

Fiscal Stimulus in the European Union to Stabilize the COVID Shock

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Abstract We document fiscal policies adopted in 2020 in five major European Union (EU) countries to deal with the COVID-19 pandemic. Then, we show the correlations between fiscal indicators and GDP growth. Economic stabilization was easier in countries where the budget deficit and the public debt were relatively small, with more room for maneuvers to conduct a counter-cyclical fiscal policy. Besides, the increase in public expenditure (cash transfers) did not always correlate with economic growth, whereas preserving government revenue was important in the case of tax cuts. More precisely, regarding the fiscal revenues of the EU member countries in 2020, reducing the weight on corporate income taxation, to sustain production supply and wealth creation by firms, was correlated with higher economic growth. Stylized facts show that the recession was weaker in countries where the relative weight of indirect taxation on household consumption increased, as in the Nordic countries.

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I. Introduction

In response to the COVID-19 crisis, governments and public health authorities worldwide implemented confinement measures (lockdown and quarantines). These measures resulted in the closure of entire sectors of the economy, particularly those that supplied economic activities and services involving high physical contact with other people, such as restoration, tourism (hospitality), culture, and leisure. Besides, workers who stayed at home were prevented from producing goods and services. Therefore, this crisis implied accentuated negative supply shock in some production sectors, whereas sectors where the job can be done at home were much less affected. As a negative supply shock, this crisis reduced both the available labor force and workers' productivity. However, the confinement and closure of many establishments required

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many workers to stay home, and some even lost their jobs and income. Therefore, consumers reduced their consumption of goods and services at home and often with a weaker (or even with no) salary. This, combined with uncertainty about the evolution of the pandemic, reduced demand for nearly all goods and services, except obviously for food. Indeed, self-isolated customers had fewer opportunities to spend. Besides, faced with uncertainties about future economic prospects, they were tempted to cut down spending even further. Only a few sectors, like retail trade or the information sector (telework), benefited from a positive demand shock. Therefore, the consequences of the COVID-19 combined the aspects of both negative supply and demand shock, affecting the various sectors of the economy asymmetrically.

In this background, fiscal policy appears to be an appropriate tool for compensating for a major demand and supply shock like the COVID crisis. First, it can provide appropriate public health spending to fight the pandemic's consequences. Moreover, it can compensate for the negative demand shock and the decrease in private investment and consumption by increasing public consumption and expenditure directed toward households and firms particularly affected by the health crisis. Indeed, automatic stabilizers increase public expenditure and transfers and reduce government revenue in an economic crisis. However, the severity of the COVID crisis also necessitated appropriate discretionary budgetary measures to compensate for the recession. Some measures implied a direct cost to public finances. In contrast, other measures were more ambiguous and were even treated differently by the statistical reports of the European Union (EU) member countries: tax deferrals represented a cost that was only reported later (even if they allowed a beneficial current increase of liquidity), whereas loan guarantees did not always imply an effective disbursement.

The COVID crisis required an unprecedented large fiscal response in all countries to support health systems and support to vulnerable households, firms, and economic activity sectors: additional spending or temporary tax cuts to compensate for foregone revenues, loans, guarantees, and equity injections by the public sector. The governments were forced to act quickly and strongly to mitigate the social and economic consequences of the COVID crisis. Member States primarily took substantial measures to protect employment, particularly in the form of short-term work schemes and other support measures for the most affected firms, such as subsidies [see Haroutunian et al. (2021)]. Indeed, fiscal policies were focused on preserving the economy's pre-crisis structure where possible and on minimizing crisis-related insolvencies and firm exit from the market. The exit of healthy firms hit by the temporary lockdown would be damaging to the subsequent recovery, as it would lead to an inefficient capital loss necessary for the production function, particularly firm-specific intangible and human capital. In all countries, public deficits and debts have increased to unprecedented levels.

The OECD (2020) mentions that the fiscal package was particularly significant in Germany, the United Kingdom, and United States. Some measures involved permanent losses, even if

only for one year (e.g., short-time work schemes). Other measures were supposed to temporarily impact budget balances (deferrals, filing extensions, loss offsets) as deferred taxes were expected to be paid later on. Finally, state loans and loan guarantees, the most significant measures in overall fiscal packages (particularly in Germany), did not have a direct fiscal cost. However, they created contingent liabilities that, in some cases, could become future expenses either in 2020 or later. These policies provided the necessary support in the short-term, but Haroutunian et al. (2021) assess they may have long-term implications. Wage subsidies preserved jobs and worker-firm relations, but they may slow future labor force allocation, labor market adjustment, and fundamental sectoral reallocation. There is a risk that temporary tax deferrals and cuts will become permanent, thus, reducing public resources and jeopardizing the sustainability of the public indebtedness level.

In the economic literature, fiscal policies are often considered efficient in sustaining economic activity in the background of such a negative shock as the COVID health crisis. For example, Woodford (2011) shows that in New Keynesian models, sticky prices or wages allow for larger multipliers than in neoclassical models. According to the author, a multiplier well exceeding 1 is possible when monetary policy is constrained by the zero lower bound. In this case, welfare increases if government purchases expand to partially fill the output gap that arises from the inability to lower interest rates. In the event of a severe negative supply shock, Fornaro and Wolf (2000) also underline that a supply-demand doom loop may occur, amplifying the supply disruption directly caused by the virus. The global economy may then become vulnerable to stagnation traps and episodes of low growth and high unemployment driven by pessimistic expectations as a result of this epidemic. Although monetary easing can help mitigate the drop in aggregate demand, their analysis suggests that aggressive fiscal policy interventions to support investment are required to push the global economy out of stagnation.

The IMF (2020) underlines the necessity of increasing public investment in the context of the current COVID crisis. Indeed, investment multipliers are particularly high in strong and unusually large macro-economic uncertainty. In this context, public investment can act as a catalyst for private investment to take off. The IMF estimates that a 1% GDP increase in public investment, in advanced economies and emerging markets, can push GDP up by 2.7% and private investment by 10%, mainly to create between 20 and 33 million jobs. Investment in health and education and digital and green infrastructure can connect people, boost economic productivity, and improve resilience to climate change and future pandemics. Priorities include developing well-resourced and better-prepared healthcare systems, expanding digital infrastructure, and addressing climate change and environmental protection. Nonetheless, Bilbiie et al. (2019) emphasize that government spending at the ZLB is not always welfare enhancing; when spending does not provide direct utility, it is generally welfare-detrimental and should be maintained at a long run optimal level. In the same way, Auray and Eyquem (2020) show that increasing

public spending and extending unemployment insurance benefits stimulating aggregate demand or improve risk-sharing. However, it has little effect on output and unemployment, despite alleviating the welfare losses associated with lockdown policies for households. Therefore, the following question is one of the consequences of various fiscal policies on economic growth: In the context of economic recession due to the COVID crisis, is it more appropriate to sustain the production function and firms, or to maintain household purchasing power?

Each firm whose financial situation is sustainable is a precious part of an economic network that, if gone, induces large losses in other parts of the economy, workers and their families, local communities, and the state as a whole. The crisis and supply chain contagion can then spread through production and sales networks. Shutdowns halt some activities, and workers' productivity and aggregate supply fall. Moreover, firms face liquidity issues or even risk of going bankrupt, which reduces employment and wages to employees. Indeed, fiscal measures can have two goals: (1) limit the short-run decline in aggregate demand and economic activity; and (2) on the supply side, sustain the productive capacities and avoid the loss of employability due to a long unemployment period or the bankruptcy of firms with cash flow or order difficulties. According to the OECD (2020), in the context of the COVID crisis, most short-term measures in OECD and G20 countries sought to ensure that businesses had sufficient cash flow to pay for wages, rents, intermediate goods, interest on debt, and taxes. Non-tax measures were mostly loan guarantees and the deferral of payments of non-wage business costs, such as rent or interests; tax measures were mostly the deferral of tax payments (in three-quarters of countries). Many countries also introduced measures to help businesses keep their workers: eligibility for short-time work schemes and sometimes expansion of unemployment benefits. Nevertheless, beyond these supply side measures, many countries also introduced measures to enhance households' cash flow: extension of tax filing deadlines, tax payment deferrals (mostly regarding the personal income tax), or plans for households unable to make their tax payments. Measures frequently took the form of enhanced cash benefits targeted at the most vulnerable households, and assistance was primarily provided through direct transfers to redistribute income, rather than through the tax system. Many countries increased sick leave and unemployment benefits coverage (e.g., to self-employed workers). Therefore, the analysis and study of the outcomes and successes of these various fiscal policies to avoid the collapse of economic activity in the context of the COVID crisis is critical.

This paper analyzes stylized facts about fiscal policies to stabilize the COVID shock in the EU. The second section documents fiscal packages implemented in five EU countries: Germany, France, Italy, Spain, and Ireland. The third section discusses the results of stylized facts and observations regarding expenditure- or taxation-based fiscal policies and the correlation between fiscal indicators and GDP growth. Finally, the fourth section concludes the paper.

