

Impact of Inflation on Fiscal Aggregates in Austria

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In Austria, temporary shocks to inflation (with unchanged real macroeconomic developments) impact the primary balance, i.e. the overall budget balance excluding interest payments, mainly via taxes and transfers whose brackets or rates are not indexed to inflation. Even though the overall effect of such shocks on budget balances would be very small in Austria, below-average inflation, for example, is still negative from a government's viewpoint because it significantly raises the public debt ratio. Lower inflation moreover depresses the gains made from both bracket creep and the devaluation of nominally fixed transfers, which is, however, somewhat compensated for by decreasing interest payments. Households, by contrast, benefit from lower inflation as it causes their net tax burden to go down.

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During the high-inflation periods of the 1970s and 1980s, the literature shedding light on the impact inflation has on public finances received considerable attention, but its importance has since diminished. Only recently – amid low and in some countries even negative inflation – has this topic attracted renewed attention. In 2014, an ESCB project team consisting of experts from the ECB and the national central banks (NCBs) of Austria, France, Germany, Greece and Italy started to analyze the effects of low and negative inflation on fiscal variables, and the European Commission organized a workshop on this topic in early 2015.²

Inflation has been shown to impact fiscal variables in a number of ways (compare Tanzi et al., 1987), namely (1) primary deficits via its effects on government revenues and current expenditures, (2) interest payments via its effects on nominal and real interest rates, and (3) in addition to these effects,

debt ratios are affected via the denominator effect.

The effects of inflation on fiscal variables vary from country to country, because they heavily depend on the institutional setting, such as the tax system, the wage-setting process or expenditure requirements. To assess the overall importance of inflation for fiscal variables, fiscal sustainability and a country's ability to comply with the requirements of the Stability and Growth Pact³, it is therefore necessary to understand the country-specific channels. This paper focuses on the impact of inflation on fiscal variables for given real macroeconomic developments. For this reason, we can neglect the question whether lower inflation is supply or demand driven.

The ESCB project team (later cited as Attinasi et al., 2015) analyzed the inflation impact on fiscal variables for Austria, France, Germany, Greece and Italy. The experts from the ECB and

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² ECFIN Workshop “9th Meeting of the Network of Public Finance Economists in Public Administration,” Brussels, February 10, 2015. Session II was dedicated to “Does Inflation Matter? Fiscal Consolidation Strategies and Debt Reduction in a Low Inflation Environment.”

³ In this context, it is important to stress that it is not part of the mandate of the Eurosystem to set its inflation target with a view to improving the fiscal sustainability of the euro area Member States.

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the NCBs of the countries focused on harmonized synthetic simulations to quantify the overall deficit and debt impact as well as fiscal sustainability issues. Drawing on the results from this ESCB project, we elaborate on them by zeroing in on Austria and by explaining in detail the most important channels for Austria. Moreover, we go beyond the purely macroeconomic focus by providing some microeconomic insights for Austria, putting the current status quo into perspective.

This paper is structured as follows: In section 1, we discuss, along the lines of the literature, the impact of inflation on tax revenues in Austria. We present the main features of the Austrian tax and social security systems, examine implications for government budgets, but also highlight the impact inflation has on individuals. In section 2, we analyze the effect of inflation on primary expenditure, again taking into account the impact on individuals. Section 3 completes the analysis as we look at the sensitivity of debt and debt servicing costs to inflation developments, and section 4 sums up and concludes.

1 The Effect of Inflation on Tax Revenue

As indicated above, a change in inflation may considerably impact the revenue side of the government budget. As long as taxes and social security contributions are levied proportionally based on transactions at current prices, tax revenues will change in line with inflation and will thus stay constant in real terms. In progressive tax systems, tax revenues will increase by more than inflation; this means that even real tax revenues increase thanks to inflation. If taxation is based on quantities or his-

torical tax bases, nominal tax revenues are not affected by inflation developments; yet, inflation erodes the real value of tax revenues.

The literature also points to the importance of inflation-induced revenue losses due to collection lags (e.g. Immervoll, 2005), which denote the period between the time a tax liability arises and the actual collection of the tax. In case of long collection delays, the loss of real tax revenue might be sizeable (Olivera-Tanzi effect). However, in most modern economies both the importance and the size of the Olivera-Tanzi effect have been reduced, because collection lags have decreased thanks to information and communication technology and remaining lags are corrected by tax prepayments. Interest payments on tax arrears and moderate inflation rates have likewise played a role.

Seigniorage is another inflation-dependent revenue source often referred to in the literature. As summarized in Attinasi et al. (2015), it represents central banks' operating profit distributed to governments (for more details, see Buiter, 2007). However, seigniorage accounts for a very small percentage of government revenues in industrialized countries, which is why we neglect the impact of inflation on seigniorage revenues.

1.1 Lower Inflation Would Have Little Impact on Real Revenue from Social Contributions⁴

Social security contributions are generally levied proportionally based on personal income. As they can be interpreted as insurance, where the risk does not rise with income, several EU Member States have introduced caps on

⁴ In the following subsections, we explain the general impact of inflation on different revenue categories; the subheadings, however, refer to the effect of below-average inflation (in line with the main topic of this paper).

social security contributions. To prevent (real and inflation-induced) wage increases from pushing more and more people over these limits, which would exempt a growing share of their income from contributions, countries generally adopt laws stipulating that such caps be indexed to inflation. Austria adjusts the caps (and the minimum contribution levels as well as the tax brackets for the partly progressive unemployment insurance contribution⁵) in line with average wage increases in $t-2$ ⁶. These adjustments keep real social security contributions stable.

