TAX FOUNDATION | EUROPE

The Impact of High Inflation on Tax Revenues across Europe

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KEY FINDINGS

- Inflation in the EU rose significantly between 2021 and 2022 due to supply-demand shocks, the Ukraine energy crisis, and COVID-19 effects. From January 2020 to December 2023, prices increased by 21.3 percent in the EU and 18.9 percent in the euro area.

- Inflation raises nominal tax bases, increasing tax revenues due to "fiscal drag" when tax brackets are not inflation-adjusted. The tax wedge increased by an average of 0.84 percent due to inflation between 2019 and 2022.

- EU Member States have responded differently to inflation, mostly with discretionary measures rather than automatic adjustments. Inflation-driven tax collection has increased government revenues by an additional 1.5 percent of GDP and accounts for 40 percent of the increase in tax collection since 2019.

- Automatic indexation in tax policy ensures fair and efficient adjustments to tax thresholds and benefits based on inflation. Only Austria, Denmark, and the Netherlands have automatic inflation adjustments for income tax thresholds, while Belgium, Finland, France, Germany, and Sweden make periodic adjustments without automatic indexing.

- Inflation has expanded the nominal tax base and increased tax revenues, leading to a higher tax burden on taxpayers in countries like Spain. On average, Spanish households saw a €557 increase in income taxes and a €392 increase in value-added taxes (VAT) from 2021 to 2023, totaling an impact of €10.45 billion.

Introduction: Price Increases across Europe

The inflationary process in EU countries in the early 2020s was driven by a series of major shocks that affected not only European Member States but also other advanced economies. Inflation began to rise as the COVID-19 crisis subsided, and it accelerated significantly following Russia's invasion of Ukraine. The sharp increase in headline inflation in 2022 was primarily due to historically large hikes in energy and food prices, as well as supply bottlenecks and post-pandemic reopening effects.

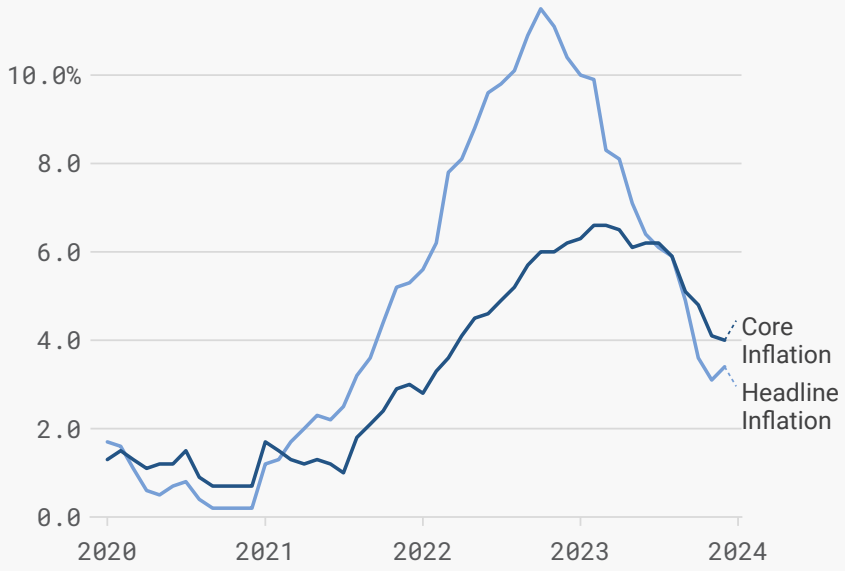
These supply-side shocks have not come alone. In the last decade, a series of unconventional monetary policies have been promoted that have flooded financial markets in developed and emerging economies with cheap credit. For example, the Federal Reserve's balance sheet reached $8.9 billion by mid-2022, or about 37 percent of US GDP. The levels reached by the European Central Bank were similar. Whether the increase in liquidity was responsible for a rise in inflation is beyond the scope of this work, but once supply was stopped by exogenous shocks, the fuse was lit for prices to rise.[1]

The COVID-19 pandemic caused disruptions in the global supply chain and reduced production, leading to shortages of goods and services. As economies began to recover, demand increased rapidly, outstripping available supply and driving up prices. Pandemic-related restrictions and the swift economic recovery created supply shortages, and the inability to meet growing demand due to production and logistics capacity constraints led to higher prices. The reopening of economies after the restrictions led to a rebound in consumption and demand for services such as travel and entertainment. This pent-up demand, coupled with a still-recovering supply, contributed to the price increases.

Figure 1.

Inflation in the European Union Rose Considerably from 2021 to 2022

Headline and Core Inflation in the European Union, Year-over-Year Monthly Change Rates, 2020-2023



Source: Own elaboration based on Eurostat, *Harmonized Index of Consumer Prices - Monthly Data.*

1 For further discussion see Edward Chancellor, *The Price of Time: The Real Story of Interest* (New York: Atlantic Monthly Press, 2022).

The Russian invasion of Ukraine in 2022 exacerbated inflationary pressures by disrupting energy and food supplies. Russia and Ukraine are major global suppliers of energy and agricultural products. Conflicts and resulting sanctions in these regions restricted supplies and drove up prices. Additionally, energy prices rose significantly, which had a knock-on effect on other sectors. The high cost of energy was passed on to production and transportation costs, increasing the final price of goods and services.

The cumulative price increase between January 2020 and December 2023 was 21.3 percent in the European Union as a whole and 18.9 percent in the euro area. However, there is some heterogeneity, as Eastern European countries have been more exposed to the Russian invasion of Ukraine. In these countries, the increase in prices is between 30 and 40 percent. Meanwhile, in Central and Southern European countries, cumulative inflation remains in narrower ranges of 15 and 20 percent.

The Determinants of European Inflation

As explained by Baba et al. (2023), the inflation process experienced in Europe has two disturbing elements.[2] The first concerns the significant heterogeneity of inflation levels across countries. In mid-2022, the price level in the Baltic countries was three to four times higher than the inflation rates in the economies less affected by this price crisis. This heterogeneity may be surprising given the nature of the common supply chain shocks. Moreover, forecast errors have been consistent over the past few years. These forecast errors consisted of a systematic underestimation of price levels. Although it is not the aim of this paper to delve into these forecast errors, it seems desirable to understand the nature and drivers of price increases to better comprehend what has transpired in recent years in European economies.

The determinants of inflation in EU countries can be analyzed in terms of common and local factors. Common factors include the COVID-19 crisis and the invasion of Ukraine, which acted as significant external shocks. These events pushed up energy and food prices, generating cost inflation that affected the entire region. According to Coutinho and Licchetta (2023), about half of the increase in inflation in 2022 can be attributed to the asymmetric response to these shocks, with a greater impact on countries with higher energy intensity and a lower share of services in gross value added (GVA).[3]

In addition to common shocks, the persistence of inflation and other local factors also play a crucial role. The rigidity of contracts and the staggered nature of price adjustments in the euro area contribute to the duration of the inflationary process. Studies have shown that common factors can explain up to two-thirds of the rise in inflation in 2022, while local factors account for the rest. Since the pandemic, inflation has become more backward-looking, making it more difficult and costly to return to target inflation levels.[4]

Finally, structural and cyclical differences across EU Member States are also important determinants. Variations in response to energy and food shocks are reflected in differences in unit labor costs and market structure. Countries with more rigid labor markets and greater concentration in the retail sector

2 Chikako Baba, Romain Duval, Ting Lan, and Petia Topalova, "The 2020-2022 Inflation Surge Across Europe: A Phillips-Curve-Based Dissection," International Monetary Fund, Feb. 10, 2023, https://www.imf.org/en/Publications/WP/Issues/2023/02/10/The-2020-2022-Inflation-Surge-Across-Europe-A-Phillips-Curve-Based-Dissection-529693.

3 Leonor Coutinho and Mirko Lichetta, "Inflation Differentials in the Euro Area at the Time of High Energy Prices," European Commission, November 2023, https://economy-finance.ec.europa.eu/document/download/63ab6f99-b7ac-4c11-8395-30c43af7e4be_en?filename=dp197_en_0.pdf.

4 Chikako Baba, Romain Duval, Ting Lan, and Petia Topalova, "The 2020-2022 Inflation Surge Across Europe: A Phillips-Curve-Based Dissection," International Monetary Fund, Feb. 10, 2023, https://www.imf.org/en/Publications/WP/Issues/2023/02/10/The-2020-2022-Inflation-Surge-Across-Europe-A-Phillips-Curve-Based-Dissection-529693; see technical appendix for an explanation of backward-looking inflation.

tend to experience more persistent and volatile inflation. This suggests that policies should focus on improving labor market flexibility and reducing energy dependence to mitigate future inflationary effects.[5]

Demand stimulus also played an important role in the inflation observed during and after the COVID-19 pandemic, according to the analysis of di Giovanni et al. (2022).[6] During the recovery phase, governments implemented unprecedented fiscal and monetary measures to stimulate the economy, which boosted aggregate demand and contributed to higher inflation, especially in sectors where supply was constrained by supply chain disruptions and labor shortages. This mismatch between supply and demand pushed up prices, particularly impacting durable goods and technology products, while services remained constrained.

