312,786	1,047,245	2,360,030	174,448,185	1.35%
2017	4,832,066	11,825,956	6,993,890	1,538,656	1,227,428	2,766,083	177,378,457	1.56%
2018	4,577,006	12,654,493	8,077,487	1,777,047	1,417,599	3,194,646	180,615,656	1.77%
2019	4,604,718	12,986,798	8,382,080	1,844,058	1,471,055	3,315,113	185,181,215	1.79%
2020	4,938,088	11,237,075	6,298,987	1,385,777	1,105,472	2,491,249	167,539,518	1.49%

2021	5,880,231	12,303,846	6,423,615	1,413,195	1,127,344	2,540,540	184,574,585	1.38%
2022	6,903,692	14,469,831	7,566,139	1,664,551	1,327,857	2,992,408	207,854,185	1.44%
A.V. 2011-2022	6,334,572	13,379,189	7,044,618	1,549,816	1,236,330	2,786,146	183,042,881	1.52%

(Source:ELSTAT,2025, IAPR,2025;The Authors)

The total annual average loss of income tax revenue to the Greek state from the business activity of the human activity sectors (H2H life services) for the period 2011-2022 was estimated -to amount at least to-€2.7 billion (1.52% of GDP), and the total annual loss of revenue from value added tax at an average rate was €1.2 billion and €1.5 billion from income tax respectively.

In fact, the tax loss was largest in 2019 (€3.3 billion), with the onset of the pandemic, which de-escalated in the following two years. The total revenue loss of sole proprietorships is estimated at 1.52% of GDP over the period 2011-2022, with the highest recorded in 2011 (1.85%) and the lowest in 2016 (1.49%). At the beginning of the Covid-19 pandemic, the loss amounted to 1.79% of GDP and peaked at 1.49% of GDP in 2020.

5. Trends in household expenditure on basic goods and services 2004-2022

5.1 Household consumption choices

The households' level of well-being, as reflected by their disposable income, depicts the general economic situation (Stasinopoulos et al., 2018). Concerning the period 2011-2022, private household expenditure shows an upward trend, except for 2020 and the outbreak of the Covid-19 pandemic.

Greece's GDP increased by 0.40% for the period under study (2011 – 2022). In 2020, it shows a decrease of 9.53% amid the health crisis, while in 2012, amid of the economic crisis, it also showed a decrease of 8.64%. In 2021 and 2022 GDP increased by 10.17% and 12.61% respectively.

Table 13: GDP of Greece 2011-2022 (in thousand €)

Year	GDP	% Of GDP
2011	203,474,989	-
2012	185,899,164	-8.64%
2013	178,113,897	-4.19%
2014	176,071,843	-1.15%
2015	175,362,878	-0.40%
2016	174,448,185	-0.52%
2017	177,378,457	1.68%
2018	180,615,656	1.83%
2019	185,181,215	2.53%
2020	167,539,518	-9.53%
2021	184,574,585	10.17%
2022	207,854,185	12.61%
A.V. 2011-2022	183,042,881	0.40%

(Source: Stasinopoulos, 2022a,b)

Table 14: Households' expenditure based on the Annual Household Budget Survey (HBS) - (in thousand €)

Code	Goods and Services	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	Food And Non-Alcoholic Beverages	17,676,633	16,414,973	15,408,725	14,941,065	14,539,414	14,172,250	14,149,831	14,154,265	14,465,340	15,058,747	15,240,502	16,475,859
2	Alcoholic Beverages And	3,311,786	3,132,918	3,148,628	2,940,876	2,843,151	2,676,751	2,647,463	2,585,207	2,451,512	2,545,499	2,639,471	2,828,266