1.2 Progressive Personal Income Taxes Would Be Dampened by Lower Inflation

Growth of average personal income (and pensions) may lead to a more than proportional rise in personal income tax revenues, a phenomenon referred to as fiscal drag. Fiscal drag is the result of a progressive tax system, where individuals end up in higher tax brackets and hence pay higher marginal income tax rates once their wages and salaries increase. This so-called bracket creep may be due to (1) increases in real wages, (2) increases in nominal wages intended to compensate for inflation or (3) a mixture of both. Inflation-induced bracket creep, also referred to as inflationary fiscal drag (“kalte Progression” in German), entails a higher tax burden and declining real after-tax incomes. Higher tax revenues due to inflationary fiscal drag are arguably of greater con-

cern than bracket creep due to higher real wages – real fiscal drag – as the latter follows the “ability to pay”⁷ principle. In a progressive tax system, the average tax burden increases with rising income also for those who do not move into the next tax bracket, because a greater proportion of their taxable income is taxed at the higher marginal rate.

Moreover, fiscal drag arises as inflation erodes the real value of nominally fixed allowances and tax credits such as the general tax credit for employees (“Arbeitnehmerabsetzbetrag”). Given that tax expenditures often aim at raising the disposable income of vulnerable groups, these groups may suffer disproportionately from inflation.

Several approaches could be used to prevent the unwanted effects of inflation, such as reducing tax rates when the general price level increases, or inflation indexing, i.e. continually adjusting tax brackets and tax expenditures for inflation.⁸ However, in the EU, the most widely used approach is the discretionary adjustment of tax brackets at irregular intervals – what is often labeled as income tax reliefs. Between such irregular adjustments policy makers have the opportunity to finance additional expenditures. Indeed, none of the five Member States analyzed in the ESCB project (Attinasi et al., 2015) currently adjusts tax brackets or tax expenditures both regularly and automatically.

⁵ A flat unemployment insurance contribution rate of 3% is generally applied to employees, but up to certain monthly incomes lower rates are charged on the whole wage income, namely 0% (up to a monthly income of EUR 1,246), 1% (up to EUR 1,359) and 2% (up to EUR 1,530). The threshold amounts are adjusted annually; the amounts indicated here refer to 2014.

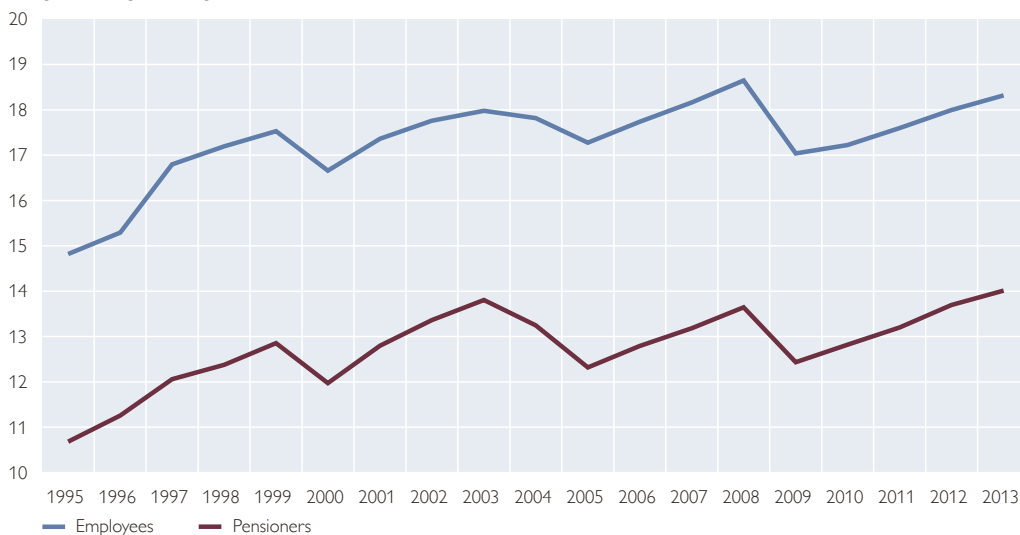
⁶ To be precise, according to §108 of the General Social Security Act (ASVG), these different bases are adjusted by the nominal growth rate of the average base for pension insurance contributions in $t-2$.

⁷ While not undisputed, the ability-to-pay principle in taxation indicates that taxes should be levied according to taxpayers’ economic capacity (i.e. ability to pay), which justifies progressive income tax systems.

⁸ For further approaches, see Immervoll (2005, p. 4f).

Income Tax Withheld from Wages and Pensions in Austria

% of gross earnings excluding social contributions



Source: Statistics Austria (wage tax statistics from 1995 to 2013).

Austria's personal income tax system is progressive and currently employs four income tax brackets, with the rates ranging from 0% to 50%.⁹ Reduced (less progressive) tax rates apply to the 13th and 14th monthly salary. As of early 2015, none of the important parameters (tax brackets, allowances) in the Austrian income tax system is automatically indexed to inflation or wage developments.¹⁰ Non-adjustment of these parameters has contributed significantly to fiscal consolidation in Austria over the last two decades.