In the European Union, demand shocks were less severe than in the United States, explaining the observed differences in inflation levels. Without imported supply and demand shocks, inflation in the euro area would have barely exceeded 3 percent by the end of 2021, compared with more than 6 percent in the United States (di Giovanni et al. 2022). This lower intensity of demand shocks in the EU provided more room for unconventional fiscal policies.

In summary, the significant inflation observed in 2021 and 2022 can be attributed to a confluence of factors, including supply shocks such as bottlenecks and the energy crisis, and demand shocks originating from monetary and fiscal stimulus in 2020 and 2021. The analysis conducted by di Giovanni et al. (2022) indicates that approximately two-thirds of inflation in the United States during that period can be attributed to aggregate demand shocks, while in the eurozone, approximately 50 percent of inflation can be attributed to this type of shock.

Unconventional Fiscal Policy

Fiscal policy plays a crucial role in reducing inflation, especially when monetary policy is limited or less effective. By restraining aggregate demand, inflationary pressures are reduced. The most effective fiscal policies include adjustments in public spending, tax increases, and specific measures to control the prices of essential goods and services, such as energy. In the recent energy price crisis in Europe, direct energy price subsidies, energy tax cuts, and direct transfers to households were implemented to reduce immediate costs to consumers and directly reduce inflation.

In contrast to the traditional logic of tight fiscal policy to combat inflation, such as cutting public spending and raising taxes, many European countries opted for an expansionary strategy. These governments intervened in energy markets through subsidies and price controls to mitigate the impact of energy costs on households and businesses. Rather than seeking a contraction in demand, these policies aimed to reduce inflation in the short term and avoid a severe negative impact on the real economy and the well-being of citizens.

Despite the implementation of these unconventional policies, there was considerable skepticism among economists and analysts about their effectiveness and sustainability. Criticism centered on the potential discouragement of energy conservation and the maintenance of high energy demand, perpet-

5 Leonor Coutinho and Mirko Lichetta, "Inflation Differentials in the Euro Area at the Time of High Energy Prices"; see the technical appendix for an explanation of the role of corporate profits as a determinant of inflation.
6 Julian di Giovanni, Sebnem Kalemli-Özcan, Alvaro Silva, and Muhammed A. Yildirim, "Global Supply Chain Pressures, International Trade, and Inflation," NBER Working Paper 30240, July 2022, https://www.nber.org/papers/w30240.

uating inflationary problems. Additionally, these policies were often poorly targeted and carried significant fiscal costs, postponing needed fiscal consolidation. There were also warnings that the measures could prove unsustainable if energy price increases persisted, pushing inflationary pressures into the future rather than solving them.

Unconventional fiscal policies implemented in response to the energy crisis in Europe amounted to about 3.3 percent of euro area GDP. These measures succeeded in reducing inflation in the region by 1 to 2 percentage points in 2022. IMF analysis suggests that about one-third to one-half of this reduction was due to the direct effects of the policies on headline inflation, while the remainder was due to a lower pass-through of energy price increases to core inflation.[7] These measures were critical to stabilizing prices in the short run, although they posed significant fiscal challenges and market distortions.

Expansionary policies, such as tax cuts and direct subsidies to mitigate the impact of high energy prices on citizens, did not translate into a significant increase in inflation in Europe, mainly because the European economy was not overheating. In contrast to the United States, where the labor market was tight and aggregate demand strong, the euro area had unused economic capacity and a less tight labor market. In this context, expansionary policies were able to support household purchasing power without generating significant additional inflationary pressures, as there was no excessive increase in aggregate demand that could have exacerbated price pressures.[8]

The aim of this report is to analyze in more detail the fiscal policies of the Member States on the tax side and the extent to which taxpayers have had to pay a tax surcharge due to price increases.

Inflation and Tax Systems across the European Union

Inflation affects public finances through four main mechanisms.[9] First, inflation increases the nominal value of goods, services, and assets, which expands the base on which taxes are calculated. For example, in the case of value-added tax (VAT), an increase in consumer prices automatically increases the amount collected, since this tax is levied as a percentage of the value of goods and services sold. Similarly, personal and corporate income taxes can rise because nominal wages and corporate profits tend to rise with inflation.

Second, inflation can cause a phenomenon known as “fiscal drag” in progressive tax systems.[10] This occurs when taxpayers’ nominal incomes rise due to inflation, pushing them into higher tax brackets without a real increase in their purchasing power. Thus, income tax revenues can rise disproportionately to real economic growth, as more nominal income is taxed at higher rates.

Third, inflation affects government revenues and expenditures differently. Tax revenues tend to adjust more quickly to price changes than many types of public spending. This is because tax revenues are directly linked to economic transactions that reflect current prices, while many public expenditures, such as public sector wages and social transfers, may be subject to periodic and non-automatic adjustments, leading to a time lag in the expenditure response to inflation.

7 Mai Chi Dao, Allan Dizioli, Chris Jackson, Pierre-Olivier Gourinchas, and Daniel Leigh, “Unconventional Fiscal Policy in Times of High Inflation,” International Monetary Fund, Sep. 1, 2023, https://www.imf.org/en/Publications/WP/Issues/2023/08/31/Unconventional-Fiscal-Policy-in-Times-of-High-Inflation-537454.

8 Despite the relative successes observed with unconventional fiscal policies, this does not mean that fiscal stimulus measures such as tax cuts can be applied without caution. It is crucial to recognize that the economic context of low inflation and slack capacity in Europe has been a key factor in avoiding a significant increase in inflation. However, in different situations, especially in economies showing signs of overheating, such policies could exacerbate inflationary pressures. It is therefore preferable that policies be fiscally neutral, i.e., that any fiscal stimulus be offset by cuts in other expenditures or increases in revenues, to avoid fiscal imbalances and maintain macroeconomic stability.

9 See the technical appendix for an explanation of the differences in the reaction between the public and private sectors to a price increase.

10 It is also referred to as bracket creep in the US and Kalte Progression in German-speaking countries.

Fourth, inflation can help reduce the debt-to-GDP ratio. As inflation rises, nominal GDP also rises, which can reduce the debt-to-GDP ratio even if nominal debt remains unchanged. This effect is particularly significant if the additional tax revenues generated by inflation are used to improve the government's primary balance (revenues minus expenditures excluding interest payments), thereby contributing to a sustained reduction in government debt.

In summary, fiscal stimulus from inflation means that an increase in the general price level can lead to higher tax revenues without the need to increase tax rates. This temporarily improves the government's fiscal balance and can contribute to a reduction in the debt ratio. However, these effects may be transitory if public spending eventually adjusts to the new price level and if the increase in inflation is not sustained or anticipated in sufficient time.

In a mixed economy, where a substantial part of government revenue is raised through taxes and used for government spending, even expected inflation can have real effects if the tax system is not inflation-neutral. Fiscal neutrality with respect to inflation means that the effects of the tax system on tax incentives and burdens do not change with inflation. The main distortions caused by inflation include: (i) the failure of certain parameters of the tax system to adjust for inflation (such as tax thresholds set in nominal terms or specific taxes set in nominal amounts); (ii) tax effects arising from time lags, such as the time it takes to collect and refund taxes; and (iii) in general, taxation of nominal rather than real profits and gains, both at the household and the corporate level. At the corporate level, this is imperfectly (and often excessively) compensated for by the ability to deduct nominal rather than real interest.[11]

We can consider the specific cases of consumption and income taxes. The latter, as will be indicated below, are the most susceptible to changes due to the impact of inflation.

Monetary base taxes such as VAT imply an increase in government revenue when inflation occurs due to several factors. First, inflation increases the prices of goods and services, which in turn increases the VAT tax base. Since VAT is levied as a percentage of the selling price, the amount of VAT collected increases proportionately as prices rise. For example, if the price of a product rises from €100 to €110 due to inflation, the VAT collected on that product will also rise, increasing the government's total revenue.

In addition, changes in VAT rates can have significant effects on consumer prices, depending on the elasticity of supply and demand. In competitive markets with elastic supply, increases in VAT rates will be fully passed through to consumer prices, further increasing government revenue. This means that in inflationary contexts, where prices are constantly rising, the government can experience a significant increase in VAT revenue without having to adjust tax rates.

However, in markets with finite supply elasticity or monopolistic markets, the pass-through of VAT to prices may be less complete, which could moderate the revenue increase. Nevertheless, as highlighted by Beer et al. (2023), empirical evidence suggests that there is generally a significant pass-through of VAT to prices, especially for durable goods, which guarantees an increase in tax revenue in inflationary contexts.