	Tobacco												
3	Clothing And Footwear	5,601,459	4,763,075	4,381,005	4,274,784	4,130,859	3,974,987	3,982,944	4,044,214	4,200,704	3,048,337	3,491,434	3,807,850
4	Housing, Water, Electricity, Gas & Other Fuels Of Main And Secondary Residence	11,458,819	11,344,152	10,377,939	9,670,708	9,371,264	9,489,537	9,729,722	9,869,554	10,157,942	9,995,142	10,226,484	11,476,822
5	Furnishings, Household Equipment & Routine Maintenance Of The House.	5,478,985	4,744,590	4,208,533	3,622,031	3,281,130	3,019,532	3,031,267	3,049,680	3,238,502	2,726,481	3,109,688	3,526,208
6	Health	5,704,517	5,231,189	5,236,349	5,317,694	5,313,154	5,106,265	5,058,476	5,246,693	5,119,838	5,180,999	5,617,675	5,982,074
7	Transport	11,951,206	10,485,360	9,485,493	9,142,527	8,902,601	8,868,984	8,924,909	9,102,398	9,662,158	8,038,082	8,828,054	10,491,812
8	Communication	3,668,754	3,406,693	3,104,006	2,990,704	2,899,074	2,874,737	2,888,320	2,882,061	2,975,193	2,996,488	3,220,155	3,422,133
9	Recreation And Culture	4,267,683	3,640,500	3,450,455	3,415,741	3,385,552	3,154,478	3,222,680	3,291,633	3,581,586	2,275,003	2,617,476	3,442,356
10	Education	3,171,886	2,864,140	2,548,484	2,499,894	2,290,357	2,221,186	2,249,463	2,251,428	2,371,736	2,432,017	2,336,910	2,699,529
11	Restaurants, Cafés And Hotels	9,415,091	8,016,894	7,297,497	7,146,398	7,034,881	6,819,189	7,282,972	7,594,805	8,050,493	5,200,565	6,164,632	8,145,939
12	Miscellaneous Goods And Services	9,105,420	7,742,620	7,028,761	6,713,389	6,332,135	6,179,428	6,058,618	5,940,486	6,071,762	5,648,620	5,904,595	6,636,610
*	Total	90,812,239	81,787,104	75,675,875	72,675,811	70,323,572	68,557,324	69,226,665	70,012,424	72,346,766	65,145,980	69,397,076	78,935,458

(Source: ELSTAT,2025,The Authors)

The monthly disposable income based on the HBS for the period under study is shown in the graph below.

Table 15: Monthly Households' Expenditures and Income Based on the Annual Household Budget Survey

Year	Number of Households	Monthly Income	Households' Expenditures
2011	4,148,860	1,980.58 €	1,824.02 €
2012	4,163,236	2,084.22 €	1,637.10 €
2013	4,178,116	1,731.29 €	1,509.39 €
2014	4,152,372	1,707.69 €	1,458.54 €
2015	4,124,095	1,712.46 €	1,421.00 €
2016	4,104,187	1,687.22 €	1,392.03 €
2017	4,079,548	1,753.82 €	1,414.09 €
2018	4,085,310	1,782.69 €	1,441.03 €
2019	4,078,512	1,841.15 €	1,478.22 €
2020	4,076,189	1,857.83 €	1,331.83 €
2021	4,073,258	1,981.43 €	1,419.79 €
2022	4,110,374	2,138.27 €	1,600.34 €
A.V.2011-2022	4,114,505	1,854.89 €	1,493.95 €

5.2 Household expenditure and health crisis

Looking at households' expenditure from 2019 to 2022, during the pandemic period, it can be seen that the consumption of essential goods actually increased during the period under study, while consumption for the majority of other categories decreased.

Table 16: Households' Expenditure Based on the Annual Household Budget Survey-(HBS) during and after Covid-19 period

Code	Goods and Services	ΕΤΟΣ			
		2019 (compared to 2018)	2020 (compared to 2019)	2021 (compared to 2020)	2022 (compared to 2021)
1	Food And Non-Alcoholic Beverages	2.20%	4.10%	1.21%	8.11%
2	Alcoholic Beverages And Tobacco	-5.17%	3.83%	3.69%	7.15%
3	Clothing And Footwear	3.87%	-27.43%	14.54%	9.06%
4	Housing, Water, Electricity, Gas & Other Fuels Of Main And Secondary Residence	2.92%	-1.60%	2.31%	12.23%
5	Furnishings, Household Equipment & Routine Maintenance Of The House.	6.19%	-15.81%	14.06%	13.39%
6	Health	-2.42%	1.19%	8.43%	6.49%
7	Transport	6.15%	-16.81%	9.83%	18.85%
8	Communication	3.23%	0.72%	7.46%	6.27%
9	Recreation And Culture	8.81%	-36.48%	15.05%	31.51%
10	Education	5.34%	2.54%	-3.91%	15.52%
11	Restaurants, Cafés And Hotels	6.00%	-35.40%	18.54%	32.14%
12	Miscellaneous Goods And Services	2.21%	-6.97%	4.53%	12.40%
*	<i>Total</i>	3.33%	-9.95%	6.53%	13.74%

(Source:ELSTAT,2025,The Authors)

More specifically:

- (i) Clothing and footwear had a 27.43% decline in household preferences in 2020,
- ii) the entertainment sector was significantly negatively affected by 27.43% in 2020, where the corresponding expenditure amounted to €2.27 billion, compared to €3.58 billion in 2016,
- iii) the "Hotels, Cafes & Restaurants" sector was significantly negatively affected by 36.48% in 2020 with an expenditure of €5.2 billion, compared to €8.05 billion in 2019. Specifically, in 2020 household expenditure on catering was €4.9 billion and on accommodation €210 million, while in 2019 household expenditure on catering was €8 billion and on accommodation €494.3 million respectively,
- (iv) Housing, water, fuel and lighting recorded a decrease of 1.60%,
- (v) transport recorded a decline of 16.81%,
- (vi) Household durables recorded a decrease of 15.81%,
- vii) after the end of the pandemic, there was a dynamic increase in household expenditure, which marked the upward trend in economic growth by 9.11%.

Table 17: Households' Expenditure Based on the Annual Household Budget Survey-(HBS) during and after Covid-19 period

Code	Goods and Services	2019	2020	2022	Diff (%) 2019-2022	Diff (%) 2020-2022
1	Food And Non-Alcoholic Beverages	14,465,340	15,058,747	16,475,859	13.90%	9.41%
2	Alcoholic Beverages And Tobacco	2,451,512	2,545,499	2,828,266	15.37%	11.11%
3	Clothing And Footwear	4,200,704	3,048,337	3,807,850	-9.35%	24.92%
4	Housing, Water, Electricity, Gas & Other Fuels Of Main And Secondary Residence	10,157,942	9,995,142	11,476,822	12.98%	14.82%
5	Furnishings, Household Equipment & Routine Maintenance Of The House.	3,238,502	2,726,481	3,526,208	8.88%	29.33%
6	Health	5,119,838	5,180,999	5,982,074	16.84%	15.46%
7	Transport	9,662,158	8,038,082	10,491,812	8.59%	30.53%
8	Communication	2,975,193	2,996,488	3,422,133	15.02%	14.20%
9	Recreation And Culture	3,581,586	2,275,003	3,442,356	-3.89%	51.31%
10	Education	2,371,736	2,432,017	2,699,529	13.82%	11.00%
11	Restaurants, Cafés And Hotels	8,050,493	5,200,565	8,145,939	1.19%	56.64%
12	Miscellaneous Goods And Services	6,071,762	5,648,620	6,636,610	9.30%	17.49%
*	Total	72,346,766	65,145,980	78,935,458	9.11%	21.17%

(Source:ELSTAT,2025,The Authors)

5. Results - Discussion

From the processing and analysis of the results of the overall study, a number of interesting conclusions emerge regarding the determination of the size of the "shadow economy in sole proprietorship" during and after the Covid-19 pandemic:

More specifically:

First, self-employment was not significantly affected in terms of income, as in 2020 (€4.9 billion) it showed an increase of 7% compared to 2019 (€4.6 billion), while in 2021 (€5.8 billion) and 2022 (€6.9 billion), when the normalisation of the economy from the pandemic started, the increase in income jumped to 19% and 17% respectively.

Second, it is worth noting that tax evasion in H2H services significantly increased from 2011 to 2019, ranging between 41.46% and 64.54%. From 2020, when the pandemic was at its peak, there was a decrease of 56.06%, which carried on in 2021 (52.21%) and 2022 (52.29%). It became clear that there was a steady decline in tax evasion.

At this point, the research identifies those events that objectively took place during or shortly before the period under consideration and that influence the results of the research:

- the economic situation during the Memorandum period drastically reduced the citizens' income, the impact of which on the consumption choices and incomes of entities cannot be ignored,
- the economic crisis and a series of economic adjustment programmes in the period 2010-2018 imposed on Greece to implement extensive structural reforms oriented towards the efficiency of the state and tax authorities
- the increase in the number and the more efficient conduct of tax audits;
- the increase in the use of bank payments, mainly through the use of debit and credit cards;
- the use of indirect control techniques by the tax audit authorities for the cross-checking of income by auditing of bank deposits and the exchange of information with foreign countries for Greeks with remittances abroad;
- The restructuring of the Hellenic Tax Authority with a focus on centralisation of services, an overall rebranding that shows a significant improvement in its efficiency, and efforts to increase the tax literacy of citizens through direct or indirect targeted actions (Stasinopoulos, et al, 2022a; 2022b; 2025).

Third, the tax loss was actually higher in 2019 with the onset of the pandemic, but slowed down in the following two years.

The total annual income tax loss to the Greek state from the business activity of the human activity sectors (H2H life services) for the period 2011-2022 was estimated to be at least €2.7 billion on average, and the annual revenue loss from total VAT was €1.2 billion on average and from income tax €1.5 billion on average.