II. Fiscal Policies during the COVID Crisis in the European Union

Before trying to underline the correlations between fiscal policies and GDP growth rates, this section aims to describe stylized facts regarding economic policies in five EU countries. These countries are chosen because of their size and the representativeness of the specific fiscal packages they adopted to overcome the COVID crisis. Germany, France, Italy, and Spain are the four largest European countries in terms of GDP size, and they have chosen quite different fiscal packages to combat the recession. Meanwhile, Ireland's case is interesting because, in comparison, it is a small country with a relatively small public debt and one of the only EU countries to experience positive GDP growth in 2020. The description of these five countries' fiscal packages is based on a variety of sources, primarily data collections from the IMF (2020, 2021) and the OECD (2020). I also used the AMECO database (see Appendix A) to calculate variations in various components of the aggregate demand in each country.

A. France

Following the COVID-19 outbreak, real private consumption decreased by 7.07% in France in 2020, a similar proportion to the EU average (see Appendix A). However, in contrast to the rest of the EU, real public consumption decreased by 3.18%; current public consumption increased solely due to inflation. Indeed, the budget deficit in France was initially and remained in 2020 (-9.1% of GDP); the fiscal impulse (differential with the budget deficit in 2019), around -6.0 percentage points (pp) of GDP, represented a heavy weight on public finances at the time, and fiscal policy was hardly constrained. The very high public debt level continued to rise (115.0% of GDP in 2020), far exceeding the EU average. Simultaneously, the real gross capital formation decreased by 9.02% in France in 2020, slightly more than in the rest of the EU. Besides, the current account balance continued to be loss-making and contribute negatively to aggregate demand; net exports even very strongly decreased during the crisis because exports (due to sectoral specialization, focused in particular on aeronautics and tourism) were more reduced than imports. Therefore, France's real GDP strongly decreased by 7.85% in 2020, and the recession was more severe than the average EU contraction.

Solving the crisis was difficult in France because the budget deficit and the public debt were initially very high, limiting the fiscal room of maneuver. Furthermore, France was the only big European country where the current account balance was strongly negative¹⁾ and contributed to the decrease in aggregate demand. Besides, the relative share of net social security contributions in the total resources of the government remained above the EU average, whereas

1) In the European Union, only a few countries, like Greece, Croatia or Romania, have also negative current account balances.

the relative share of current direct taxes on income and wealth remained quite weak in France. On the contrary, the relative share of indirect taxes in France was already higher than in other EU countries, and this share was even slightly increased in 2020, which was detrimental to private consumption. What were the main fiscal measures implemented in France to overcome the crisis?

Since mid-March 2020, the French government has implemented a slew of pandemic-combating measures, including school closures, a ban on all non-essential activities, and the imposition of night-time curfews or containment measures. The authorities also introduced three supplementary budget acts between March and July 2020, increasing the fiscal resources devoted to addressing the crisis to about €135 billion (nearly 6% of GDP, including liquidity measures). This was added to a massive package of public guarantees totaling €327 billion (nearly 15% of GDP) for bank loans and credit reinsurance schemes. Indeed, up to 90% of eligible loans were guaranteed, with up to €300 billion in loans granted to companies registered in France until December 2020. Large French companies were ineligible to benefit from the state guarantee if they authorized the distribution of dividends or a share buy-back in 2020, and they should not be established in a non-cooperative state or territory. These loan guarantees ("Prêt Garanti par l'Etat" or PGE scheme) were the most powerful French weapons to prevent the pandemic from causing mass unemployment and bankruptcies, and they were in practice mainly directed on small companies. Furthermore, fiscal measures are aimed at supporting the health system and the hardest-hit sectors. Liquidity support was also provided through postponements of social security and tax payments for companies and accelerated refund of tax credits (Corporate Income Tax and VAT). Any company in difficulty could postpone, without penalty, direct taxes (corporate income tax (CIT) and payroll taxes) payments due in March, April, May, and June 2020. It applied also to the payment of wage tax due in July and August (postponement by three months). Moreover, payment of the business contribution on property (real estate occupancy tax) for firms and the property tax for households could also be suspended upon request in case of difficulties, for March, April, and May 2020.

Cash subsidies were also made to small companies negatively impacted by the crisis out of a "Solidarity Fund" of approximately €7 billion during March, April, and May 2020. Besides, remote work was strongly encouraged, whereas the government financially sustained partial unemployment. Indeed, the employee could receive 70% of its gross salary, whereas the employer was reimbursed 85% of the amount paid to the employee in partial unemployment within the limit of 4.5 times the hourly minimum wage. The partial activity scheme could be requested by businesses in exceptional circumstances. Employer's share of social security contributions was reduced. Other measures included direct financial assistance for affected microenterprises, liberal professions, independent workers, and low-income households; postponement of rent and utility payments for affected microenterprises and SMEs; extension of unemployment benefits until the end of the lockdown; and preservation of rights and benefits under the disability and

active solidarity income schemes.

Besides, on September 3, 2020, the French government announced a new fiscal package to support the recovery of the French economy ("Plan de Relance"). The plan included measures totaling approximately €100 billion (4.3% of GDP) over two years that focused on ecologically transforming the economy, increasing the competitiveness of French firms, and supporting social and territorial cohesion [IMF (2021)]. Furthermore, in response to the reintroduction of lockdown measures, the authorities announced the extension of emergency support for firms and households (by about 0.9% of GDP) in the context of the fourth supplementary budget act. The recovery plan and additional funding for emergency programs were incorporated into the 2021 budget (e.g., solidarity fund and short-time work scheme). The French government clearly aspired to relaunch the domestic production engine (including traditional industries, such as automobiles) by addressing the economy's long-standing structural rigidities through public investment. The stimulus package was geared toward: (a) achieving the green transition (€30 billion), with money earmarked to renovate buildings to be more energy-efficient, to boost investments in environmentally friendly industries and decarbonize the economy; (b) fostering industrial competitiveness (€35 billion), through a €20 billion reduction in taxes on production and funds to help companies in strategic sectors; and (c) preserving social cohesion (€35 billion) via transfers and labor market measures.

Compared with the German stimulus package, which was essentially demand-oriented, the French stimulus aimed to revive the economy's supply side. The decline in the long-term trend in labor productivity, or rigidities in the price adjustment mechanism, is a major concern in France. Indeed, loan guarantee programs for highly indebted small companies with weak productivity and profitability, those that are unable to invest and create jobs, could have been detrimental to economic restructuring and to sustainable long-term growth. France suffered a long-term negative shock to productivity, owing primarily to lower capital stock and inertia in firms' price adjustment behavior (otherwise, prices would have fallen even further). Besides, France was strongly reliant on imports for consumption and investment. Therefore, by stimulating domestic demand, government stimulus packages naturally increased import demand, thereby benefiting trading partners. Among Europe's major economies, France experienced the most extensive leakage from its fiscal stimulus, causing its structural merchandise trade deficit to deteriorate strongly. Germany (chemicals, automotive manufacturers, machinery, and equipment) and China (computers and telecom) were the main winners of the French increase in imports.

Because of these fiscal measures, real private consumption in France increased by 4.38% in 2021, slightly above the EU average, but it will only return to the 2019 level in 2022 (see Appendix A). Indeed, the persistence of uncertainty in the health and labor markets hampered private consumption, limiting the reduction in forced savings built up during lockdown. Therefore, in France, the recovery was mainly driven by public demand (real public consumption strongly increased by 5.39% in 2021) and income support expenditure. The budget deficit began to be

reduced, but it remained very large (8.1% of GDP), and it increased the excessive public indebtedness level. Real gross capital formation increased by 12.49% in 2021 in France, more than the EU average, with private investment exceeding the 2019 level. The recovery of private investment could be due to expected rapid recovery in profit margins and the aforementioned reduction in taxes on production. Nevertheless, the current account deficit still increased, and net exports remained negative. Finally, real GDP increased by 6.54% in 2021 in France, more than in the rest of the EU, but it remained below the 2019 level.

B. Germany

Following the COVID-19 outbreak, real private consumption decreased in Germany by 5.86% in 2020, less than the EU average (see Appendix A). Furthermore, real public consumption increased by 3.54%, more than the rest of the EU. Indeed, the budget surplus turned into a budget deficit in 2020 (-4.3% of GDP), though the latter was more limited than in the other member countries, with the fiscal impulse being around -5.8 pp of GDP. The public debt then increased slightly (68.7% of GDP in 2020), but it remained lower than the average EU indebtedness level. Simultaneously, the real gross capital formation moderately decreased by 6.36% in Germany. However, the positive current account balance continued to strongly contribute to aggregate demand, even if net exports were very slightly reduced during the crisis because exports were more reduced than imports. Therefore, real GDP in Germany fell by 4.57% in 2020, and the recession was narrower than the EU's average contraction.