11 Sebastian Beer, Mark Griffiths, and Alexander Klemm, "Tax Distortions from Inflation: What are They? How to Deal with Them?," International Monetary Fund, Jan. 27, 2023, https://www.imf.org/en/Publications/WP/Issues/2023/01/27/Tax-Distortions-from-Inflation-What-are-They-How-to-Deal-with-Them-528666.

In summary, monetary taxes such as VAT imply an increase in government revenue during inflation due to the increase in prices of goods and services, which increases the tax base and thus the amount of taxes collected. This makes VAT an important source of additional government revenue during periods of inflation.

Inflation also has a significant impact on income taxes through the failure of tax brackets to adjust, known as "fiscal drag." In progressive tax systems, where tax rates increase with income levels, inflation can push taxpayers into higher tax brackets as their nominal income increases, even though their real purchasing power does not.

This occurs because tax bracket thresholds are set in nominal terms and are not automatically adjusted for inflation, resulting in a higher real tax burden for taxpayers without a corresponding increase in their real ability to pay. The greater the number of tax brackets in the system and the greater the dispersion between marginal rates, the greater the effect of fiscal drag.

Are Tax Systems Designed to Be Inflation-Proof?

Globally, only a few countries adjust their income tax thresholds for inflation. Specifically, out of 160 economies, 131 have no adjustment at all. In the rest, adjustments are made on a regular basis, although only nine have explicit rules. Across Europe, these countries are Austria, Denmark, and the Netherlands—three EU Member States—and Serbia. Other EU countries index their personal income tax, but without applying automatic rules. This is the case in Belgium, Finland, France, Germany, and Sweden. Similar policies are implemented in both Ukraine and Norway (both non-EU Member States).[12]

We can take a closer look at the situation in the euro area countries, for which the European Central Bank has collected information on the indexation of the various tax rates. This information indicates that the tax systems in the eurozone countries experience significant fiscal drag. This primarily affects personal income taxes, where almost all countries employ progressive tax schemes. Progressivity is achieved by applying increasing marginal rates to taxable income, which is organized in brackets. However, most of these countries do not automatically adjust tax bracket thresholds for inflation, which makes their tax systems vulnerable to fiscal drag. In contrast, other tax categories do not face this problem to the same extent. Corporate taxes and social contributions are typically proportional, with the latter often subject to ceilings. Furthermore, excise taxes, such as energy taxes, are typically based on fixed amounts and are not affected by price fluctuations.[13]

The economic policy of automatically adjusting taxes for inflation is advantageous for taxpayers, as it prevents fiscal drag and ensures that tax liabilities do not disproportionately increase due to inflation. However, policymakers often find it challenging to promote this measure to their electorate. The lack of discretionary control means they cannot tailor tax adjustments to specific economic conditions or voter preferences, making it difficult to present themselves as proactive in managing economic policy. Consequently, despite its clear benefits in providing fairness and predictability for taxpayers, the policy faces significant political hurdles and is often overshadowed by more discretionary fiscal measures.[14]

12 See the full table in the Appendix.
13 Krzysztof Bankowski, Cristina Checherita-Westphal, Julia Jesionek, and Philip Muggenthaler (eds.), "The effects of high inflation on public finances in the euro area," European Central Bank, December 2023, https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op332~2dde0481fe.en.pdf.
14 See the technical appendix for a discussion on adjusting other tax items.

Finally, the timing of the adjustment should also be noted. The most common approach is to use the most recent data before the beginning of the fiscal year, which usually coincides with the beginning of the calendar year. That is, the adjustment for the year 2023 coincides, in most cases, with the inflation data for the second half of 2022. In cases where prices are stable, this does not pose a serious problem; however, in recent years, with price level increases so significant, it can exacerbate fiscal drag. In the first case, an annual adjustment may be sufficient; in the second case, more than one adjustment may be required, and forward-looking estimates may be used.[15]

The example of Austria should be highlighted, a country that in September 2022 approved a reform to index personal income tax and social transfers with the specific aim of counteracting fiscal drag. In this case, two independent research institutes calculate the impact of inflation on tax revenues, and based on these estimates, tax limits and tax credits are adjusted to neutralize the aforementioned impact. The adjustment is annual, which means that for 2023, the monthly inflation data between July 2021 and 2022 is used.

Table 1. Tax Progressivity and Other Indexation Aspects of Taxes in Euro Area Countries, 2022

	Personal Income Tax			Corporate Income Tax			Social Security Contribution			Excise Duties			Energy Taxes		
Tax Type/ Country	Prog.	Nº br.	Ind. br.	Prog.	Nº br.	Ind. br.	Prog.	Nº br.	Ind. br.	Prog.	Nº br.	Ind. br.	Prog.	Nº br.	Ind. br.
Austria	P	7	YES	F			F (capped)		YES	Fq		NO	Fq		NO
Belgium	P	4	YES	F			F			Fq		NO	Mixed		NO
Cyprus	P	5	NO	F			F (capped)		YES	Fq		NO	Fq		NO
Germany	P	5	NO	F			F		YES	Fq		NO	Fq		NO
Estonia	P	4	NO	F			F		NO	Fq		NO			NO
Spain	P	6	NO	F			F (capped)		NO	Fq/F		NO	Fq/F		NO
Finland	P	4	NO	F			F		NO	Fq		NO	Fq		NO
France	P	5	YES	P		NO	F/P		NO	Fq		NO	Fq		NO
Greece	P	5	NO	F			F		NO	Fq		NO			NO
Ireland	P	2	NO	F			P	2	NO	Fq		NO	F		NO
Italy	P	4	NO	F			F (capped)		YES	Fq		NO	Fq		NO
Lithuania	P	2	YES	P	2	NO	F		NO	Fq		NO	Fq		NO
Luxembourg	P	23	NO	P	2	NO	F (capped)		NO	Fq/F		NO	Fq		NO
Latvia	P	3	NO	F			F		NO	Fq		NO	Fq		NO
Malta	P	5	NO	F			F (capped)	3	YES	Fq		NO	Fq		NO
Netherlands	P	2	YES	P		NO	F (capped)		YES	Fq		YES	D	4-5	YES
Portugal	P	9	NO	F			F		NO	Fq		NO	Fq		NO
Slovenia	P	5	NO	F			F		NO	Fq		NO	Fq		NO
Slovakia	P	2	YES	F			F (capped)		NO	Fq		NO	Fq		NO

Notes: Abbreviations in table headings: Prog: progressivity; Nº br.: number brackets; and Ind. br: indexation brackets.

Source: Bankowski et al. (2023).

15 OECD, *Taxing Wages 2023* (Paris: OECD Publishing), https://www.doi.org/10.1787/8c99fa4d-en.

Table 2 gives the full picture for all European and OECD countries according to OECD data for income taxes and social contributions.[16] Up to 15 countries opt to use discretionary measures to update income tax and social contribution limits, making it the majority option (55 percent). The remaining countries choose different indexes, based on the evolution of wages and/or prices.

Table 2. Indexation Benchmarks and Reference Period in European Union Countries, 2022

Country	Personal Income Taxes	Social Security Contributions	Reference Period
Austria[17]	Discretionary	Not applicable	Prior year
Belgium	CPI	Custom price index	Two years prior/prior year; current for social contributions
Czech Republic	CPI	CPI	Prior year
Denmark	Average wage	Not applicable	Two years prior
Estonia	Discretionary	Minimum wage	Prior year
Finland	The higher of CPI or wage index	The higher of CPI or wage index	Forward-looking estimates for year t
France	Custom price index	Wages (average and minimum)	Current (nowcasting)
Germany	Discretionary	Discretionary	Discretionary
Greece	Discretionary	CPI	Prior year for social contributions
Hungary	Discretionary	Discretionary	Discretionary
Ireland	Discretionary	Discretionary	Discretionary
Italy	Discretionary	CPI	Prior year
Latvia	Discretionary	Discretionary	Discretionary
Lithuania	Average wage	Wages (average and minimum)	Discretionary
Luxembourg	Discretionary	Minimum wages	Current
Netherlands	Custom price index	Custom price index	Two years prior /prior year
Poland	Discretionary	Average wage	Forward-looking wage estimates
Portugal	Discretionary	Discretionary	Prior year
Slovakia	Minimum living standard	Average wage	Two years prior
Slovenia	CPI	CPI	Prior year
Spain	Discretionary	Discretionary	Discretionary
Sweden	Custom price index	Custom price index/wage index	Two years prior /prior year
Bulgaria	Flat rate[18]	n.a.	n.a.
Croatia	Discretionary	n.a.	n.a.
Cyprus	Discretionary	n.a.	n.a.
Malta	Discretionary	n.a.	n.a.
Romania	Flat rate	n.a.	n.a.

Source: OECD and IMF.