Since 1995, three relatively large tax cuts (in 2000, 2004/2005 and 2009) more than compensated, in nominal terms, for the effect of two consolidation packages (in 1996/1997 and 2001)

that had included significant wage income tax measures. However, the real decline in tax brackets, tax credits and allowances (examples of the latter two are shown in chart 2) led to a substantial increase in implicit wage tax rates¹¹ over this time horizon. This is illustrated by chart 1, which shows separate figures for employees and pensioners.

This fiscal drag creates significant room for maneuver for the government.¹² None of the post-2009 consolidation packages included an explicit major (i.e. with an impact of more than 0.1% of GDP) measure on the wage income tax. Nevertheless, revenue from this tax increased much more strongly than its bases (chart 1) or than trend GDP and hence contributed signifi-

⁹ The Austrian federal government recently agreed on a tax reform which would increase the number of tax brackets to seven, ranging from 0% to 55%.

¹⁰ However, taxable income is adjusted to the extent to which tax-deductible social security contributions are raised in line with inflation.

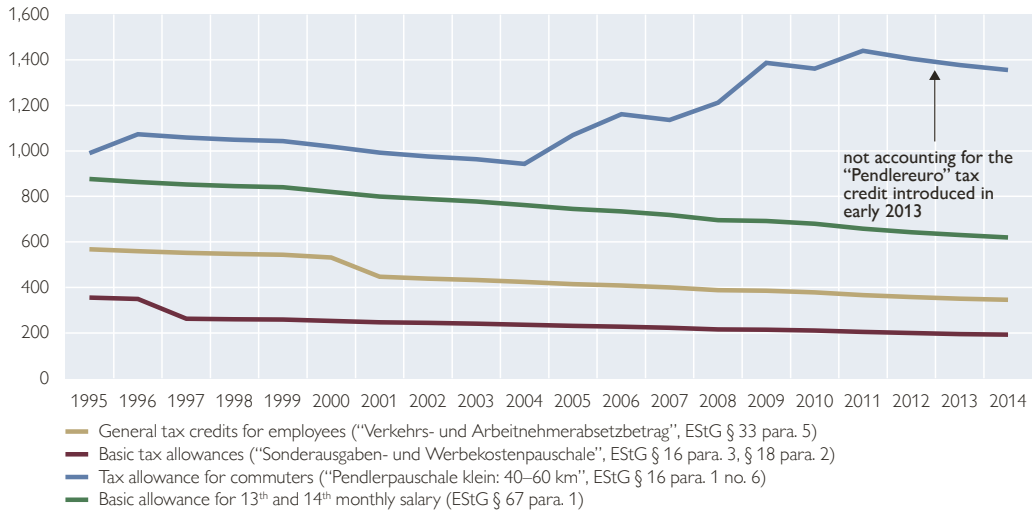
¹¹ Here the implicit tax rate is defined as personal income tax revenues divided by gross earnings without social security contributions.

¹² The extent of this fiscal drag is also reflected in the elasticities of the personal income tax with regard to its base variables. In the OeNB fiscal projection model (see Prammer and Reiss, 2014), a 1% increase in average wages (average pensions) leads to a 1.8% (2.05%) increase in the revenue from personal income tax on wages (pensions).

Chart 2

Development of Different Parameters of Austria's Income Tax System in Real Terms

EUR, CPI deflated (2014=1)

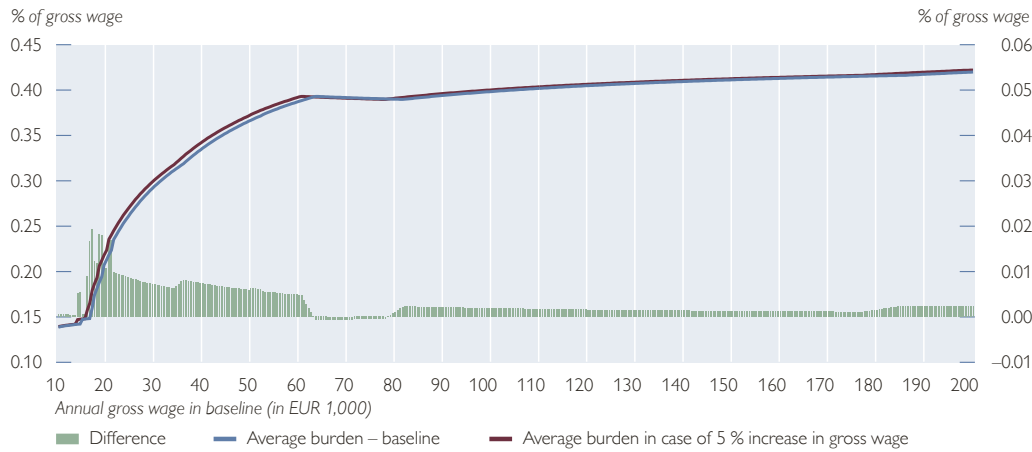


Source: Austrian Federal Chancellery, Statistics Austria, OeNB.

Note: EStG refers to the Einkommenssteuergesetz (Austrian Income Tax Act).

Chart 3

Average Burden on Employees from Social Contributions and Wage income Tax



Source: OeNB.