Resolving the crisis was easier in Germany than in other European countries because it had a budget surplus in 2019 and a particularly low public indebtedness level, giving more fiscal room of maneuver to increase public expenditure. General government budget surpluses and sustained economic growth during the preceding years have significantly contributed to giving a large margin of fiscal space to fall back on during 2020, when a quick and decisive fiscal policy action was required. Therefore, the fiscal impulse in Germany was mainly due to public expenditure. Besides, Germany's social security contributions took a particularly large share of the government's total revenue in 2019, reaching a record level in Europe (see Appendix A); this share still increased with the crisis. The weight given to current direct taxes on income and wealth strongly decreased in 2020, to become smaller than the EU average, which helped sustain private investment. In contrast, Germany gave a much weaker weight than other member countries to indirect taxes. This small relative share was still reduced in 2020 and could have contributed to better limiting the contraction of private consumption in Germany. What were the main fiscal measures adopted in Germany to overcome the crisis?

Germany, long known for its fiscal austerity and aversion to deficits, has spent heavily in response to the crisis. Using long-accumulated fiscal space, the government implemented sizable

measures (among the largest in advanced economies) to combat the pandemic. According to the, Germany approved €263 billion (8.3% of GDP) in additional spending and foregone revenue and €1 trillion (30.8% of GDP) in liquidity support (loans, equity, and guarantees). Furthermore, on March 23, 2021, the German federal cabinet approved a supplementary budget and economic stabilization fund to address the economic consequences of the pandemic. The budget included €122.3 billion in new spending and €33.5 billion in tax cuts. Most of the spending went toward immediate grant assistance to SMEs, increased welfare payments, and additional funding for hospitals and medical providers. Germany also expanded its wage subsidy program or short-time work benefit (*Kurzarbeit*), which reimbursed employers for the wages of furloughed employees [IMF (2021), OCED (2020)]. The supplementary budget reduced the requirements for receiving wage subsidies, and Germany extended the duration of support until the end of 2021 in August. Employees whose hours were reduced were eligible to receive at least 60% of their wages under the program, which greatly contributed to Germany's remarkable labor market resilience during the crisis by preserving jobs and stabilizing incomes. However, the majority of job losses were borne by marginally employed workers who were ineligible for "*Kurzarbeit*" (mostly women, employed in hard hit contact-intensive services).

The duration of unemployment benefits was also extended, and firms were provided with liquidity. Germany also established an economic stabilization fund, which included €957 billion in federally administered loan guarantees and equity investments in severely impacted companies, to stabilize large companies particularly vital in the German industrial base. However, effective loan guarantees have remained limited in Germany; only a limited share of these loans implied effective disbursements. Furthermore, tax payment deferrals were favored if tax collection was a "considerable hardship" for the taxpayer. This measure applied to income tax, corporation tax, and VAT, but not to wage tax and capital gains tax. Additionally, companies, self-employed persons, and freelancers could request adjustments to the amount of their income tax and corporation tax prepayments, if it was clear that their income would be lower than before the pandemic.

Furthermore, on June 3, 2020, the German Bundestag approved a second supplementary budget and stimulus package of €130 billion, which included 57 measures to address both immediate financing needs and long-term recovery. The emphasis was on increasing domestic demand through a temporary value-added tax cut, expanding support for small businesses, and increasing public spending on green investment, digital infrastructure, and healthcare. The value-added tax rates were temporarily reduced from 19% to 16% between July and December 2020, and the reduced rates were reduced from 7% to 5%, at an estimated cost of €20 billion or 0.6% of GDP. The goal of this policy was to temporarily lower prices to pave the way for future increases in sales taxes, thereby stimulating inflation expectations, consumption, and aggregate demand today. The package also included a €25 billion programs to compensate 80% of the operating costs for small businesses significantly impacted by the shutdown. The second budget

also included a €50 billion future investment program aimed at reducing Germany's carbon footprint and promoting digital innovation. This included electronic vehicle subsidies, a nationwide 5G telecommunications network development, and an increased investment in artificial intelligence.

In November and December 2020, further measures were introduced to support the most affected businesses during the renewed lockdown. Germany created an initial short-term aid program (Überbrückungshilfe I) from June to August 2020, to help companies that suffered revenue losses of at least 60% compared with the same period in the previous year. This program, which targets small and medium-sized enterprises, self-employed individuals and freelancers, and non-profit companies and organizations in all economic sectors, was extended with Überbrückungshilfe II between September and December 2020 and III since January 2021. They could receive grants of up to €1.5 million per month (€3 million for groups) for certain fixed operating expenses. Besides, the upper limits for loss carrybacks were temporary and slightly increased in 2020 and 2021, to improve companies' liquidity. Moreover, social security contributions were stabilized at a maximum of 40% by means of the Social Guarantee 2021 (German Federal Ministry of Finance, 2021, pp. 18, 26). Furthermore, lower taxes and social security contributions, particularly for families and low and middle-income earners, increased disposable income. The first Family Tax Burden Reduction Act provided annual relief of approximately €9.8 billion in 2019 and 2020. The Second Family Tax Burden Reduction Act, along with the elimination of the solidarity surcharge for approximately 90% of tax payers who were previously subject to it, intended to reduce the tax burden on low and middle-income groups by around €20 billion in 2021 and 2022 (German Federal Ministry of Finance, 2021, p. 26).

Thanks to the aforementioned fiscal measures, real private consumption was stabilized in Germany in 2021 (see Appendix A). Real public consumption increased by 3.02% in 2021, in line with the EU average. However, the budget deficit continued to be smaller than that in the rest of the EU, and it could be strongly reduced after 2022, to reduce the public debt level. Therefore, the goal of a general government structural deficit no higher than 0.5% of GDP could be achieved again in 2024. Real gross capital formation strongly increased by 8.94% in Germany in 2021, more than the EU average. Net exports continued to be strongly positive; the current account surplus only very slightly increased, without expecting to return to the 2019 level in 2022. Therefore, the German real GDP increased by only 2.74% in 2021, less than the EU average, and it will only exceed the 2019 level in 2022.

C. Italy

Following the COVID-19 outbreak, which entailed severe lockdown measures, internal demand collapsed dramatically in Italy, more than the EU average. Real private consumption decreased by 10.74% in 2020, which is one of the hardest decreases in the EU (see Appendix

A). With a 1.89% increase in real public consumption, the decline in aggregate real consumption was then more severe than the rest of the EU. Indeed, the budget deficit was initially and remained in 2020 (-9.6% of GDP), which is especially large in Italy. Thus, the fiscal impulse, around -8.1 pp of GDP, represented a heavy weight on public finances. The very high public debt level continued to grow (155.6% of GDP in 2020), whereas Italy's real gross capital formation decreased by 11.37% in 2020. As mentioned by Di Pietro et al. (2020), on the supply side, the manufacturing sector was critical in Italy. In contrast, this sector was more sensitive to external and global shocks than services, and Italian businesses were heavily involved and exposed to the disruption of global value chains caused by a negative supply shock like the COVID. Furthermore, Italy has traditionally imported a large volume of intermediate goods via global value chains, transforming them into semi-finished or finished goods. Therefore, the Italian current account balance remained positive despite the crisis, even if it was reduced in 2020, as the decrease in exports was a little bit more accentuated than the decrease in imports. In 2020, Italy's real GDP fell by 8.94%, far worse than the EU's average contraction. Italy was one of the countries that suffered the most from the Great Recession in 2008, and it was subsequently affected by the sovereign public debt crisis in 2014, two episodes from which it had not fully recovered when the COVID crisis broke out.

Solving the crisis was difficult in Italy because the budget deficit and the public debt were initially very high, limiting the fiscal room for maneuver. Furthermore, the relative share of indirect taxes in Italy has historically been higher than in other EU member countries. This share decreased in 2020, but its height could have contributed to making it harder to sustain private consumption than in other countries. The relative share of current direct taxes on income and wealth, which was already high, still strongly increased in Italy in 2020, which could have contributed to harming private investment. In contrast, the relative share of net social security contributions in the total resources of the government increased slightly in Italy in 2020 (see Appendix A), but it remained weaker than the EU average. What fiscal measures were adopted to overcome the crisis?

First, the "Cure Italy Decree" (March 17, 2020) introduced urgent measures to limit the spread of COVID-19. The deadline was suspended for most taxpayers with revenues from business activities in Italy: withholding tax payments on employee and related income, value-added tax payments, social security contributions (possibility of deferral until June 2020), and insurance premiums. The immediate fiscal impulse was then worth €61.3 billion. It included €35.4 billion (increased by €25 billion in May) for keeping people employed and supporting the unemployed (freezing of layoffs, the extension of unemployed insurance mechanisms, etc.). According to Di Pietro et al. (2020), these employment subsidies were mainly for small firms, the most affected by the crisis, salaried workers, and self-employed. The Decree [see IMF (2021)] also included €7.5 billion (increased by €4.3 billion in May) in additional healthcare-related spending;

€6.2 billion in grants to businesses, self-employed people, and VAT holders (tax exempt); €2.4 billion in reduced taxes and contributions for all firms in severely affected sectors (tourism and leisure, transportation, restaurants and bars, culture, education, and events): suspension of VAT payments and contributions in March, 60% tax break on commercial rents; and €1.5 billion worth of tax credit on rent, lease, or concession of non-residential properties for SMEs. Besides, €235.3 billion of deferrals were provided: €220 billion moratorium on all loans and mortgages for SMEs, and about €4.6 billion deferral of VAT payments for April and May 2020 for firms with a large decrease in their income. Afterward, the "Liquidity Decree" (April 8, 2020) included measures intended to assist businesses by providing state loan guarantees (up to €400 billion, or 25% of GDP), government assumption of non-market risks, and certain targeted tax relief.