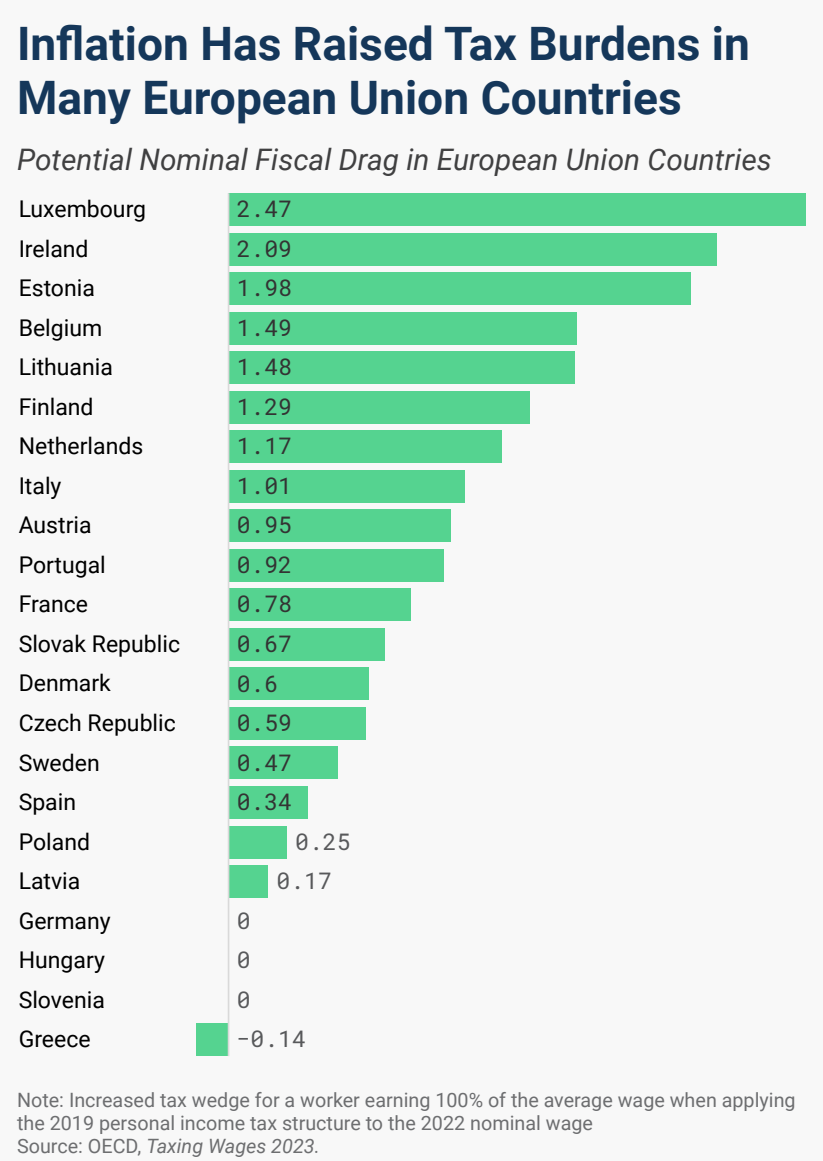
16 Data for Bulgaria, Croatia, Cyprus, Malta, and Romania are taken from Vybhavi Balsasundharam, Arika Kayastha, and Marcos Poplawaski, "Inflation Indexation in Public Finances," International Monetary Fund, Dec. 22, 2023, https://www.elibrary.imf.org/view/journals/001/2023/264/article-A001-en.xml.
17 Data for 2022 is presented. In 2023 the adjustment in Austria is different.
18 It should be noted that both Bulgaria and Romania have a flat income tax, so by definition, income tax thresholds should not be adjusted.

Potential Fiscal Drag

The increase in nominal salaries due to inflation in 2021 and, in particular, 2022, has resulted in a rise in personal income tax rates faced by workers, despite not necessarily increasing actual hours worked by taxpayers. One way to measure this potential fiscal drag is to apply the tax rates from before the inflation increase, specifically from 2019, to 2022 wages in nominal terms. In the absence of indexation, the discrepancy between the actual tax liability of a taxpayer in 2019 and the potential tax liability with an increasing nominal 2022 wage represents the inflation-induced increase in the tax wedge.

The figure below illustrates the potential increase in the tax wedge for individuals earning 100 percent of the 2022 average wage but applying the 2019 tax structure.[19] The increase in the average tax wedge is 0.84 percentage points across the OECD member countries of the European Union. However, there are notable divergences between countries. For instance, countries that apply a flat tax, such as Hungary, Latvia, or Poland, demonstrate a reduced potential for fiscal drag, as the increase in nominal wages is subject to the same tax rates. The appendix presents the results for a parent of two children earning 67 percent of the average wage. In this case, the impact is greater, as a greater number of elements of personal income tax are involved, such as tax benefits or exempt minimums, which must also be indexed to compensate for the increase in prices. The results indicate the potential for inflation to increase the tax burden on EU citizens. The following sections provide a more detailed examination of the fiscal impact of rising prices, thus offering a more comprehensive understanding of the fiscal burden placed on taxpayers as a result of inflation.

Figure 2.



Note: Increased tax wedge for a worker earning 100% of the average wage when applying the 2019 personal income tax structure to the 2022 nominal wage
Source: OECD, *Taxing Wages 2023*.

19 It is important to note that the potential fiscal drag is not equivalent to the actual fiscal drag. Various factors influence the latter, including the level of inflation, the increase in real wages, and the fiscal policies applied to mitigate the impact of inflation. These results should be interpreted as an exercise to understand the effect that inflation has on the tax burden borne by taxpayers.

How Have Tax Revenues Changed with Inflation?

So far, we have reviewed the consequences of inflation on the tax burden borne by taxpayers. But how much have governments benefited from rising prices? One approach is to look at how tax revenue has evolved and compare it with the expected trend before the outbreak of the 2020 pandemic. If there has been an increase in government revenue from taxes above the 2019 inertial level —i.e. above the growth rate prior to 2019—, it is an indication that inflation has helped increase government revenue.

This can be seen in Figure 3. The differences across EU countries between actual tax collection and a scenario in which tax collection in the years 2020, 2021, and 2022 followed the 2014-2019 trend have been estimated.[20] As shown, tax revenues have grown more than expected in all Member States, with the exception of Malta and Hungary. On average, the increase is 1.5 GDP points.

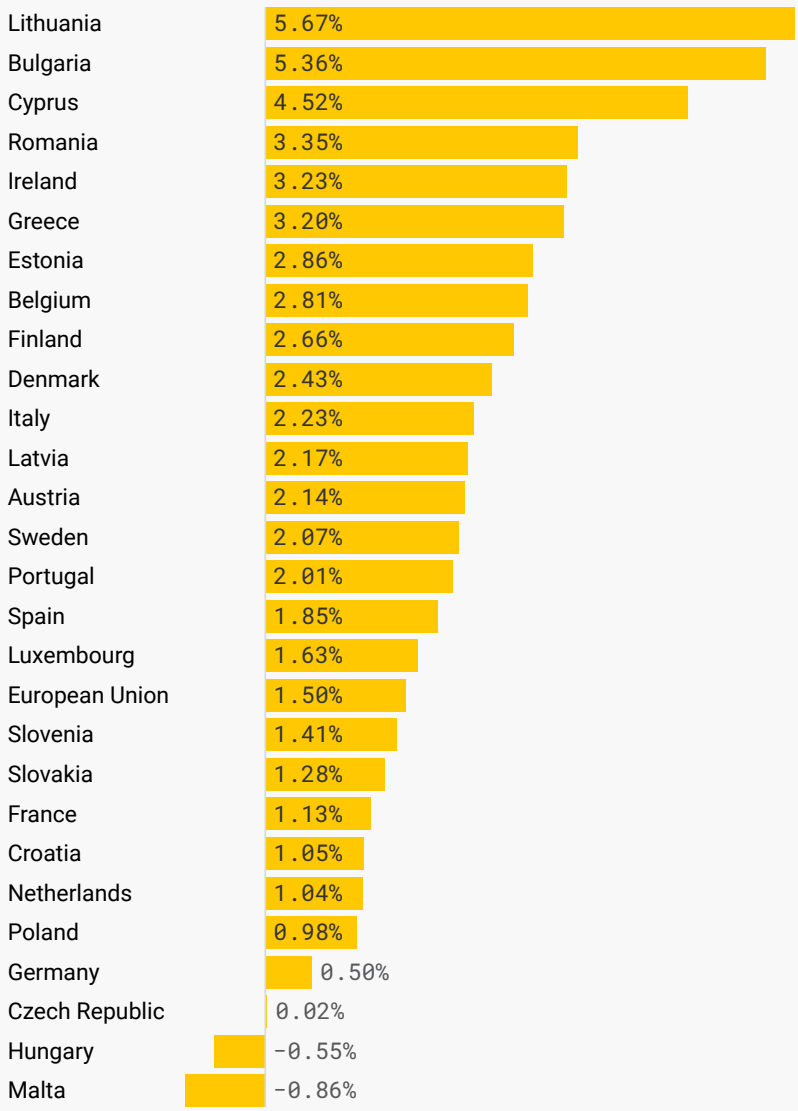
It is true that during this period, Europe has not only experienced a considerable increase in prices, but governments have also implemented numerous legislative changes and patterns of economic growth and other real variables that condition this evolution. Even so, it is reasonable to think that part of the difference with respect to an alternative scenario in the absence of the shocks that caused the period of high inflation was due precisely to the increase in prices.