Note: Assumptions: White-collar worker, member of the Austrian Chamber of Labour, no additional deductions, based on 2014 tax Laws. For simplicity, indexed parameters (e.g. the maximum base) are not adjusted in the 5% increase wage scenario. The simulation is based on 2014 values (for tax brackets etc.).

cantly to the improvement of the Austrian structural balance (of more than ¾% of GDP by end-2014). This room for maneuver has also, to a small extent, been used to increase allowances for commuters (chart 2).

What does this imply for average tax rates? Earners of lower to middle incomes are hit hardest by these policies as the difference between the average and the marginal tax rate is largest for them (chart 3).

The way changes in inflation impact the revenue from personal income taxes depends on whether such changes originate from wage developments and, if not, how fast they translate into changes in wages.

1.3 Effective Real Corporate and Capital Gains Tax Rates Decrease with Lower Inflation

In general, the EU Member States apply proportional standard corporate income tax rates; sometimes with deviating rates for low/high profits or special sectors and regions. Overall, corporate income taxes are far less progressive than personal income taxes, given their smaller number of tax brackets. The Austrian corporate income tax is strictly proportional, with a standard corporate tax rate of 25%. However, even if corporate profits are taxed proportionally, inflation does play a role. Depreciation allowances, which reduce corporate profits, are usually based on historical nominal costs, i.e. the price that was paid when the investment was made. By reducing the real value of depreciation allowances, inflation, thus, indirectly increases the effective corporate tax rate.

In the same vein, the effective tax rate on capital gains (e.g. interest income or dividends) increases with inflation, as these taxes are, generally, levied on nominal bases. In other words, inflation erodes the real value of capital gains. In Austria, capital gains are taxed at a flat rate of 25%. Assuming an asset was bought at EUR 100 and sold at EUR 110, the capital gain of EUR 10 would hence be subject to a tax of EUR 2.5. At an inflation rate of 2%,

the real capital gain would only equal EUR 8 and the real effective tax rate would amount to 31.25%. Real effective tax rates can easily go far beyond 100% if inflation comes close to (or even exceeds) the nominal capital gain. For capital gains on real estate property, by contrast, inflation developments may currently be taken into account. If the property is sold more than ten years after the purchase, inflation developments from the tenth year onward can be used to deflate nominal capital gains. Gains made over the first ten years are taxed on a nominal basis, however.

1.4 Revenues on Excise Duties Would Erode Less with Lower Inflation

Most revenue from other (mainly indirect) taxes in the EU comes from taxes which are levied proportionally on an ad valorem basis; i.e. they are levied as a percentage of the transaction value at the time of the transaction, such as the VAT. Hence, such a tax changes in line with the nominal value of the underlying tax base and the real value of the tax remains unchanged irrespective of inflation.

Excise duties are a major exception to the ad valorem basis, as they are mostly levied proportionally to quantities. These taxes comprise mineral oil and energy taxes, alcohol and tobacco taxes¹³ as well as motor vehicle taxes, which are all levied on the quantity acquired, e.g. liters in the case of mineral oil taxes or kW in the case of motor vehicle taxes. Thus, price developments should not affect nominal excise tax revenues. Yet in real terms, these tax revenues tend to gradually erode with inflation. Moreover, tax revenues that

¹³ To be precise, the base for the tobacco tax is partly ad valorem. However, we allocated it to the taxes with nominally fixed rates as (due to the very high implicit tax rates on tobacco) the ad valorem part is mainly levied on the nominally fixed part of the tax.

Chart 4

Rates of Selected “Consumption-Related” Taxes in Austria in Real Terms

EUR, CPI deflated (2014=1)

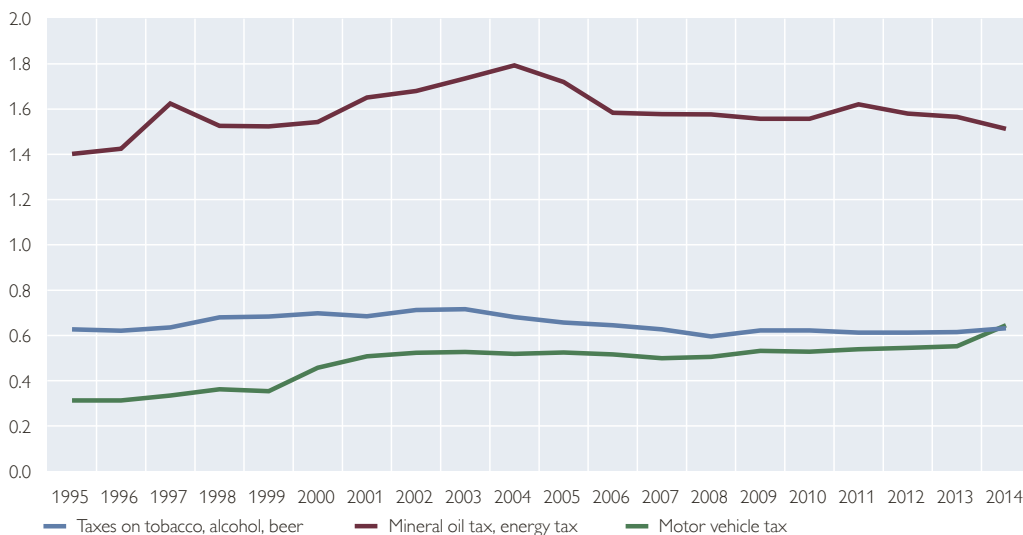


Source: Austrian Federal Chancellery, Statistics Austria, OeNB.