Then, the "Relaunch Decree" (May 19, 2020) included €55 billion (3.5% of GDP) in urgent fiscal measures for 2020 to support healthcare, employment and the economy, and social policies. It specifically provided measures to help businesses, such as grants for SMEs and tax deferrals (€16 billion). Taxpayers, businesses, and professionals who have lost a large part of their activity in 2020 could defer their tax payments, whereas taxpayers in the "red zone," the most affected by the crisis, or in the most heavily impacted industries were granted larger tax payments deferrals. Besides, tax credits were available (for the contributing entity and for the company receiving the equity contribution) concerning equity injections made in favor of small-medium Italian companies, if the 2019 revenues of the relevant Italian entity were between €5 million and €50 million, and if the March and April 2020 revenues of the company were lower than 33% of the March and April 2019 revenues. According to Di Pietro et al. (2020), the "Relaunch Decree" also provided €4 billion Italian Regional Production Tax reduction, as the first semi-annual payment was canceled for all SMEs, and other direct and indirect tax reductions. The Decree also provided additional income support for families (€14.5 billion) and funds for the healthcare system (€3.3 billion); in fact, the increase in government spending was approximately €12 billion, with two-thirds of this spending intended to support healthcare. Furthermore, using the "safeguard clauses" allowed cancelation of the expected and scheduled increases in VAT rates. Therefore, VAT rates remained in 2020 at the levels of 22% and 10% for the standard and reduced rates, respectively.

Furthermore, the "August Decree" (August 14, 2020) included supplementary measures to support employment and the economy. Labor and social measures (€12 billion) included additional income support for families and some workers, an extension of the short-time work program, and a suspension of social security contributions for new hires. Other key measures were extension of the moratorium on SMEs' debt repayment and the time to pay back tax obligations. Finally, in mid-January 2021, the Italian government announced another stimulus package of about €32 billion, aiming at extending support for businesses and workers affected by the pandemic and kick-starting the economy in early 2021.

Thanks to the aforementioned fiscal measures, real private consumption increased by 5.34% in Italy in 2021, but it was not supposed to return to the 2019 level at the end of 2022 (see Appendix A). The budget deficit was slightly reduced, but it remained higher than in the rest of the EU, nevertheless allowing a first decrease in the high public debt level. In 2021, the increase in real gross capital formation by 14.97% was more sustained than the EU average, with private investment exceeding the 2019 level. The current account surplus and net exports have stabilized since 2021. Therefore, Italy's real GDP increased by 6.22% in 2021, without returning to the 2019 level. The quantitative analysis of Di Pietro et al. (2020) suggests that fiscal policies implemented in Italy reduced the GDP impact of the COVID shock by 25% between Q2:2020 and Q2:2021. The authors also conclude that a fiscal package oriented toward larger increases in public spending rather than tax cuts could have been slightly more effective in stabilizing the aggregate economy. However, Italian households and businesses were already under severe fiscal pressure, and the public debt was already excessively high at the start of the crisis. Indeed, the fiscal pressure due to direct taxation (personal income and profits) was relatively large in Italy compared with other OECD countries. Therefore, this high pressure on businesses and SMEs in Italy explains why the main goal of the anti-COVID package was to reduce the weight of taxation on SMEs. The authors also show that an even greater emphasis on corporate tax relief than on transfers to households might have better mitigated the decrease in GDP; however, such a fiscal package could have yielded less-desirable distributive consequences. Besides, Odendahl and Springford (2020) found that regions in Southern Europe, where the manufacturing sector or tourism is critical (like Italy or Spain), will probably suffer larger and longer-lasting recessions than northern or eastern European regions.

D. Spain

Following the COVID-19 outbreak, internal demand collapsed dramatically in Spain, much more than the EU average. Indeed, real private consumption decreased by 12% in 2020, the highest decrease in the EU (see Appendix A). The increase of 3.31% of real public consumption was not sufficient to compensate. The excessive public debt still increased (120% of GDP in 2020) much beyond the EU average indebtedness level. The budget deficit (-11% of GDP in 2020) was one of the highest in the EU; the fiscal impulse, around -8.1 pp of GDP, represented then a heavy weight on public finances. In 2020, the real gross capital formation decreased by 11.45%, more than in other member countries, but the Spanish current account balance remained positive, even if net exports became insignificant. Indeed, the tourism sector was the most affected by the crisis, whereas the weight of tourism activities was larger in Spain than anywhere else. Therefore, real GDP in Spain fell by 10.82% in 2020, the largest contraction in the EU. Indeed, structural features made the Spanish economy particularly vulnerable to disruptions. Tourism,

which accounted for about 12% of Spain's economy, was particularly hard hit. Small and medium-sized companies, which typically had fewer financial resources and employed more than 70% of the workforce, found it difficult to avoid bankruptcy. Furthermore, in Spain, the widespread use of temporary employment accounted for the majority of job losses. According to Bosca et al. (2021), supply (total factor productivity) shocks already represented 58% of the fall in GDP at the beginning of the COVID crisis, and became even more predominant with the gradual recovery of the various demand factors led by the large public demand.

Solving the crisis was difficult in Spain because the budget deficit and the public debt were initially very high; however, this did not prevent one of the largest increases in the budget deficit and public expenditure. The relative share of net social security contributions in the total resources of the government increased in Spain in 2020 and remained higher than that in the rest of the EU (see Appendix A). In contrast, the relative share of current direct taxes on income and wealth in total resources remained weaker in Spain, even if it slightly increased (implying an accentuated decrease in private investment). The relative share of indirect taxes in Spain was around the EU average, but its stronger decrease in 2020 was insufficient to sustain private consumption, which decreased more than in any other European country. What were the main fiscal measures adopted in Spain to overcome the crisis?

The Spanish authorities have provided swift income and liquidity support to limit the fallout from the pandemic. Fiscal measures in 2020 represented about €164.1 billion, distributed between the following: discretionary spending measures (€55.59 billion, or about 5% of GDP, among which about €21 billion for health spending); discretionary income measures (€922 million), for example, exemptions in the payment of taxes; and public guarantees and guarantees for loans (€ 107.6 billion) mainly targeted toward small businesses. Flexible mechanisms were provided for temporary adjustments in activity and unemployment benefits. These measures included income protection subsidies for workers, self-employed, and firms. Moreover, in Spain, the short-time work scheme benefited approximately 22% of salaried workers at its peak. Indeed, the flexibility of the Expediente de Regulación Temporal de Empleo (ERTE or Temporary Employment Adjustment Schemes) allowed companies to label their workforces as temporarily redundant. Among large European countries, Spain was very efficient in preventing the increase in unemployment (as predicted by the Okun law in case of recession) through its ERTE and partial work program. This program also strongly reduced the default risk of companies. However, the crisis increased the number of more vulnerable workers with a lower educational level. Besides, temporary employment was more important in Spain than in any other country, which was harmful to labor productivity growth. During the recession implied by the COVID crisis, temporary employed and more vulnerable workers were the first to lose their job. Some transfers were also directed toward households: job furlough schemes, self-employed aids for temporary cessation of activity, and unemployment benefits (€25.06 billion). More precisely, according

to the IMF (2021), the unemployment benefit entitlement for workers temporarily laid off under the ERTE due to COVID-19 represented about €19 billion. An extraordinary benefit was also allocated to self-employed workers, including seasonal self-employed individuals, affected by economic activity suspension (about €5.75 billion).

In parallel, firms could benefit from social security contribution exemptions (€9.70 billion) or from an exemption of taxes (€318 million). These measures included exemptions of social security contributions for impacted companies that maintained employment or reinstated jobs for ERTE workers (around €6.8 billion); exemption from social security contributions for self-employed who receive extraordinary benefits (approximately €2.9 billion); deferral of social security debts for companies and self-employed (approximately €533 million); moratoria of social security contributions for self-employed and companies in selected industries; tax payment deferrals for SMEs and self-employed; and flexibility for SMEs and self-employed to calculate their income tax and VAT installment payment based on the actual profit in 2020 (about €200 million) [see IMF (2021)]. More precisely, SMEs (companies with a turnover inferior to €6 million in 2019) and self-employed workers were granted a 6-month deferral on the payment of state tax debts not exceeding €30,000 when the deadline for payment fell on or before May 30, 2020. The deferral applied to state withholding taxes, VAT, and CIT prepayments.