Changes in prices affect the macro bases on which taxes are levied.[21] The relationship between prices and taxes is readily apparent. The phenomenon of inflation serves to expand the nominal tax base, thereby generating increased tax

Figure 3.

Inflation Pushed Up Tax Revenues in the European Union by an Additional 1.5 GDP Points on Average in 2022

Difference in Percentage Points of GDP between Observed and Estimated Tax Collection Based on 2014-2019 Trend across European Union Countries



Source: Own elaboration based on Eurostat data.

20 For this purpose, the trend has been estimated as the linear interpolation over the period 2014-2019.
21 The term "macro base" refers to the approximation of the tax base of each tax figure by this type of model through macroeconomic base variables constructed from national accounting data.

revenues. Furthermore, tax collection is enhanced by the expansion of the macroeconomic base in real terms, as well as by the tax measures approved for the fiscal year.

As previously stated, fiscal drag is a clear illustration of the impact of price increases on tax revenue growth. This phenomenon is further compounded by the imposition of progressive taxation, the existence of multiple income brackets, and the absence of an automatic mechanism to offset inflationary pressures.[22]

Estimates suggest that two-thirds of the revenue increase is due to macro bases and tax measures, while the remainder is explained by tax residuals. It should be noted that 65 percent of the explained growth in income tax, VAT, and social contributions corresponds to the nominal component of tax bases. In other words, prices explain €4 out of every €10 of the increase in tax revenue during these years as a result of high inflation.[23]

The weight of tax residuals in recent years, much higher than in the past, is due to the extraordinary economic situation. There are some suggestive hypotheses, such as the flourishing of the informal economy. However, the unprecedented rise in prices may also have affected the historical relationship between tax bases and tax revenues, which underestimates the elasticities and thus the explained part of the model.

Some analyses point to the existence of fiscal buoyancy due to rising prices.[24] Fiscal buoyancy refers to the ability of a tax system to raise additional revenue in response to an increase in the general price level in the economy. This concept implies that when inflation rises, tax revenues also tend to rise due to several mechanisms operating within the tax system, as explained in the previous section.

Case Study: How Much Has Inflation Cost Spanish Taxpayers?

Spain is one country in which the buoyancy of tax revenues has been most noticeable during the years of high inflation. Public revenues have increased by around 3.7 percentage points of GDP, compared to 0.7 percentage points for the European Union average. The gap in the tax burden with respect to the EU average has therefore halved in three years, from around 6 GDP points to less than 3 GDP points.

As indicated above, Spain is one of the few countries where no corrective measures have been taken to adapt rates to price increases.[25] For this reason, Spain is an interesting case study to see how much taxpayers have been affected by inflation.[26]

As explained earlier, inflation generates a fiscal overload in many tax figures, but it is particularly relevant in those with a progressive structure. With a progressive personal income tax scale like Spain's, it is easy to move to a higher bracket due to the nominal effect of prices, without increasing real capacity.

22 See the methodological description section for a more detailed analysis of the relationship among tax revenues, macro bases, and prices.
23 Esteban García-Miralles and Jorge Martínez-Pagés, "Government revenues in the wage of the pandemic. Tax residuals and inflation," *Banco de España Economic Bulletin* (March 2023), https://doi.org/10.53479/29791.
24 Daniel Garcia-Macia, "The Effects of Inflation on Public Finances," International Monetary Fund, May 2023, https://www.imf.org/en/Publications/WP/Issues/2023/05/05/The-Effects-of-Inflation-on-Public-Finances-533099.
25 The exempt minimum was updated but due to the increase in the minimum wage.
26 It is true that the personal income tax is 50 percent transferred to the regional governments. In some regions, these governments have chosen to index certain elements of the tax, but in a partial and discretionary way.

Considering the years 2021, 2022, and 2023 allows us to evaluate the time point for which prices have increased well above "normal" levels of the past. Specifically, the year-on-year price increase was 6.5 percent in 2021, 5.7 percent in 2022, and 3.1 percent in 2023.

Measuring the effect of this tax on the tax base and effective progressivity allows for the assessment of the magnitude of these two areas. The first effect has to do with the application of minimum exemptions and reductions, which, in real terms, are reduced. The second case relates to the real amplitude of the brackets for which different tax rates are applied, as previously discussed.

In this exercise, three scenarios are simulated. The first scenario is the reference scenario, which applies the tax without deflating rates or tax benefits and allowances. The second scenario deflates the tax rates. Finally, the third scenario updates all the elements that are taken into account when calculating the tax base.

To carry out these simulations, the EUROMOD tool is used. EUROMOD is a sophisticated tax-benefit microsimulation model designed to analyze the impact of tax and benefit policies on household incomes and poverty rates across the European Union. It allows policymakers, researchers, and analysts to evaluate the redistributive and revenue effects of tax and benefit reforms in a harmonized manner across EU Member States. By using detailed microdata, EUROMOD can simulate policy changes and assess their effects on income distribution and social welfare, providing critical insights for evidence-based policymaking.[27]

Normally, there is some lag in the income statistics, which are based on the EU statistics on income and living conditions (EU-SILC) microdata. As a result, incomes are updated. This is not a disadvantage for fiscal years 2021 and 2022, but it is a disadvantage for 2023. We are working with version I6.0+, which contains the regulations in force in 2023, i.e., the current one, but the data are taken from EU-SILC 2021. Despite this, the income data are updated to 2023 based on forecasted macroeconomic variables. This allows us to work with the most up-to-date data possible. The reference and updated values for each year for each tax item are included in the Appendix, as well as the detailed impact results by income deciles.

Table 3 shows the estimated savings for each of the scenarios, both in total amounts and savings per household. As can be seen, taxpayers suffered the greatest tax burdens in 2021 and 2022. If all elements of personal income tax in Spain had been indexed, taxpayers would have saved on average around €220 in 2021 and €217 in 2022. If the result for 2023, with more moderate inflation, is added, the total cost per household amounts to €557. For comparison, in 2022—the last year with available data—the equivalent final disposable income per household was €19,160, according to the National Institute of Statistics in Spain.[28] Therefore, in 2021 and 2022, Spanish households paid 1.1 percent of their disposable income due to fiscal drag.

The total amounts are approximately €4.0 billion in 2021 and 2022, and €2.26 billion in fiscal year 2023. In total, personal income tax receipts increased by €10.45 billion in these years due to inflationary pressures. This implies that about 3.5 percent of personal income tax collection is explained by inflation. Given that the revenue from this tax increased in 2021 and 2022 by €23 billion, about 35 percent of the increase in revenue is explained by inflation.

27 For further information, see Borja Gambau and Nuria Badenes, "Usos docentes de EUROMOD Online: microsimulación de reformas en el sistema tax-benefit y efectos sobre la distribución de la renta," *Revista electrónica sobre la enseñanza de la Economía Pública* 34 (February 2024): 57-93, https://e-publica.unizar.es/wp-content/uploads/2024/02/344_EUROMOD3.pdf.
28 National Institute of Statistics, *Living Conditions Survey*.

Table 3. Savings from Personal Income Tax Indexation in Spain Compared to Baseline Scenario 1 (Euros)

		2021	2022	2023	Total
Scenario 2	Total (Millions)	912	964	654	2,530
	Per Household	49	51	35	135
Scenario 3	Total (Millions)	4,104	4,087	2,260	10,451
	Per Household	220	217	120	557

Source: Own elaboration based on EUROMOD.

The Effect of Inflation on Value-Added Tax in Spain

Higher prices also increased the VAT burden. To understand this effect, it is important to clarify that VAT revenue borne by households can be estimated by considering two main components. The first component is the actual amount spent by households on goods and services, excluding indirect taxes and adjusted for price changes. The second component is the impact of the specific consumer price index for each household and the average VAT rate. By combining these elements, one can see how VAT revenue consists of the "pure" VAT amount unaffected by inflation and the additional revenue generated by price increases.[29]

According to the analysis made by Desiderio Romerio Jordán, households with lower spending capacity have borne the brunt of the inflationary impact.[30] These households allocate a larger proportion of their expenditures to essential goods such as food and energy, which have experienced significant price increases. In 2021, 70 percent of households faced a price index above the average, and in 2022, this figure rose to 80 percent, indicating that inflation disproportionately affected these households.