Chart 5

Revenue from Nominally Fixed “Consumption-Related” Taxes in Austria

% of GDP



Source: Statistics Austria, Austrian Federal Ministry of Finance.

are levied on fixed nominal values, such as recurrent property taxes in Austria, are also eroded by inflation.

In Austria, taxes that do not respond automatically to any price developments make up around 3% of GDP.

When we use the methodology applied in Attinasi et al. (2015), the fiscal drag for indirect taxes not subject to mandatory inflation indexation in Austria – i.e. the real revenue loss – amounts to 0.03% of GDP per 1% inflation.

In fact, the mineral oil tax and especially the tobacco tax have been adjusted regularly in Austria; increases in the latter were part of virtually every consolidation package over the last two decades. Adjustments of nominal tax rates for other “consumption-related” taxes like the motor vehicle tax (“motorbezogene Versicherungssteuer”), other energy taxes (“Energieabgaben”), the alcohol tax and the beer tax have been rare, but in part relatively large. For example, the rates of both the energy tax for electricity and the motor vehicle tax were adjusted only once between 1997 and 2013: in 2000, they were increased by about 100% and 50%, respectively (chart 4). Note, however, that a comparison of the developments of the motor vehicle tax¹⁴ and the tobacco tax (plus the small taxes on alcohol and beer) shows that trends in household behavior partly compensate for the developments of real tax rates (chart 5).

2 The Effect of Inflation on Primary Expenditure

Inflation affects expenditure via different channels, which will be analyzed in detail in this section. A large share of entitlement spending, in particular pension benefits, is indexed to inflation developments, while some smaller lump-sum social benefits are not indexed. Public wages are de facto linked to past inflation. Other primary expenditure categories are mainly driven by enterprises classified under government as well as state and local governments; therefore it is quite hard to esti-

mate how fast lower inflation would pass through to them.

2.1 Pensions (de jure) and Public Wages (de facto) Are (Directly) Linked to (Past) Inflation

In Austria, the most important expenditure categories that are, under current law, indexed to past inflation developments are pension benefits. Inflation developments also play a role for expenditure on public employees, albeit not automatically, but via the wage-setting process. Adjustment relies on past realized inflation rates, however, and not on current or projected inflation rates. The effect of a temporary decrease of the inflation rate by 1 percentage point on nominal spending on these items is therefore negligible on impact. It only feeds through with a significant time lag, reducing government expenditure.

In principle, public pensions (social security pensions and pensions for retired civil servants) should be adjusted annually with the so-called adjustment factor, which itself is based on lagged inflation.¹⁵ This is not always the case, though. In recent years, the average adjustment was several times below past inflation, especially in 2013 and 2014 (as part of the consolidation package of 2012), and the rate of nominal increase tended to be higher for lower pensions. However, there has not been any nominal pension freeze recently. Means-tested social (inclusion) benefits are also adjusted with the adjustment factor. Unemployment benefits are granted based on the unemployed person’s past earnings.¹⁶ So, similar to pen-

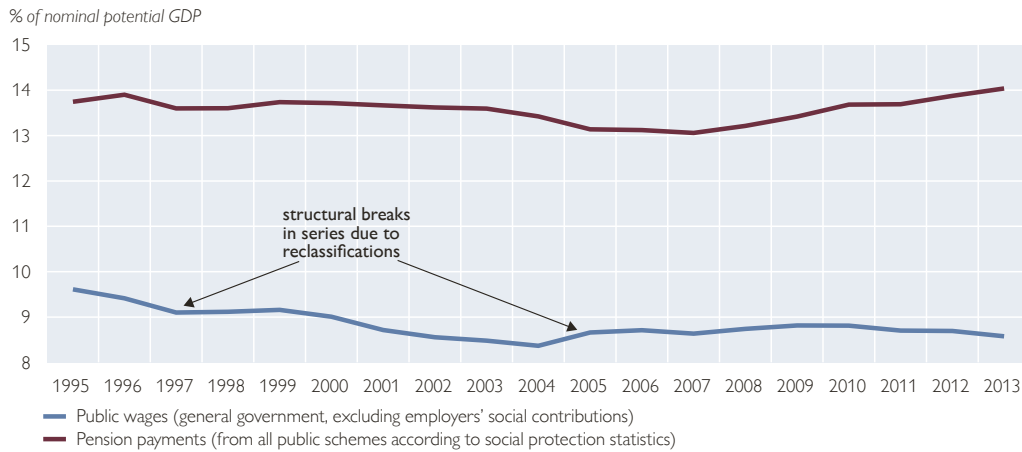
¹⁴ In early 2014, the motor vehicle tax was increased again (which is also indicated in charts 4 and 5).

¹⁵ The General Social Security Act (§108 ASVG) states that increases in pensions should in principle be based on the so-called adjustment factor, which in year t equals the arithmetic average of year-on-year CPI inflation rates from August $t-2$ to July $t-1$.

¹⁶ According to the Unemployment Insurance Act (AIVG), unemployment benefits are granted in relation to wages of $t-2$ if claimed in the first half-year t , and in relation to wages of $t-1$ otherwise (§21 AIVG). Unemployment benefits based on wages of $t-2$ are adjusted by the adjustment factor.

Chart 6

Expenditure on Public Wages and Pensions in Austria



Source: Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection, Eurostat, European Commission.

sions and public wages, overall payments on unemployment benefits react with some lag to price and wage developments.