In March 2020, the "Royal Decree Law" extended the deadline for tax procedures to April 30 or May 20. Deferrals of payment of tax debts were granted for all tax returns and self-assessments, with filing and payment deadlines falling between March 13, 2020, and May 30, 2020. The Decree extended the filing and payment deadlines for taxpayers with a volume of business not exceeding €600,000 in 2019, for quarterly VAT returns, CIT installment payment returns, and personal income tax returns. Nevertheless, Bosca et al. (2021) assess that implicit tax rates on labor and capital were mainly pro-cyclical in Spain during the crisis: tax deferrals and exemptions (mainly through decreases in social security contributions) were insufficient to compensate for the decrease in the tax bases, for the higher tax burden on labor, and, to a lesser extent, on capital incomes. Other measures included a moratorium on mortgage payments and non-mortgage loans and credits, including consumer credits, for the most vulnerable. Furthermore, the Spanish government extended up to €100 billion in government guarantees to small and medium-sized firms and self-employed. It also launched a new line of guarantees to encourage investment activities, particularly in environmental sustainability and digitization, and provided liquidity (€40 billion). Indeed, one of the Spanish government's top priorities was to ensure companies' access to liquidity through guarantees such as Instituto de Crédito Oficial credits. The goal was to assist companies with low short-term cash levels in dealing with the crisis.

Thanks to the aforementioned fiscal measures, real private consumption increased by 4.80% in Spain in 2021, more than the EU average, but it should remain below the 2019 level in 2022 (see Appendix A). The public debt was stabilized, but the decreasing budget deficit was still

higher than that in the rest of the EU. Moreover, real gross capital formation increased by 4.69% in Spain in 2021, less than the EU average, and private investment then remained below the 2019 level. Net exports continued to be positive; however, the current account surplus became small and below its 2019 level. Therefore, in Spain, real GDP moderately increased by 4.62% and less than the EU average in 2021; it should not return to the 2019 level in 2022 because of the more severe initial contraction. Bosca et al. (2021) analyze the stabilizing effects of economic policies during the COVID-19 crisis in Spain, using EREMS, a new version of the DSGE model. They find that unemployment benefits, tax deferrals, and aids for temporary cessation of activity have implicitly reduced the fall in aggregate demand from the private sector. Indeed, this recession has been partially offset by public consumption, transfers to the private sector, and the credit impulse, especially for firms. The authors also highlight the significant contribution of the credit impulse, partly due to the public guarantee programs, that allow firms to face the enormous increase in the financing needs during the crisis.

E. Ireland

Following the COVID-19 outbreak, real private consumption decreased in Ireland by 11.18% in 2020, more than in other EU member countries (see Appendix A). However, real public consumption increased by 9.45%, far exceeding the EU average. Indeed, the budget surplus turned into a budget deficit in 2020, with the fiscal impulse being around -5.4 pp of GDP. The public debt then increased, despite remaining lower than the average EU indebtedness level. Simultaneously, the real gross capital formation decreased dramatically in Ireland by 22.06%, more than in other member countries. However, the current account balance continued to contribute positively to aggregate demand; net exports even strongly increased during the crisis because imports were reduced, whereas exports were still increasing, sustained by a strong performance of the pharmaceutical and IT sectors. Therefore, Ireland was one of the few countries where real GDP increased by 5.86% in 2020, despite the fact that the rest of the EU was in deep recession.

Resolving the crisis was facilitated in Ireland because it had a budget surplus in 2019 and a particularly low public indebtedness level (only 57.2% of GDP), giving a more fiscal room of maneuver to increase public expenditure. Therefore, the fiscal impulse was mainly due to public expenditure. Besides, Ireland gave a particularly high weight to current direct taxes on income and wealth in total government revenue, reaching a record level in Europe (see Appendix A). Moreover, this weight still increased strongly with the COVID crisis in 2020, whereas it was stable in other European countries. Thus, this weight given to direct taxation could have contributed to penalizing private investment. In contrast, Ireland gave a particularly small weight to net social security contributions. The relative share of indirect taxes in Ireland was also higher than that in other EU member countries. Therefore, even if this share was reduced in 2020,

slightly above the EU average, it did not avoid the large decrease in private consumption. What were the main fiscal measures adopted in Ireland to overcome the crisis?

Ireland was one country with the strongest containment measures and a stringent set of restrictions, in correlation with the more severe economic contraction regarding private consumption. To compensate for the recession, the Irish government announced a comprehensive fiscal package of €24.5 billion (about 14% of gross national income), distributed over 2020 and 2021, which included €20.5 billion in direct support, including: (a) €2.9 billion in taxation measures, such as warehousing and deferrals; and (b) €17.6 billion in expenditure measures: €11.4 billion in labor market support, €2 billion in health sector capacity enhancement, and €1.5 billion in business support. The €4 billion in indirect support was linked to a €2 billion credit guarantee scheme and a €2 billion Pandemic Stabilization and Recovery Fund (ISIF) [IMF, 2021].

First, on March 16, 2020, the Irish government established a "Pandemic Unemployment Payment," to support by cash transfer incomes of households who lost their job. This budgetary support focused on cushioning household incomes, maintaining the critical link between employees and their employers and providing important liquidity support for firms. These included deferred taxation payments, payment breaks on business loans, and loan guarantees for SMEs [Department of Finance, Ireland (2020)]. The application of interest on late tax payments was suspended for SMEs with temporary cash flow difficulties. Besides, the Temporary Wage Subsidy Scheme was designed to keep employees "on the books" and, in doing so, to maintain the important link with the labor market. Indeed, subsidies were given to help pay the salaries of workers in sectors whose business activities were severely impacted by the pandemic. The scheme was afterward extended until August 2020, and then replaced with a similar Employment Wage Subsidy Scheme. Employers, whose turnover had fallen by 30%, could receive a flat-rate subsidy of up to €203 weekly per employee.

Furthermore, on July 23, 2020, Ireland's government announced a "July Stimulus package," worth €5.2 billion. Then, the focus was on stimulating demand with a counter-cyclical fiscal policy. Taxation instruments were then deployed (€3.4 billion for 2020), with, for example, a temporary reduction in the standard VAT rate from 23% to 21%, for a period from September 1, 2020, to February 28, 2021, designed to boost personal consumer spending. Besides, enhanced corporate tax loss relief was introduced to provide additional liquidity support for businesses. The "Stay and Spend Initiative" introduced a tax credit until April 2021 to enhance tourism and support the providers of accommodation and food during the off-season. On October 13, 2020, Ireland unveiled a record budget package to tackle the recession. Regarding taxation, the COVID Restrictions Support Scheme was introduced, aimed at supporting businesses that had either been prohibited from operating or were trading at significantly reduced levels due to the imposition of restrictions (accommodation, food and the arts, recreation, and entertainment). The 2021 budget also included a temporary reduction in VAT for tourism and hospitality items

from 13.5% to 9%, effective from November 1, 2020, to December 31, 2021.

Thanks to the aforementioned fiscal measures, real private consumption increased by 7.48% in Ireland in 2021, above the EU average, without returning to the 2019 level (see Appendix A). However, the budget deficit remained smaller than that in the rest of the EU, and it could begin to be reduced in 2022, to stabilize the public debt level. Real public consumption increased around EU average by 4.09% in 2021. In Ireland, gross capital formation fell by 30.91% in 2021, whereas net exports remained strongly positive. Finally, even without a recession in 2020, Ireland's real GDP increased by 14.56% in 2021, far outpacing the rest of the EU.

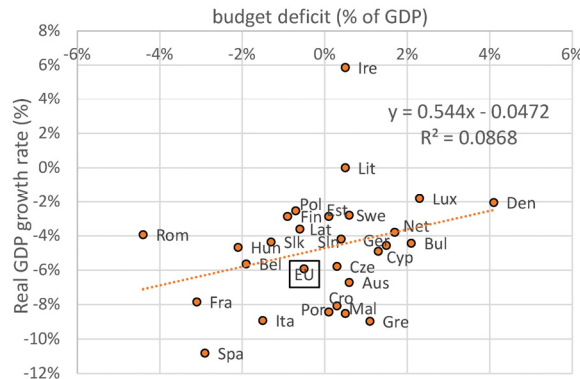
III. Correlation between Fiscal Policies and Economic Growth

We use macro-economic data from the AMECO database, extracted in November 2021, for the 27 EU countries (the 5 aforementioned countries and the 22 other EU countries). Figures stressing stylized facts and correlations are realized with Excel.