Inflation induced an increase in VAT revenue of €79.4 per household in 2021 and €217.6 in 2022. To highlight the importance of the nominal part of the tax, between 2021 and 2022, the VAT borne by Spanish households increased by €263.6, of which €138.2 is due to inflation. In other words, 52.3 percent of the increase in VAT borne by households is explained by inflation.[31]

Although households with a higher spending capacity bear a higher cost overrun due to inflation (€515.7 in 2022), the relative incidence of inflation decreases according to the expenditure decile. For example, households in the first expenditure decile spend €45.2 more on VAT, 63.3 percent of which is due to inflation. As mentioned above, the explanation lies in the fact that households with fewer resources spend a larger share of their income on essential goods such as food and energy, which have experienced greater price pressures in recent years. In any case, this is not a justification to implement VAT exemptions and carveouts, as these could lead to uncompetitive distortions in the tax code. Our research highlights that automatic tax adjustments are indeed more efficient and equitable measures.

The household located at the median expenditure had to bear an additional VAT of €175 due to the price increase. Taking into account that households bore an increase in personal income tax of €217

29 See the methodological description for a technical analysis.
30 Desiderio Romero Jordán, "Impacto de la inflación sobre el IVA soportado por los hogares españoles en los años 2021 y 2022," *Cuadernos de Información Económica* 296 (September-October 2023), https://www.funcas.es/articulos/impacto-de-la-inflacion-sobre-el-iva-soportado-por-los-hogares-espanoles-en-los-anos-2021-y-2022/#:~:text=En%20media%2C%20de%20los%20263,del%20aumento%20de%20los%20precios.
31 See Table 7 in the Appendix for more details on the impact by expenditure deciles.

in 2022 due to fiscal drag, the total excess cost borne by Spanish taxpayers amounts to €392.

In conclusion, inflation significantly impacted VAT revenue during 2021 and 2022, disproportionately affecting households with lower spending capacity. The increase in VAT borne by households in these years reflects both the direct effect of inflation on the prices of goods and services and its impact on total fiscal revenue. This analysis underscores the importance of considering inflation when assessing the fiscal burden on households and its impact on economic dynamism.

Conclusion

In recent years, European Union countries have experienced high inflation—driven by supply factors, demand, and imported inflation—that has significantly altered the economic landscape. This shift from low to high prices has profound implications, especially from a fiscal perspective. This paper's primary focus has been on the inflationary environment's fiscal consequences.

Inflation tends to increase the tax burden on taxpayers disproportionately to their economic capacity. This mismatch occurs because tax systems often do not adjust swiftly enough to the rising price levels, leading to higher effective tax rates even though real incomes have not increased equivalently. This underscores the importance of adapting tax systems to inflationary conditions to maintain fairness and efficiency.

Furthermore, the work of Herwig Immervoll emphasizes that addressing tax distortions caused by inflation is more manageable during periods of low inflation.[32] Implementing measures to neutralize these distortions can prevent significant revenue losses and also dispel the notion that tax adjustments are an admission of failure in controlling inflation. Instead, they should be viewed as proactive steps to maintain the integrity of the tax system.

Inflation impacts low-income households more severely, as they spend a larger portion of their income on essentials like energy and food. The rising costs of these items exacerbate economic inequality, highlighting the need for targeted fiscal policies that can mitigate the adverse effects. Indexing tax brackets and benefits to inflation is one such measure that can help protect the purchasing power of vulnerable populations.[33]

From a policy perspective, the indexation of taxes and benefits is crucial in an inflationary environment. This process involves adjusting tax thresholds and benefit amounts in line with inflation, ensuring that taxpayers do not inadvertently move into higher tax brackets and that benefits retain their real value. This helps prevent fiscal drag and benefit erosion, which can otherwise undermine efforts to reduce poverty and inequality.[34]

Moreover, as highlighted by Paulus et al. (2020), structural policy changes, although important, are often more effectively complemented by an appropriate updating of monetary parameters.[35] For example, during the period that they study, countries that implemented automatic tax and benefit indexation

32 Herwig Immervoll, "The Impact Inflation on Income Tax and Social Insurance Contributions in Europe," EUROMOD Working Papers, June 2000, https://www.iser.essex.ac.uk/wp-content/uploads/files/working-papers/euromod/em2-00.pdf.
33 Grégory Claeys, and Lionel Guetta-Jeanrenaud, "Who is suffering most from rising inflation?," *Bruegel,* Feb. 1, 2022, https://www.bruegel.org/blog-post/who-suffering-most-rising-inflation.
34 Alari Paulus, Holly Sutherland, and Iva Tesseva, "Indexing Out of Poverty? Fiscal Drag and Benefit Erosion in Cross-National Perspective," *The Review of Income and Wealth* 66:2 (June 2020): 311-333, https://doi.org/10.1111/roiw.12413.
35 Ibid.

mechanisms managed to avoid significant fiscal burden and benefit erosion, thus maintaining a more equitable distribution of income.

Another significant aspect of dealing with inflation is the role of behavioral changes among consumers and businesses. High inflation can alter consumption patterns, which in turn affect tax revenues and expenditure needs. Governments need to be agile in their policy responses, ensuring that tax and benefit systems are responsive to these dynamic changes in the economy.[36]

Finally, maintaining price stability remains a key objective for policymakers. While inflation control is often seen as the domain of central banks, fiscal policy also plays a crucial role. By ensuring that tax and benefit systems are resilient to inflation, governments can contribute to a more stable economic environment, which in turn supports sustainable growth and social equity.

The European Union's experience with high inflation highlights the critical need for adaptive fiscal policies. Best practices drawn from the academic literature recommend implementing automatic adjustment mechanisms with a certain periodicity and based on price increases. Though this is unlikely to be policymakers' desired solution, it best mitigates the increase in the tax burden on taxpayers and maintains an efficient and fair tax system.

36 Manos Matsaganis and Sotiria Theodoropoulou, "The return of inflation: Can we protect real incomes?," *Greek & European Economy Observatory* (June 2022), https://www.eliamep.gr/wp-content/uploads/2022/11/Policy-paper-117-Matsaganis-Theodoropoulou-final-.pdf.

Appendix

Technical Notes

Backward-Looking Inflation

Backward-looking inflation refers to the tendency of prices to be influenced by past inflation levels. This means that price increases tend to persist as firms and workers adjust their expectations and behavior based on recent inflation. According to Baba et al. (2023), this dynamic has become more relevant since the pandemic, slowing price adjustments and prolonging inflationary effects.[37] Retrospective inflation can lead to a wage-price spiral, where wage increases to compensate for past inflation lead to higher costs for firms, which in turn raise prices.

Corporate Margins

In addition to the common and local determinants of inflation in the European Union, it is important to consider the role of corporate margins during the crisis. Contrary to the perception that firms have increased their profit margins across the board, data shows that inflation has not been driven by an increase in corporate margins, but rather by rising input and output costs. According to the European Commission (2023), while some sectors have seen an increase in overall profit margins, particularly against a backdrop of falling real wages, industries that rely heavily on energy have seen their margins squeezed by rising energy costs that have outpaced increases in final prices.[38] Firms have struggled to fully pass on energy cost increases to consumers, leading to reduced margins in energy-intensive sectors such as transportation, metals, mineral products, and chemicals. This highlights that the inflation problem is largely due to increases in input costs rather than a deliberate increase in profit margins by firms.

The Public and Private Sectors React Differently to Inflation

The private and public sectors react differently to inflation due to their different characteristics and objectives. In simple models of the private market economy with full market adjustment, changes in nominal variables such as the money supply and the general price level, if anticipated, should not have significant real effects. In the short run, an increase in the money supply may have real effects due to rigidities in prices and wages, but in the long run, these adjustments and decisions are based on real or relative prices, leaving the actual equilibrium unchanged. With fully flexible prices, expected changes in inflation should have little real economic impact, except for a reduction in real cash holdings and some additional cost of printing money. In the case of hyperinflation, however, the effects may be more significant.

Which Indicator Should Be Used as a Benchmark to Adjust for Inflation?

Another relevant issue is to establish the benchmark for the adjustment. For example, the consumer price index (CPI) can be used, which prevents fiscal drag, except in cases where there is growth in

37 Chikako Baba, Romain Duval, Ting Lan, and Petia Topalova, "The 2020-2022 Inflation Surge Across Europe: A Phillips-Curve-Based Dissection," International Monetary Fund, February 2023, https://www.imf.org/en/Publications/WP/Issues/2023/02/10/The-2020-2022-Inflation-Surge-Across-Europe-A-Phillips-Curve-Based-Dissection-529693.

38 European Commission, "Corporate Vulnerability and the Energy Crisis: Challenges and Policy Responses," April 2023, https://www.consilium.europa.eu/media/64262/eg-note-corporate-vulnerability.pdf.

real wages. In the latter case, the limits could be adjusted for wage growth instead of inflation. Nevertheless, using real wages as a proxy for adjusting taxes is undesirable for several reasons. First, real wages reflect purchasing power and do not account for inflation, which can lead to disproportionate tax increases in times of economic growth. This phenomenon, known as "real fiscal drag," can push taxpayers into higher tax brackets simply because of increases in their real wages, thus increasing their tax burden without a corresponding increase in the cost of living. In contrast, "nominal tax drag" adjusts revenues for inflation, keeping the tax burden proportional to taxpayers' real purchasing power. Most EU countries have opted to use the CPI, but there are some exceptions, such as the Netherlands, which designed its own index for this specific purpose.