In Austria, public wages are not legally indexed to inflation. Public-sector wage increases are determined by negotiations between trade unions and the respective minister. While, in general, trade unions negotiate for wage increases taking into account (usually past CPI) inflation and productivity gains, the actual wage increase reflects much more than that, namely e.g. the specific economic situation and consolidation needs. Hence, there is undoubtedly some, yet no one-to-one, relation between inflation and wage increases in Austria.

Chart 6 shows the development of public wages and pensions since 1995. In the absence of restrictive policy measures, pension expenditure tends to in-

crease more strongly than trend GDP in times of stable inflation. In years with decreasing inflation, the ratio of spending on these items to nominal potential (trend) GDP^{17,18} advances faster than usual (e.g. in 2009¹⁹), while it increases more slowly if inflation rises (e.g. in 2011). Therefore, years with sizeable restrictive measures on public wages and pensions are sometimes hard to detect when only looking at macro data. For example, in 2013, pensions were indexed 1 percentage point below past inflation, and (based on figures from Statistics Austria) the number of pensioners increased less than in the years before. Expenditure on pensions nevertheless grew at a considerably faster pace than nominal potential GDP (chart 6), as inflation in 2013 was significantly lower than in 2011 and 2012.

¹⁷ Nominal potential GDP is computed by multiplying smoothed real GDP (in this case the trend is calculated via the production function approach of the European Commission) with the GDP deflator. Therefore, nominal potential (trend) GDP will tend to increase more strongly in times of high inflation, as the price component is not smoothed.

¹⁸ These expenditure aggregates are divided by (nominal) potential GDP as they are presumably less cyclical than the revenue aggregates in chart 5 (especially the mineral oil tax).

¹⁹ With regard to the rise in pension spending, the expansive measures of 2009 (especially the indexation above past inflation) and the large increase in the number of pensioners should have been roughly compensated for by the phase-out of one-off measures taken in 2008.

2.2 Lump-Sum Family and Long-Term Care Benefits are Nominally Fixed and Not Indexed to Inflation

Other social transfers such as federal lump-sum family benefits and lump-sum long-term care benefits are not indexed to inflation. Hence, their real value erodes over time in the absence of discretionary adjustment.

Chart 7 indicates that nominal adjustments of the most important federal lump-sum family benefits²⁰ tend to be irregular (with almost all adjustments being increases). However, some of these adjustments (especially in 1999/2000 and 2008/2009) were quite substantial, which is why these benefits tend to be somewhat higher in

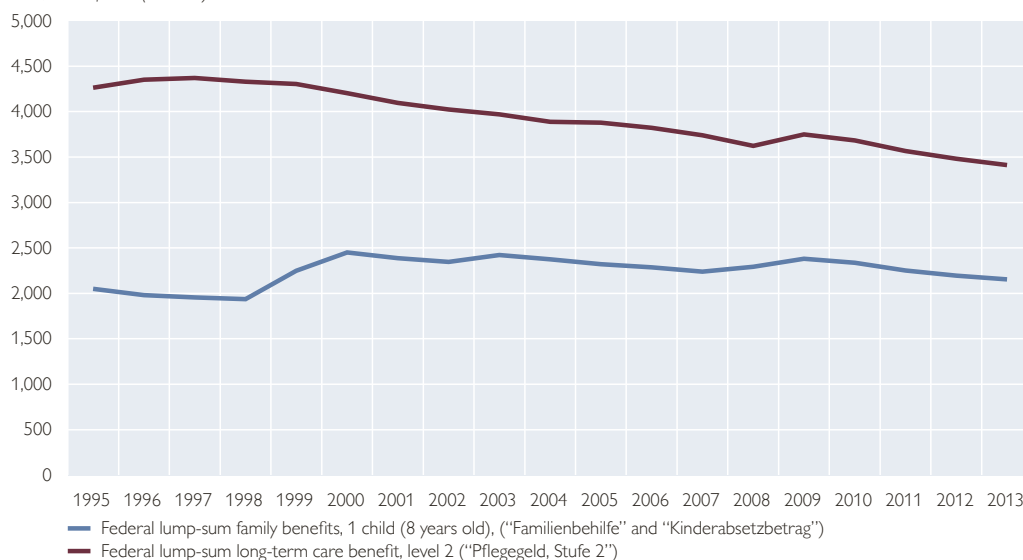
real terms than in the mid-1990s.²¹ This cannot be said of lump-sum long-term care benefits (“Pflegegeld”), however. Because these benefits have only seen one sizeable increase since their introduction in the mid-1990s,²² their value has significantly declined in real terms.

Chart 8 indicates that expenditures on these items are also driven by demographic developments given that overall population growth exceeds that of recipients of family benefits, while trailing that of recipients of long-term care benefits. So, despite a significant real decline in rates (and some tightening of eligibility), the ratio of spending on long-term care benefits has remained roughly stable since 1997.

Chart 7

Annual Entitlement to Selected Family and Long-Term Care Benefits in Austria

EUR, CPI deflated (2013=1)



Source: Austrian Federal Chancellery, Statistics Austria, OeNB.