A. Importance of the initial fiscal situation

One observation stands out among the stylized facts observed in the preceding section. Economic stabilization is always more difficult in countries where there is no fiscal room of maneuver, where the budget deficit and public debt are already very high (cf. Italy, France, Spain). In contrast, in countries where the fiscal situation is initially sound, where the budget deficit is small and the public debt is moderate, limiting the width of the economic crisis is much easier (cf. Ireland, Germany). Indeed, there is then much more room for maneuver to conduct a counter-cyclical fiscal policy, increase public expenditure, and lighten the weight of some taxation rates to compensate for the recessionary consequences of the shock. Figure 1 shows that Luxembourg (2.3% of GDP) and Denmark (4.1%) had budget surpluses in 2019; the recession was then limited in these countries in 2020 (respectively, 1.81% and 2.06% decrease in real GDP) despite the COVID crisis. In contrast, France (-3.1% of GDP), Spain (-2.9%), and Italy (-1.5%) had a high budget deficit in 2019, and the recession was then much more severe in 2020 in these countries (resp. decrease of real GDP: 7.85%, 10.82%, and 8.94%).

Figure 1. Budget deficit in 2019 (% of GDP) and real GDP growth rate in 2020 (%)



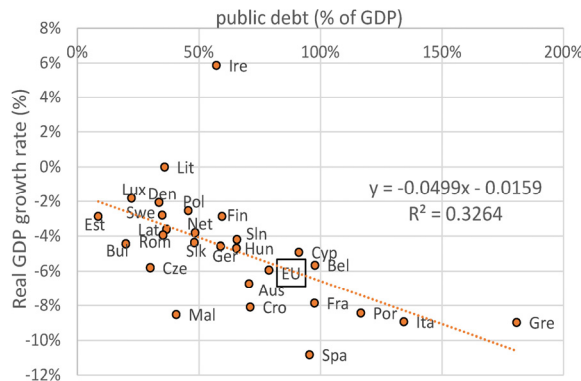
Budget deficit: net lending, in % of GDP, in 2019

Real GDP growth rate: Growth rate of the Gross Domestic Product at constant prices, in percentage, between 2019 and 2020

Austria (Aus), Belgium (Bel), Bulgaria (Bul), Croatia (Cro), Cyprus (Cyp), Czechia (Cze), Denmark (Den), Estonia (Est), Finland (Fin), France (Fra), Germany (Ger), Greece (Gre), Hungary (Hun), Ireland (Ire), Italy (Ita), Latvia (Lat), Lithuania (Lit), Luxembourg (Lux), Malta (Mal), Netherlands (Net), Poland (Pol), Portugal (Por), Romania (Rom), Slovakia (Sik), Slovenia (Sln), Spain (Spa), Sweden (Swe).

In Figure 2, a negative link between the public debt level and economic growth is still more obvious. Indeed, the public debt was moderate in 2019 in Luxembourg (22.3% of GDP), Lithuania (35.9%), Denmark (33.6%) and Sweden (34.9%), and therefore, despite the crisis, these countries succeeded in limiting the recession in 2020 (resp. real GDP growth rates: -1.81%, 0%, -2.06%, -2.80%). In contrast, the public debt was excessively high in Greece (180.7% of GDP), Italy (134.3%), and Spain (95.5%) in 2019, and the recession was then much more severe in 2020 in these countries (resp. decrease of real GDP: 8.99%, 8.94%, and 10.82%).

Figure 2. Public debt in 2019 (% of GDP) and real GDP growth rate in 2020 (%)



Public debt, in % of GDP, in 2019

Real GDP growth rate: Growth rate of the Gross Domestic Product at constant prices, in percentage, between 2019 and 2020

According to Odendahl and Springford (2020), during the crisis, consumer confidence was hit the hardest in countries that implemented less stimulus, and higher debt-to-GDP ratios likely resulted in higher borrowing costs for governments. As a result of more tax and business revenue being used to finance debt, there was less capacity for investment. Risk premiums on interest rates of government bonds in Italy, Spain, Greece, and Portugal could rise more than in other countries. Over the last two decades, labor productivity growth in these countries has been negligible, avoiding the use of a high real growth rate to reduce the weight of public indebtedness. Over time, less indebted countries were thus better able to protect and then revive their economies. As a result, consumer confidence fell everywhere, but the impact was smaller in countries that scored higher on a "economic stimulus index" developed by economists at Brown University. This index includes increased spending and liquidity support measures, and other forms of stimulus, such as lowering bank capital requirements to encourage lending.

B. Comparison between tax cuts and cash transfers

Another important question is the following. In the case of a huge negative demand and supply shock like the COVID crisis, to sustain economic activity, is it more appropriate to increase government expenditure or reduce taxation rates (to decrease government revenue)?

Makin and Layton (2021) mention that the fiscal stimulus during the crisis has been directed toward keeping companies afloat to minimize short-term unemployment. However, the authors underline that these fiscal policies could have been too expansionary in some countries, increasing an unsustainable public debt level with macro-economic risks for long-term economic growth. They also emphasize the distinction between fiscal relief policies (tax cuts), which are required to sustain supply and companies creating investment and jobs, and fiscal stimulus policies, which increase public demand and government spending.

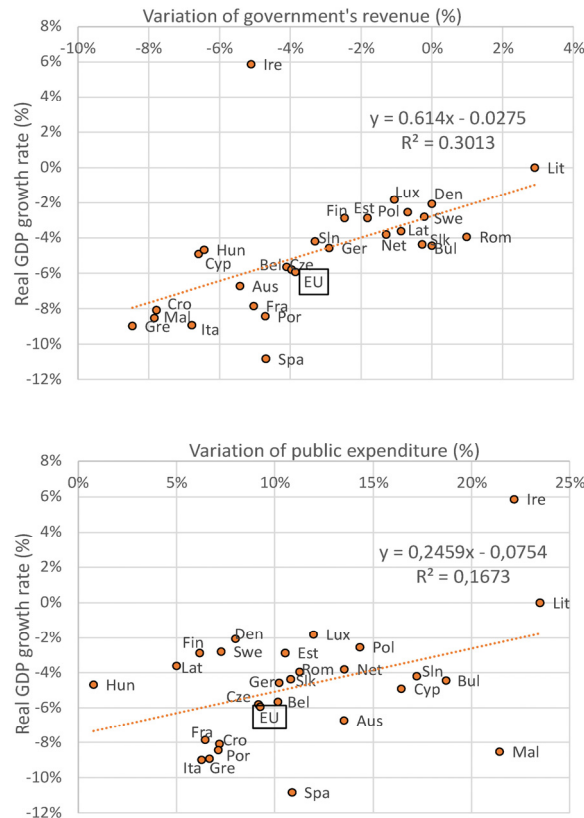
Using the estimated model of the Italian dynamic General Equilibrium Model, for the period 1992-2012, Acocella et al. (2020) assess that plans of fiscal consolidation aimed at reducing the public debt level based on tax increases rather than expenditure reductions are more effective. Tax-based austerity measures would be inexpensive, as spending multipliers associated with taxes would be weaker than those associated with government spending. Similarly, in the recession implied by the COVID crisis, reducing the burden of taxation, particularly on small businesses, should be an appropriate economic policy. For the United States, Drechsel and Kalemli-Ozcan (2020) even suggest that in this context, the government should provide small and medium firms with liquidity problems with a cash transfer, a negative lump sum tax, defined as a share of a firm's past revenues. Therefore, varying government revenues and the relative weights of various fiscal bases and taxation rates may be more efficient than varying government expenditure to sustain economic activity. What are then the teachings of stylized facts for 2020, regarding

the stabilization of the COVID shock?

Observations and stylized facts fail to find a significant positive link between the variation of public consumption and economic growth in 2020. Section 2 has shown that the higher public consumption expenditure mainly compensates for the insufficiency of private consumption after a negative demand shock. Indeed, households were often prevented to consuming because of lockdown and quarantine measures taken in all countries. Therefore, the higher public consumption could not be attributed to increased global economic activity during the crisis. However, when we exclude interest rates from global public expenditure (intermediate consumption and gross capital formation, wages, transfers, etc.), the results are a little more significant. Indeed, stylized data show a small positive correlation between variations in global public spending and economic activity (see Figure 3). With the COVID crisis, for example, global public expenditure increased by 0.78% to 23.49% in EU countries in 2020. However, Hungary had the smallest increase in global public expenditure increase despite the crisis (+0.78%); real GDP strongly decreased by 4.68% in this country. In contrast, global public expenditure increased more strongly in Ireland (+22.18%) and in Lithuania (+23.49%); and economic growth was positive in these two countries (resp: real GDP growth rate of 5.86% and +0%), on the opposite to the recessions in the other EU member countries.

More significantly, stylized facts confirm a strong correlation between government revenue and economic growth. Indeed, Figure 3 shows that the considerable decrease in government revenue in 2020 in Greece (8.46%), Italy (6.78%), and Spain (4.69%) was linked to a stronger decrease in real GDP in these countries (resp: 8.99%, 8.94%, 10.82%). In contrast, the growth in government revenue was limited in Lithuania (2.91%), Denmark (0.0%), and Sweden (-0.21%), and the recession was also much more contained in these countries (resp. decrease of real GDP: 0.0%, 2.06%, 2.80%). This correlation is obvious because government revenues are based on income taxation (social security contributions, personal, or CIT) and consumption taxation (VAT, excises). Therefore, in the context of a negative demand and supply shock like the COVID crisis, the collapse of government revenues must be avoided to sustain economic activity, and simultaneously, to lighten the financial cost of the crisis for both companies and households. Regarding this contradictory goal, we can now shed light on the correlation between the structure of government revenues (direct and indirect taxation) and indicators of economic growth.