Methodology

Relationship between Tax Revenue and Inflation

Thus, as shown in equation 1, the increase in tax revenues is determined by the elements described above:

$$\Delta Tax\ revenue = \varepsilon * \Delta\ macro\ base + measures + residuals \qquad (1)$$

In this case, ε measures the historical relationship of tax revenues to changes in the tax base (elasticity). The macro base can be decomposed through deflators into a real and a nominal component. Additionally, a residual component is employed to assess the discrepancy between the tax base and the macro base. This discrepancy may be attributed to a number of factors, including an inadequate estimation of the impact of the measures or the change in elasticities due to changes in rates, as well as the effect of fiscal drag. By definition, tax residuals are the difference between the increase in observed and estimated tax revenues (i.e., the increase in revenue that cannot be explained by the model).

Relationship between VAT and Inflation

The VAT revenue borne by households can be approximated by the following formula:

$$R_{ti} = E_{it} * (1 + HCPI_{it}) * t^*_{it}$$

Here, E_{it} represents the expenditure on goods and services during period *t*, net of indirect taxes and price changes, $HCPI_{it}$ is the specific consumer price index for each household, and t^*_{it} is the weighted average VAT rate. This formula breaks down VAT into two components: the "pure" VAT revenue net of inflation and the revenue induced by price increases.[39]

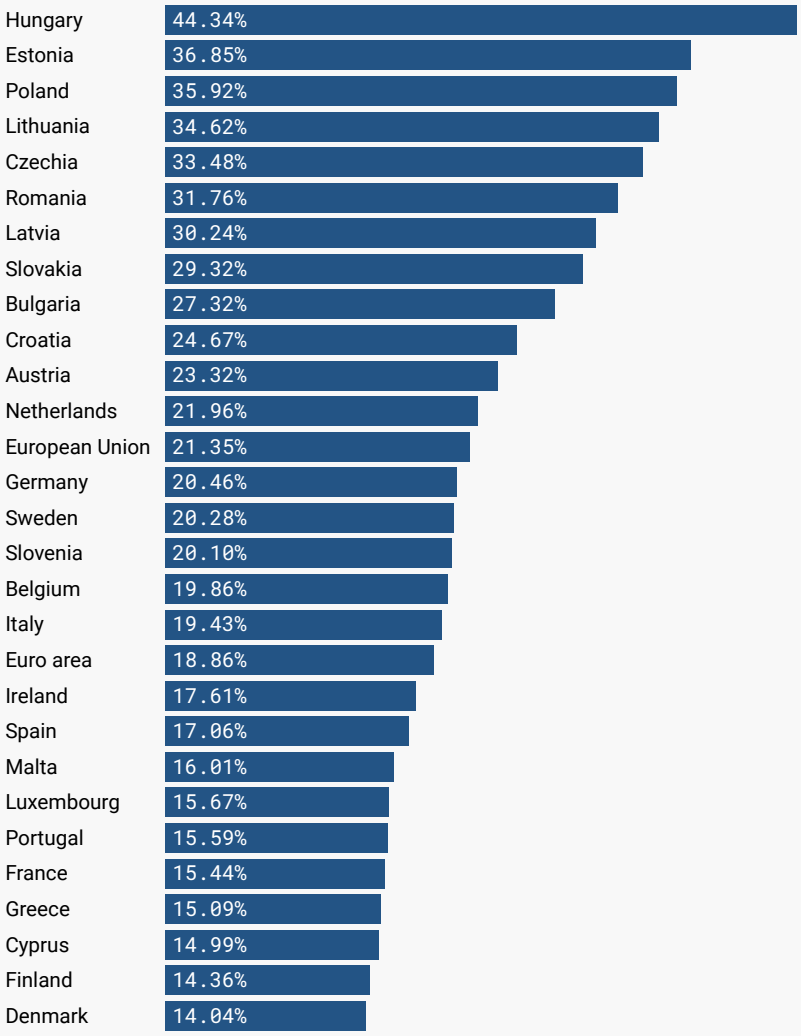
39 Desiderio Romero Jordán, "Impacto de la inflación sobre el IVA soportado por los hogares españoles en los años 2021 y 2022," *Cuadernos de Información Económica* 296 (September-October 2023), https://www.funcas.es/articulos/impacto-de-la-inflacion-sobre-el-iva-soportado-por-los-hogares-espanoles-en-los-anos-2021-y-2022/#:~:text=En%20media%2C%20de%20los%20263,del%20aumento%20de%20los%20precios.

Data

Appendix Figure 1.

Inflation Varied Significantly across European Countries

Cumulative Inflation in Member States between January 2020 and December 2023



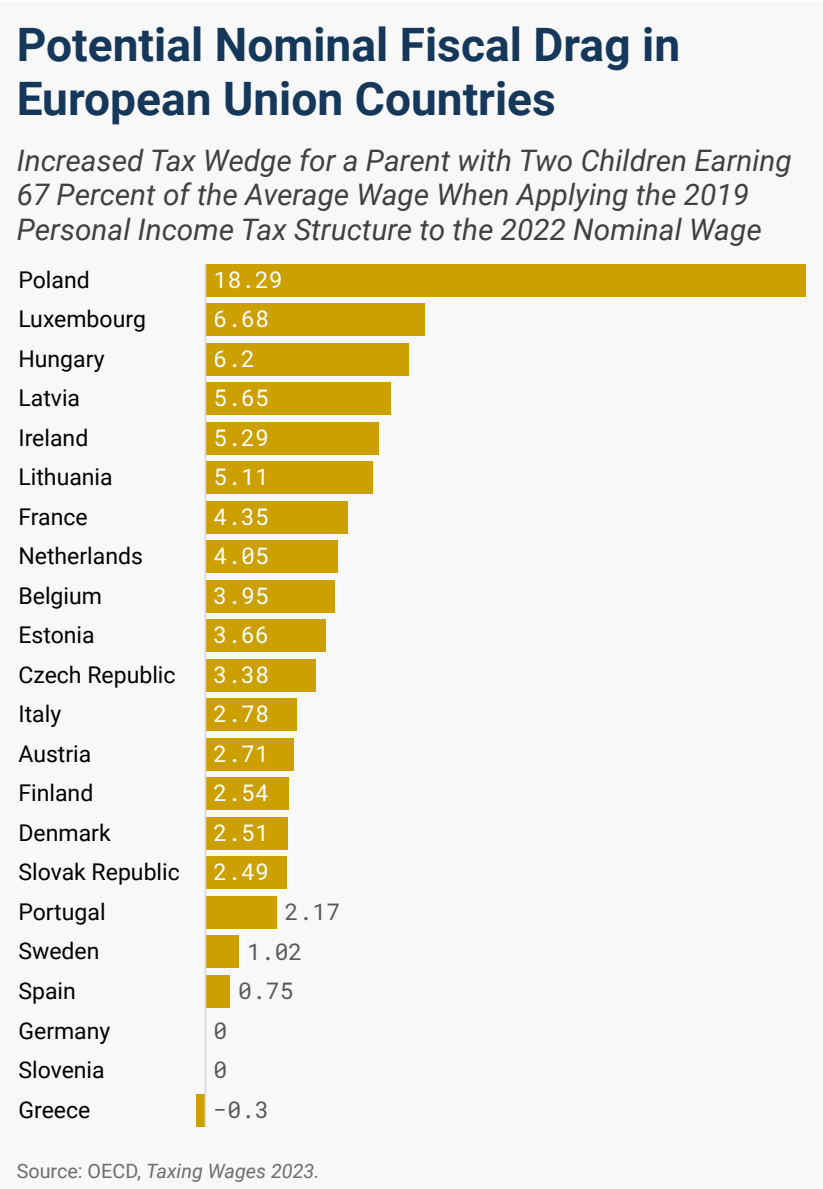
Source: Own elaboration based on Eurostat, *Harmonized Index of Consumer Prices - Monthly Data.*

Appendix Table 1. Adjustment of Income Tax Threshold

No Inflation Adjustment	Unclear Process	Automatic
131 countries	Argentina	Austria
	Azerbaijan	Canada
	Belgium	Chile
	Colombia	Denmark
	Costa Rica	Israel
	Ecuador	Netherlands
	Finland	Serbia
	France	Taiwan, POC
	Germany	United States
	Honduras	Venezuela
	Iran	
	Norway	
	Paraguay	
	Peru	
	South Africa	
	Sweden	
	Turkey	
	Ukraine	
	Uzbekistan	

Source: Beer et al. (2023).

Appendix Figure 2.