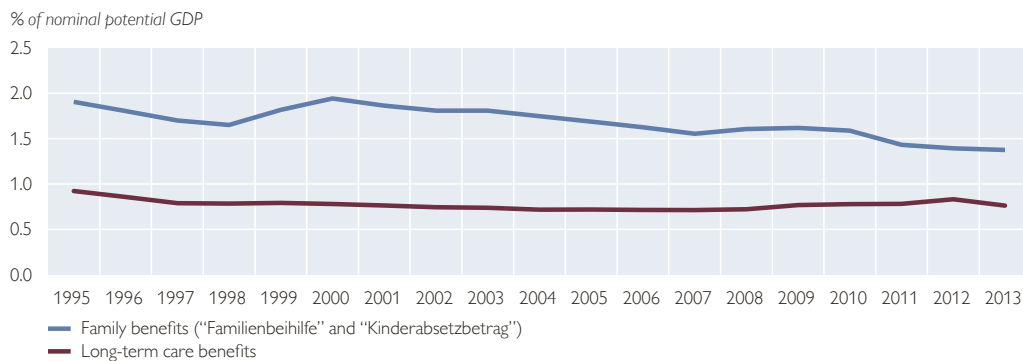
²⁰ Note that there are also some other child-related cash benefits in Austria, above all the child-care benefit (“Kinderbetreuungsgeld”). However, the family allowance (“Familienbeihilfe”) and the child tax credit (“Kinderabsetzbetrag”) are the only major lump-sum, not means-tested family benefits in cash that have been in place since at least 1995.

²¹ Eligibility for university-level students was tightened over this time span, however.

²² In addition, eligibility for these benefits has also been tightened somewhat over the last 20 years. The trend for the other six levels of the long-term care benefit (“Pflegegeld”) is similar.

Chart 8

Expenditure on Selected Nominally Fixed Cash Social Benefits in Austria



Source: Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection, Eurostat, European Commission.

Nonadjustment of these transfers creates significant savings for the government, but is likely to hit lower- to middle-income households most, because these transfers make up a relatively higher share of their disposable income.

2.3 Most other Primary Expenditures and Non-Tax Revenues Should Respond rather Quickly to Changes in Inflation

Social benefits in kind provided via market producers consist mainly of entitlement spending related to health care (e.g. outpatient services, pharmaceuticals). Consequently, a change in prices charged within the private sector should translate rather quickly into nominal spending on these items.

Most other primary expenditures (other than wages and social benefits) as well as most non-tax revenues are driven by entities other than core central government (and social security funds), namely by regional and local government and by extra-budgetary units classified under government (e.g. subsidiaries of the Austrian Federal Railways (ÖBB) holding company, state hospitals, universities, theaters and mu-

seums). Estimating the possible impact of changes in inflation is therefore difficult. Furthermore, these remaining items are dominated by spending and revenue directly related to the value of goods and services, namely spending on intermediate consumption and investment as well as the proceeds from market or non-market output.²³ Therefore, it may be plausible to assume that changes in inflation translate relatively quickly into the nominal value of these revenue and expenditure items.

3 The Effect of Inflation on Debt and (Net) Interest Payments

Changing inflation rates also impact on government debt and the related interest payments.

3.1 The Effect on Interest Expenditures Depends on the Size of the Fisher Effect and the Debt Structure

The extent to which inflation affects interest payments depends on the nature of the inflationary shock, the pass-through of inflation to nominal interest rates and the size and composition of government debt.

²³ Also, note that fees for municipal services (which are part of the proceeds from market or non-market output as well as property income) tend to be regularly adjusted for inflation.

Most importantly, one has to take into account that Austria is a euro area member, and that a country-specific inflation shock would only have a negligible impact on euro area inflation and, hence, interest rates. A full Fisher effect (in case of a euro-area-wide shock) would assume a one-to-one pass-through of inflation to nominal interest rates. This is, however, a very unlikely assumption in case the fall in inflation is only temporary and/or if interest rates were already very low before. The composition of government debt is important as it determines which part of interest liabilities are affected by changed nominal interest rates. The more non-maturing, fixed interest-rate home currency debt is held (and the lower the deficit), the less interest payments are exposed to changes in interest rates in the short run.

In Austria, cash deficits and variable interest-rate debt tend to be small compared to overall debt. Furthermore, the average residual maturity of the core central government debt (which constitutes about three-quarters of overall debt) is above eight years. Hence, Austria's interest expenditure remains relatively unaffected by temporary changes of interest rates (and thus also by inflation rates).

3.2 In the Short to Medium Run, Lower Inflation Tends to Raise the Debt Ratio

Given that debt in year t is influenced by the budget balance in t , it follows that debt is affected by inflation devel-

opments. As analyzed above, the exact impact of inflation on public debt depends on the indexation mechanisms of revenues and expenditures for the primary balance and the composition of public debt for interest payments.

More importantly, the debt ratio is particularly affected by inflation via the development in the denominator, namely nominal GDP. As mentioned before, the impact of lower inflation on interest payments is rather muted in Austria. Even in the (unlikely) case of a full Fisher effect, the change in the denominator would dominate in the short run.

This is corroborated by simulations in Attinasi et al. (2015), where a drop in the inflation rate by 1 percentage point would, in the first year, raise the Austrian debt ratio by 0.7 percentage points.²⁴ Debt sustainability analysis in the same paper showed that a temporary shock to inflation reducing its growth by 1 percentage point for three years²⁵ would cause the Austrian debt ratio to increase by 5.7% of GDP over a period of ten years.