Figure 3. Fiscal revenues, public expenditures and GDP growth rates in 2020 (%)



Government's revenue: Growth rate of General government total revenue, in percentage, between 2019 and 2020

Public expenditure: Growth rate of General government total expenditure excluding interests, in percentage, between 2019 and 2020

Real GDP growth rate: Growth rate of the Gross Domestic Product at constant prices, in percentage, between 2019 and 2020

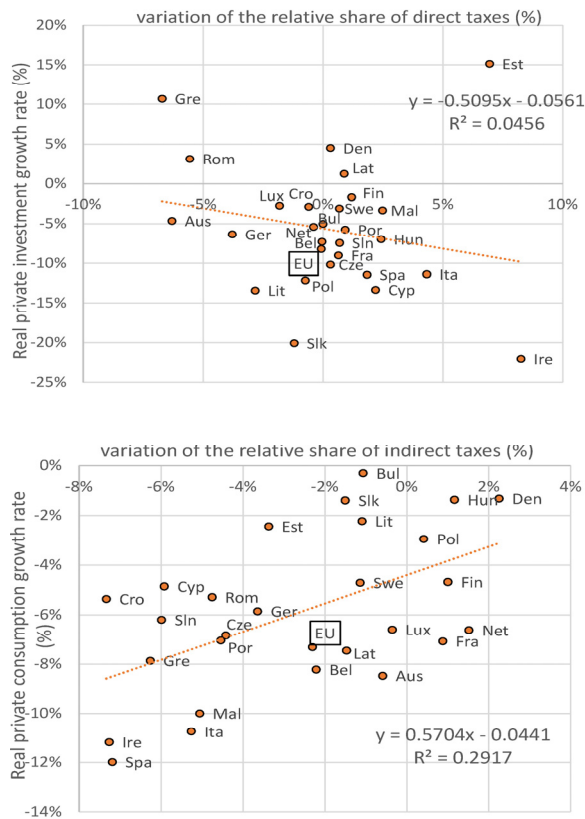
C. Importance of the government revenue structure

The final interesting question is related to government revenue structure: Is the leverage of direct or indirect taxation more correlated with economic growth? In France, the fiscal package was mainly aimed at sustaining the economy's supply side, the productive capacity of firms. Indeed, the lack of productivity was a recurrent problem, and due to the current account balance deficit and the high level of imports, stimulating demand would imply more leakages in France (see section 2A). In contrast, the German economy was better specialized and more productive. As a result, a demand-side stimulus package was feasible and more appropriate in Germany (see section 2B). Nonetheless, what was the relationship between the selection of these fiscal packages and economic growth in the EU?

Our data show no obvious and significant correlation between the relative shares of direct taxes, indirect taxes, or social security contributions in total revenue of the governments in 2020, or variations of these relative shares between 2019 and 2020, and real GDP growth rates between 2019 and 2020 in EU member countries. The variation in the relative share of current direct taxes on income and wealth was not correlated with the variation in real gross capital formation and private investment in 2020 (see Figure 4). Indeed, an increase in the share of direct taxes, when this share was already high, could be detrimental to private investment and economic growth, as in Ireland or Italy (see Appendix A). In Spain, the slight increase in this share, even if it remained weaker than in the rest of the EU, implied an accentuated decrease in private investment. In contrast, in Germany, the share of direct taxes was initially slightly higher than in other EU countries, but the more accentuated reduction of this share contributed to sustaining private investment. Meanwhile, in France, the weaker relative share of direct taxation than in the rest of the EU could have contributed to limiting the breakdown of private investment, despite the limited increase in this share in 2020.

However, our findings show a moderate but positive relationship between the variation in the relative share of indirect taxes on imports (custom duties) and production (VAT) in total government revenues and the variation in real private consumption in the EU in 2020 (Figure 4). This is self-evident, because if real private consumption grows faster than income, real economic activity, and real GDP during the pandemic (as is expected by the permanent income hypothesis), the share of consumption taxes in the government's total revenues is expected to rise. Therefore, the recession and mostly the decrease in real private consumption by 1.32% were both much more limited in Denmark, which implied an increase in the relative share of indirect taxes by 2.25%. In France, the initial share of indirect taxation was already high; so, this share could only moderately increase by 0.88%, as the government limited the decrease of real private consumption by 7.07% compared with the greatest decrease in incomes. In the contrast, a more severe decrease in real private consumption could not be avoided in Spain (11.99%), Ireland (11.18%), or Italy (10.74%), higher than the decrease in real economic activity (see Appendix A). Therefore, the relative shares of indirect taxes in total revenues of the governments strongly decreased in Ireland by 7.26% or in Italy by 5.26%, where they were initially higher than in other EU countries, or in Spain by 7.19%.

Figure 4. Relative shares of various taxes and investment or consumption (%)



Direct taxes on income and wealth, divided by the total amount of fiscal resources; percentage of variation between 2019 and 2020

Private investment: Growth rate of Gross capital formation at constant prices, total economy, in percentage, between 2019 and 2020

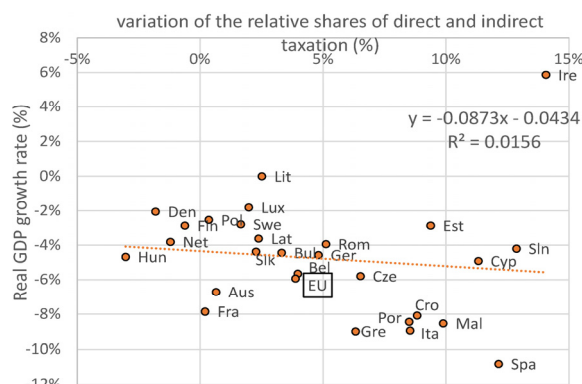
Indirect taxes on imports and production, divided by the total amount of fiscal resources; percentage of variation between 2019 and 2020

Private consumption: Growth rate of private final consumption expenditure at constant prices, in percentage, between 2019 and 2020

Last stylized fact can be mentioned regarding the data for 2020. With the COVID crisis, the recession seemed more severe in countries where the relative share of direct taxation in their fiscal revenues increased than in countries where the relative share of indirect taxation increased. Indeed, if we consider the weight of direct taxes and social security contributions compared with the weight of indirect taxes in the government's total revenues, the results are as follows. The most affected countries by the crisis were those where the relative weight of direct taxation in their fiscal revenue increased (see Figure 5). For example, the share of direct taxation and social security contributions in government revenue increased strongly in Croatia (+8.83), Greece (+6.33%), and Portugal (+8.51%), even if these shares remained relatively small;

the decrease in real GDP (resp.: 8.08%, 8.99%, and 8.43%) was then more severe than in other EU countries. The relative shares of direct taxation also increased strongly in Spain (+12.15%) and Italy (+8.55%), slightly beyond the EU average, while the recession was severe in these countries (resp: -10.82%, -8.94%). The relative weight of direct taxation was already above the EU average, and it still increased by 4.82% in 2020 in Germany. However, the recession and decrease by 4.57% of real GDP could be more moderate in Germany than in other EU countries.²⁾

Figure 5. Variation of the relative shares of direct and indirect taxation and GDP growth rates (%) in 2020



(Direct taxes on income and wealth and social security contributions/Indirect taxes on imports and production); percentage of variation between 2019 and 2020

Real GDP growth rate: Growth rate of the Gross Domestic Product at constant prices, in percentage, between 2019 and 2020

In contrast, where the relative weight of indirect taxation increased, as in the Nordic countries, the recession due to the COVID crisis was probably more moderate. Indeed, the relative share of direct taxation was reduced in the Netherlands by 1.20% in 2020, even if it remained above the EU average; the recession was then more limited (decrease of real GDP by 3.80%) than in other EU countries. Similarly, the relative weight of direct taxation fell by 1.81% in Denmark and 0.61% in Finland, falling slightly below the EU average, while the 2020 recession was much more limited (resp. decrease of real GDP: 2.06% and 2.87%). In these countries, the crisis was associated with a reduction in the heavier weight placed on direct taxation, and with support of economic activity by limiting the financial cost for companies at the origin of production, wealth creation, and value-added.

2) Ireland is an outlier in this description. Indeed, Ireland's relative share of direct taxes was around the EU average in 2019, but it strongly increased by 14.07% in 2020, allowing the country to maintain a strong real GDP growth rate of 5.86% in contrast to the European global economic recession.