Compared to the Covid-19 pandemic, the total average annual income tax revenue lost by the Greek government from the business activity of the above sectors only was estimated -at least- at €1.4 billion in 2020, and the total average annual VAT revenue loss was estimated at €1.1 billion.

Fourth, the total loss of state revenue from taxes on sole proprietorships is estimated at 1.52% of GDP over the period 2011-2022, with the highest recorded in 2011 at 1.85% and the lowest in 2016 at 1.49%. In the period from the onset of Covid-19 in 2019, the total loss amounts to 1.79% of GDP.

Fifth, based on data from the Tax Authority, the wage costs for employees and pensioners during the health crisis decreased slightly in 2020 (from €61.3 billion in 2019 to €58.4 billion), but bounced back after 2021 (to €62.6 billion) and even exceeded the level before 2018 (€58.6 billion). Both the tax authority and the BHS data show that wage and salary income reduced by 5%, but increased by 7% and 6% respectively from 2021 and onwards. It should be noted that during the period of the pandemic, on the one hand, the social safety net functioned adequately by protecting and preventing dismissals and, on the other hand, the state strengthened incomes through its interventions and the granting of benefits.

Sixth, sole-proprietorship was not significantly affected in terms of income, as in 2020 (€4.9 billion) it showed an increase of 7% compared to 2019 (€4.6 billion), while in 2021 (€5.8 billion) and 2022 (€6.9 billion), when normalisation from the pandemic started, the increase in income jumped to 19% and 17% respectively.

While net income from economic activity increased by 7% in 2020 compared to 2019, gross income showed a significant decrease of 9% (from €45.3 billion to €41.1 billion). In 2021 and 2022, gross income increased by 17% (48.3 billion euro) and 16% (56.02 billion euro) respectively. Moreover, the above effect is also reflected in GDP, which jumps from €167 billion in 2020 at the peak of the health crisis to €207.8 billion after its end.

Seventh, there is a recorded 5% decrease in the gross revenues of legal entities in 2020 (from €264 billion in 2019 to €251.6 billion in 2020) with a corresponding 3% decrease in their profitability in 2020 (from €14.6 billion in 2019 to €14.2 billion). In 2021 and 2022, however, profitability increases to 26% (€17.9 billion) and 40% (€25.1 billion) respectively.

Eight, the following outcomes on the impact of the pandemic on household consumption choices and expenditure are worth mentioning:

- (i) household expenditure on clothing and footwear decreased by 27.43% in 2020 and household durables by 15.81%;
 - (ii) the entertainment sector took a significant hit of 27.43% in 2020, with household expenditure amounting to EUR 2.27 billion, compared to EUR 3.58 billion in 2016,
 - iii) the Hotels, Cafes & Restaurants sector took a significant hit of 36.48% in 2020 with expenditure amounting to €5.2 billion compared to €8.05 billion in 2019. Specifically, in 2020 household expenditure on eating out was €4.9 billion and on accommodation €210 million, while in 2019 household expenditure on catering was €8 billion and on accommodation €494.3 million,
 - (iv) Housing, water, fuel and lighting recorded a decrease in household expenditure of 1.60%,
 - v) household expenditure on transport fell by 16.81%.
- However, after the end of the pandemic, there was a dynamic increase in household expenditure, which marked the upward trend of economic growth by 9.11%.

6. Conclusion

Existing models for estimating the shadow economy have generally been heavily criticised, mainly because of their flexibility and arbitrary setting parameter estimation. The current paper has pointed out the value of combining the analysis of existing data sources, such as those collected by the Hellenic Statistical Authority by means of the Household Budget Survey on a sample of households, and those formally (administrative data) reported by taxpayers to the tax authority through their income tax returns.

The originality of combining the above methods can be seen, on the one hand, in the assessment and measurement of the phenomenon of the shadow economy in the area of individual entrepreneurship before and after the period of the COVID-19 pandemic and, on the other hand, in the ability to make comparisons of the phenomenon over time in recent years and of updating the data in the future.

In conclusion, the COVID-19 pandemic was one of the most significant events of modern times, affecting all aspects of social, economic and health life throughout the world. However, the COVID-19 pandemic does not seem to have had an irreversible impact on the Greek economy. On the contrary, the economy seems to have 'recovered' rapidly from the following year onwards, both in terms of productivity and profitability, and in terms of a reduction in shadow economic activity, at least regarding individual entrepreneurship (H2H), which is the focus of this paper.

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