4 Overall Effects of Inflation on the Fiscal Deficit and on Debt

In the analysis of Attinasi et al. (2015), revenues in Austria respond somewhat faster to inflation changes than current expenditure.²⁶ The initial impact of a 1 percentage point decrease in inflation on the primary balance is negative, but fades out after two to three years. Assuming that reduced inflation passes (to some extent) through to lower nom-

²⁴ These results assume a partial Fisher effect of 0.6, and are based on the debt ratio for 2013 as presented in the March 2014 notification (which was still drawn up according to ESA 95).

²⁵ The analysis is based on a temporary shock lowering GDP deflator growth by 1 percentage point for three years (2015–2017), followed by gradual linear convergence over the subsequent five years (2018–2022) to the path in the benchmark (reaching GDP deflator growth of the benchmark in 2022).

²⁶ To draw conclusions on the overall implications for the government deficit and debt, the authors had to make assumptions on how fast lower inflation passes through to private wages as well as other primary expenditure and non-tax revenue.

inal interest rates (Fisher effect), the positive effects of reduced interest payments almost balance out the negative effects of lower inflation on the primary balance and result in small effects on the deficit ratio in Austria. This is in line with the results for the other euro area member countries analyzed in Attinasi et al. (2015), although the dynamics of the effects vary due to different institutionalization and indexation mechanisms. While Germany and Austria display a diminishing impact on the deficit ratio, in France and Greece the impact builds up in the second and third year after the inflationary shock. This is mainly due to the fact that in France and Greece public wages do not adjust to lower inflation, as their wage indexation mechanisms have been suspended. As indicated above, the impact on the debt ratio is considerably larger, particularly via the denominator effect. The size of the effect also depends on

the debt level and the debt structure and refinancing requirements. Among the countries analyzed in Attinasi et al. (2015), the short-term impact on the debt ratio is highest in Italy. This is due to Italy's high debt ratio and relatively low share of short-term and variable interest rate debt. In Greece, the high share of variable and short-term debt (about 80%) allows this country to benefit immediately from falling interest rates. Hence the impact of lower inflation on the debt to GDP ratio is less pronounced than in Italy, despite a higher debt ratio.

For temporary negative inflation, the effects on the public deficit and on debt are not clear. In the short term, nominal downward rigidity of wages, social benefits and nominal interest rates would be very likely. Hence, while revenues may be sustained due to nominal wage rigidity (and the high share of labor taxes in overall tax reve-

Table 1

Structure of Government Revenue and Primary Expenditure in Austria

	2013 % of GDP	Explanatory notes	Permanent effect of 1% drop in price deflator on ratio to GDP
Taxes on income	12.7		
of which wage income tax	8.0	brackets, allowances and tax credits are nominally fixed and not indexed to inflation	-0.08
of which personal income tax	1.3		
Other taxes	15.2		
of which excise duties	2.3	rates mostly nominally fixed, not indexed to inflation	0.03
of which motor vehicle tax	0.6	rates nominally fixed, not indexed to inflation	
of which land tax	0.2		
Social contributions	15.3		
Other revenue	6.2		
Social benefits other than in kind	19.2		
of which pension benefits	~14	indexed on past CPI (average of August t-2 to July t-1)	0.03
of which unemployment benefits	~1¼		
of which long-term care benefits	~¾	rates nominally fixed, not indexed to inflation	
of which family benefits	~2	rates mostly nominally fixed, not indexed to inflation	
of which other	~1		
Expenditure on personnel	11.1		
of which wages	8.6	negotiations take past CPI into account	
of which employers' social contributions and payroll taxes	2.4		
Social benefits in kind (via market producers)	3.8		
Other primary spending	14.3		

Source: Statistics Austria, Austrian Federal Chancellery, Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection, OeNB.

nue), real expenditure also increases. The exact effect on the deficit depends – as with lower inflation – on the indexation mechanism, and the wage/price bargaining mechanism. The impact on the debt-to-GDP ratio is likely to be stronger and more persistent given the adverse implications of the denominator effect.

Apart from boosting debt, lower inflation entails three medium-term effects on fiscal variables (table 1), which do not depend on rigid assumptions: Compared to a baseline with higher inflation, real revenue from personal income taxes would be dampened due to reduced bracket creep. The size of this effect can be inferred from the elasticities of the personal income tax with regard to its base variables (see Prammer and Reiss, 2014). A 1% decrease in inflation feeding through to a 1% drop of average wages (pensions) causes the revenue from personal income tax on wages (pensions) to contract by 1.8% (2.05%) compared to the baseline. The ratio of income taxes to GDP shrinks as a consequence. Lower

inflation furthermore reduces the real revenue losses of nominally fixed excise duties (as well as of the motor vehicle tax and property tax). On the expenditure side, lower inflation limits the erosion of nominally fixed (social) transfers such as long-term care and family benefits. The effects on excise duties should more or less offset the effects on transfers.

To sum up, it is difficult to determine the exact impact inflation has on the fiscal deficit and on debt. Nevertheless, there is a clear tendency that lower inflation would adversely affect both the debt ratio and the (structural) budget balance in Austria. Amid low inflation, it would therefore become more challenging to comply with the requirements of the Stability and Growth Pact (SGP), especially with regard to the debt rule. The effects on the budget balance are more limited, however, and, as of end-2014, the SGP requirements for Austria under the preventive arm prescribing an improvement of the structural budget balance tend to be stricter than the debt rule.

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