Appendix Table 2. Tax Benefits and Allowances Restated to Correct for Inflation (Euros)

			Reference 2021	Updated 2021	Reference 2022	Updated 2022	Reference 2023	Updated 2023
Tax Allowances	Personal	Basic	5,550	5,911	5,550	5,866	5,550	5,722
		Older than 65	1,150	1,225	1,150	1,216	1,150	1,186
		Older than 75	1,400	1,491	1,400	1,480	1,400	1,443
		Joint taxation for lone parents	2,150	2,290	2,150	2,273	2,150	2,217
		Joint taxation if married	3,400	3,621	3,400	3,594	3,400	3,505
	Family	Deduction 1st child	2,400	2,556	2,400	2,537	2,400	2,474
		Deduction 2nd child	2,700	2,876	2,700	2,854	2,700	2,784
		Deduction 3rd child	4,000	4,260	4,000	4,228	4,000	4,124
		Deduction 4 or more children	4,500	4,793	4,500	4,757	4,500	4,640
		Complement for children less than 3	2,800	2,982	2,800	2,960	2,800	2,887
		Dependent parent-amount	1,150	1,225	1,150	1,216	1,150	1,186
		Dependent parent-income limit	8,000	8,520	8,000	8,456	8,000	8,248
		Dependent parent complement-older than 75	1,400	1,491	1,400	1,480	1,400	1,443
	Work-Related	General tax deduction	2,000	2,130	2,000	2,114	2,000	2,062
		Amount below 1st limit	5,565	5,927	5,565	5,882	6,498	6,699
		1st limit	13,115	13,967	13,115	13,863	14,047	14,482
		2nd limit	16,825	17,919	16,825	17,784	19,747	20,359
		Limit for other income	6,500	6,923	6,500	6,871	6,500	6,702
Tax Credits	Family	Working mother for each child under 3 years	1,200	1,278	1,200	1,268	1,200	1,237
		Large families 3-5 children	600	639	600	634	600	619
		Large families, lone parent, single earner or more than 5 children	1,200	1,278	1,200	1,268	1,200	1,237
		Large families, lone parent, single earner with more than 5 children	2,400	2,556	2,400	2,537	2,400	2,474
		Lone parent with at least 2 children	1,200	1,278	1,200	1,268	1,200	1,237

Source: Own elaboration based on EUROMOD.

Appendix Table 3. Tax Benefits and Allowances Restated to Correct for Inflation (Euros)

	Reference 2021	Updated 2021	Reference 2022	Updated 2022	Reference 2023	Updated 2023
Bracket 1	0-12,450	0-13,259	0-12,450	0-13,160	0-12,450	0-12,836
Bracket 2	12,450-20,200	13,259-21,534	12,450-20,200	13,160-21,351	12,450-20,200	12,836-20,826
Bracket 3	20,200-35,200	21,534-37,488	20,200-35,200	21,351-37,206	20,200-35,200	20,826-36,291
Bracket 4	35,200-60,000	37,488-63,900	35,200-60,000	37,206-63,420	35,200-60,000	36,291-61,860
Bracket 5	60,000-300,000	63,900-319,500	60,000-300,000	63,420-317,100	60,000-300,000	61,860-309,300
Bracket 6	>300,000	>319,500	>300,000	>317,100	>300,000	>309,300

Source: Own elaboration based on EUROMOD.

Appendix Table 4. Tax Revenue Impact of Personal Income Tax Indexation in Spain, 2021 (Euros)

	Total Annual Income Taxes + Social Contribution Paid			Mean Annual Income Taxes + Social Contributions Paid at Household Level		
Decile	Baseline	Scenario 2	Scenario 3	Baseline	Scenario 2	Scenario 3
1	1,748,672,972	1,748,488,750	1,743,416,823	941	941	938
2	2,068,480,958	2,067,015,977	2,031,453,669	1,235	1,234	1,212
3	2,446,769,216	2,441,104,039	2,342,594,007	1,220	1,217	1,168
4	3,874,830,214	3,858,784,719	3,641,493,989	2,084	2,076	1,959
5	5,298,110,685	5,268,558,586	4,982,747,709	2,916	2,900	2,742
6	7,559,560,035	7,507,248,381	6,932,840,325	3,866	3,839	3,545
7	10,456,408,819	10,375,420,861	9,897,574,732	5,588	5,545	5,290
8	15,014,117,849	14,880,531,101	14,392,157,875	8,169	8,097	7,831
9	21,334,424,026	21,142,774,437	20,630,045,727	11,447	11,344	11,069
10	47,037,806,832	46,637,078,687	46,141,037,082	24,649	24,439	24,179
Total	116,839,181,606	115,927,005,538	112,735,361,939	6,264	6,215	6,044

Source: Own elaboration based on EUROMOD.

Appendix Table 5. Tax Revenue Impact of Personal Income Tax Indexation in Spain, 2022 (Euros)

	Total Annual Income Taxes + Social Contribution Paid			Mean Annual Income Taxes + Social Contributions Paid at Household Level		
Decile	Baseline	Scenario 2	Scenario 3	Baseline	Scenario 2	Scenario 3
1	2,233,314,190	2,233,028,084	2,227,709,978	1,193	1,193	1,190
2	2,126,842,639	2,123,913,942	2,061,101,619	1,253	1,251	1,214
3	3,150,558,712	3,140,391,448	2,988,387,875	1,563	1,558	1,482
4	4,635,548,315	4,614,145,660	4,382,147,848	2,510	2,499	2,373
5	6,355,835,172	6,321,509,570	5,943,860,823	3,392	3,374	3,172
6	9,260,772,377	9,200,414,382	8,738,982,693	4,959	4,927	4,680
7	12,412,776,704	12,319,156,043	11,862,373,366	6,504	6,455	6,216
8	17,518,579,421	17,379,258,016	16,924,473,875	9,717	9,640	9,388
9	25,058,482,751	24,857,278,485	24,383,954,122	12,688	12,586	12,347
10	51,411,958,513	51,011,263,524	50,569,212,810	26,853	26,643	26,413
Total	134,164,668,793	133,200,359,154	130,082,205,009	7,146	7,095	6,929

Source: Own elaboration based on EUROMOD.

Appendix Table 6. Tax Revenue Impact of Personal Income Tax Indexation in Spain, 2023 (Euros)

Decile	Total Annual Income Taxes + Social Contribution Paid			Mean Annual Income Taxes + Social Contributions Paid at Household Level		
	Baseline	Scenario 2	Scenario 3	Baseline	Scenario 2	Scenario 3
1	1,626,486,236	1,626,189,930	1,623,676,196	853	853	851
2	2,543,465,076	2,540,905,630	2,504,248,425	1,469	1,467	1,446
3	3,480,921,972	3,472,492,107	3,373,890,425	1,723	1,719	1,670
4	5,335,732,873	5,320,606,374	5,168,510,713	2,884	2,876	2,793
5	7,729,220,412	7,700,197,333	7,465,036,921	4,216	4,200	4,072
6	10,679,729,296	10,636,540,817	10,402,868,135	5,728	5,705	5,579
7	15,026,266,074	14,957,630,212	14,741,213,238	8,037	8,000	7,884
8	20,514,058,972	20,421,199,156	20,208,146,610	10,969	10,920	10,806
9	30,040,704,045	29,897,020,808	29,683,306,976	15,130	15,058	14,950
10	58,748,672,798	58,498,196,418	58,293,868,196	31,028	30,896	30,788
Total	155,725,257,754	155,070,978,785	153,464,765,836	8,272	8,237	8,152

Source: Own elaboration based on EUROMOD.

Appendix Table 7. VAT Tax Burden Caused by Inflation in 2021 and 2022

Average Adjusted Expenditure Deciles in 2022	Total Revenues				Revenues from Inflation				
	2021 Euros (1)	2022 Euros (2)	Growth in Euros (3)	Growth in Percentage (4)	2021 Euros (5)	2022 Euros (6)	Growth in Euros (7)	Accumulated in Euros (5) + (6)	Relative Incidence in Percentage (7)/(3)
1	626	671	45	7.2	30	59	29	89	63
2	1,034	1,134	100	9.7	42	96	54	138	53
3	1,337	1,465	128	9.6	51	119	68	169	53
4	1,660	1,801	142	8.5	59	147	88	206	62
5	1,965	2,196	230	11.7	66	175	109	242	47
6	2,313	2,603	290	12.5	76	202	126	279	44
7	2,763	3,094	331	12	87	240	153	327	46
8	3,288	3,696	408	12.4	97	280	183	377	45
9	4,168	4,637	469	11.2	115	341	226	457	48
10	6,766	7,256	490	7.2	169	516	347	684	71
Total	2,592	2,856	264	10.2	79	218	138	297	52

Source: Desiderio Romero Jordán, "Impacto de la inflación sobre el IVA soportado por los hogares españoles en los años 2021 y 2022," *Cuadernos de Información Económica* 296 (September-October 2023), https://www.funcas.es/articulos/impacto-de-la-inflacion-sobre-el-iva-soportado-por-los-hogares-espanoles-en-los-anos-2021-y-2022.