IV. Conclusion

The COVID crisis was unexpected, with the strongest demand and supply shocks and the most serious crisis since the Great Recession in 1929. The current paper is one of many economic studies that describe the various fiscal packages implemented to mitigate this shock. First, stylized facts show that in the event of a large demand and supply shock, economic stabilization is always more difficult in countries with no fiscal room for maneuver, where the budget deficit and public debt are already very high (Italy, France, Spain). In contrast, in countries where the fiscal situation is initially sound, where the budget deficit is small and the public debt is moderate, limiting the width of the economic crisis is much easier (Ireland, Germany). Indeed, there is then much more room for maneuver to conduct a counter-cyclical fiscal policy, increase public expenditure, and lighten the fiscal weight of some taxation sources to compensate for the recessionary consequences of the shock.

Furthermore, our data show that with such a shock, increasing public spending is not unambiguously linked to economic growth, as government spending is not always sufficiently productive. However, it is critical to avoid a collapse in government revenue, which is directly related to the level of economic activity: private consumption by households and private production by firms. Nevertheless, the goal of preserving government revenue is contradictory to the necessity to lighten the financial cost of the crisis, both for companies and for households. Therefore, our last stylized facts are related to the structure of government revenues, that is, the correlation between the relative weights of income or consumption taxation, and economic growth.

In 2020, countries where the relative share of indirect taxation in their government revenues increased seemed less affected by the COVID crisis than countries where the relative share of direct taxation increased. Indeed, stylized facts show that countries where the relative weight of direct taxation significantly raised, like Greece, Portugal, Spain, and Italy, were more affected by the crisis. In contrast, countries where the relative weight of indirect taxation increased, like the Nordic countries (the Netherlands, Denmark, or Finland), were less affected by the crisis. Indeed, the crisis was an opportunity for these countries to reduce a heavier weight put on direct taxation and sustain economic activity by limiting the financial cost for companies, at the origin of production, creation of wealth and value-added. Besides, the increasing weight put on indirect taxation also demonstrates that the decrease in private consumption could then be limited and more moderate than the decrease in global economic activity and incomes of households.

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Appendix

Appendix A. AMECO Database (extraction: November 2021; Projections for 2021 and 2022)

Private final consumption expenditure, at constant prices, in billions of euros				
	2019	2020	2021	2022
France	1261.2	1172.0 (-7.07%)	1223.3 (+4.38%)	1286.3 (+5.15%)
Germany	1715.7	1615.2 (-5.86%)	1615.4 (+0.01%)	1723.7 (+6.70%)
Ireland	99.3	88.2 (-11.18%)	94.8 (+7.48%)	101.1 (+6.65%)
Italy	1046.1	933.7 (-10.74%)	983.6 (+5.34%)	1031.2 (+4.84%)
Spain	684.7	602.6 (-11.99%)	631.5 (+4.80%)	664.3 (+5.19%)
European Union	7126.7	6 605.6 (-7.31%)	6836.9 (+3.50%)	7210.1 (+5.46%)

Final consumption expenditure of general government, at constant prices, in billions of euros				
	2019	2020	2021	2022
France	547.7	530.3 (-3.18%)	558.9 (+5.39%)	561.2 (+0.41%)
Germany	655.3	678.5 (+3.54%)	699.0 (+3.02%)	703.9 (+0.70%)
Ireland	40.2	44.0 (+9.45%)	45.8 (+4.09%)	45.9 (+0.22%)
Italy	316.9	322.9 (+1.89%)	327.0 (+1.27%)	330.9 (+1.19%)
Spain	223.4	230.8 (+3.31%)	238.4 (+3.29%)	244.8 (+2.68%)
European Union	2709.6	2744.8 (+1.30%)	2838.3 (+3.41%)	2860.4 (+0.78%)

Gross capital formation, total economy, at constant prices, in billions of euros				
	2019	2020	2021	2022
France	567.6	516.4 (-9.02%)	580.9(+12.49%)	598.4 (+3.01%)
Germany	691.6	647.6 (-6.36%)	705.5 (+8.94%)	729.6 (+3.42%)
Ireland	176.8	137.8 (-22.06%)	95.2 (-30.91%)	98.9 (+3.89%)
Italy	316.5	280.5 (-11.37%)	322.5 (+14.97%)	344.5 (+6.82%)
Spain	245.5	217.4 (-11.45%)	227.6 (+4.69%)	244.1 (+7.25%)
European Union	3013.9	2765.8 (-8.23%)	2967.6 (+7.30%)	3105.8 (+4.66%)

Net exports of goods and services, at constant prices, in billions of euros				
	2019	2020	2021	2022
France	-18.2	-46.1 (-153.3%)	-48.7(-5.64%)	-43.1(+11.50%)
Germany	180.2	153.2(-14.98%)	155.1 (+1.24%)	164.5 (+6.06%)
Ireland	21.3	96.4 (+352.58%)	189.7 (+96.78%)	201.5 (+6.22%)
Italy	47.4	35.1 (-25.95%)	35.4 (+0.85%)	33.1 (-6.50%)
Spain	40.0	13.1 (-67.25%)	15.3 (+16.79%)	21.2 (+38.56%)
European Union	462.6	409.7 (-11.44%)	510.3 (+24.55%)	547.8 (+7.35%)

Gross Domestic Product, at constant prices, in billions of euros				
	2019	2020	2021	2022
France	2358.5	2173.3 (-7.85%)	2315.4 (+6.54%)	2402.6 (+3.77%)

Appendix A. *Continued*

	2019	2020	2021	2022
Germany	3245.0	3096.7 (-4.57%)	3181.4 (+2.74%)	3327.5 (+4.59%)
Ireland	334.2	353.8 (+5.86%)	405.3 (+14.56%)	426.0 (+5.11%)
Italy	1727.6	1573.2 (-8.94%)	1671.1 (+6.22%)	1742.5 (+4.27%)
Spain	1193.8	1064.6 (-10.82%)	1113.8 (+4.62%)	1175.4 (+5.53%)
European Union	13313.0	12523.3 (-5.93%)	13150.4 (+5.01%)	13717.2 (+4.31%)

Budget deficit: Net lending, % of GDP

	2019	2020	2021	2022
France	-3.1	-9.1	-8.1	-5.3
Germany	1.5	-4.3	-6.5	-2.5
Ireland	0.5	-4.9	-3.2	-1.7
Italy	-1.5	-9.6	-9.4	-5.8
Spain	-2.9	-11.0	-8.1	-5.2
European Union	-0.5	-6.9	-6.6	-3.6

Gross Public debt, % of GDP

	2019	2020	2021	2022
France	97.5	115.0	114.6	113.7
Germany	58.9	68.7	71.4	69.2
Ireland	57.2	58.4	55.6	52.3
Italy	134.3	155.6	154.4	151.4
Spain	95.5	120.0	120.6	118.2
European Union	78.8	91.8	92.1	90.0

Indirect taxes linked to imports and production in billion euros (% of total government revenue)

	2019	2020	2021	2022
France	407.0 (31.9%)	389.9 (32.2%)	413.0 (32.1%)	426.1 (32.0%)
Germany	369.7 (22.9%)	345.9 (22.1%)	370.7 (22.8%)	413.1 (24.2%)
Ireland	27.5 (31.2%)	24.2 (29.0%)	26.9 (28.9%)	29.2 (30.2%)
Italy	257.6 (30.6%)	227.5 (28.9%)	248.6 (29.9%)	266.8 (30.3%)
Spain	143.0 (29.3%)	126.5 (27.2%)	138.1 (27.1%)	147.0 (27.4%)
European Union	1886.8 (29.3%)	1772.3 (28.6%)	1909.2 (29.1%)	2041.7 (29.6%)

Current direct taxes on income and wealth in billion euros (in % of total government revenue)

	2019	2020	2021	2022
France	318.5 (25.0%)	304.4 (25.2%)	311.1 (24.2%)	325.8 (24.5%)
Germany	457.7 (28.4%)	427.6 (27.3%)	442.1 (27.2%)	450.2 (26.3%)
Ireland	36.6 (41.5%)	37.6 (45.0%)	42.9 (46.1%)	44.1 (45.6%)
Italy	258.1 (30.6%)	251.0 (31.9%)	261.9 (31.5%)	265.5 (30.1%)
Spain	129.1 (26.4%)	125.3 (26.9%)	140.4 (27.6%)	144.6 (27.0%)
European Union	1818.6 (28.2%)	1747.1 (28.2%)	1830.8 (27.9%)	1889.7 (27.4%)

Appendix A. *Continued*

Net social security contributions received in billion euros (in % of total government revenue)				
	2019	2020	2021	2022
France	407.8 (32.0%)	392.8 (32.5%)	413.7 (32.2%)	431.2 (32.4%)
Germany	598.2 (37.1%)	607.9 (38.8%)	624.7 (38.4%)	653.5 (38.2%)
Ireland	15.8 (17.9%)	15.0 (17.9%)	16.1 (17.3%)	16.7 (17.3%)
Italy	242.2 (28.7%)	228.6 (29.1%)	233.0 (28.0%)	249.4 (28.3%)
Spain	160.7 (32.9%)	162.2 (34.9%)	163.8 (32.1%)	168.8 (31.5%)
European Union	1980.9 (30.7%)	1960.5 (31.6%)	2037.0 (31.0%)	2134.3 (30.9%)