

»» Government spending: efficiency also matters

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Germany's debt brake will create a significant need for debt consolidation in the coming years due to crisis-driven increased debt levels, while significant public investment will become necessary at the same time. Against this backdrop, it is important to look at the structure of government expenditure and, in particular, its efficiency. That means examining the relationship between the output achieved in pursuing the objectives of government spending and public funds used. The aim of this paper is to provide input for reflection on this issue. It examines the efficiency of public expenditure in Germany in an international comparison on the basis of current indicators. The focus is on education and infrastructure. Overall, Germany's public sector so far appears to be quite efficient in both categories. Since the outputs are rather average, however, the efficiency primarily results from the comparatively low amounts spent on these areas. Thus, a major challenge will be to remain efficient even with higher expenditures.

Efficiency of government expenditure is becoming increasingly important

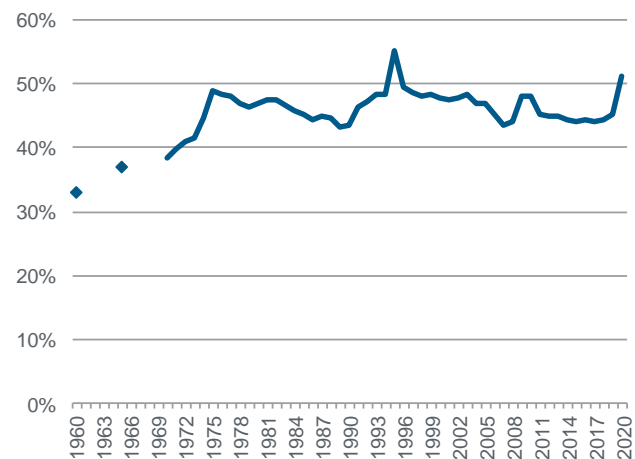
Germany's budget deficit and debt level have risen significantly in the course of the coronavirus crisis. Under the requirements of the debt brake, that means there will be a considerable need for consolidation in the coming years.¹ At the same time, various studies indicate a substantial investment gap which is creating a high need for additional government spending.² Much work needs to be done, particularly in the areas of digitalisation, climate neutrality and climate change adaptation.³ The demographic trend is also causing significant additional expenditure.⁴ All of this makes it worthwhile to take a closer look at the efficiency of government expenditure in Germany. That means examining the ratio between the output achieved in pursuing the objectives of government spending and public funds used and to compare it with other countries. To be sure, this does not permit a final assessment of expenditure efficiency in Germany but it does provide a rough indication of efficiency reserves.

Development and allocation of government expenditure

First of all, the government expenditure rate, the ratio of government spending to gross domestic product, has been on a similar level since the mid-1970s. Variations are either due to the business cycle or result from special effects such as the assumption of the Treuhand debt in the year 1995. Prior to the sharp rise resulting from the coronavirus crisis in 2020, a moderate consolidation trend compared with the 1990s and early 2000s was discernible.

Figure 1: Development of government expenditure ratio in Germany

Government expenditure in relation to GDP (for Western Germany up to 1990)



Source: Destatis, Federal Ministry of Finance

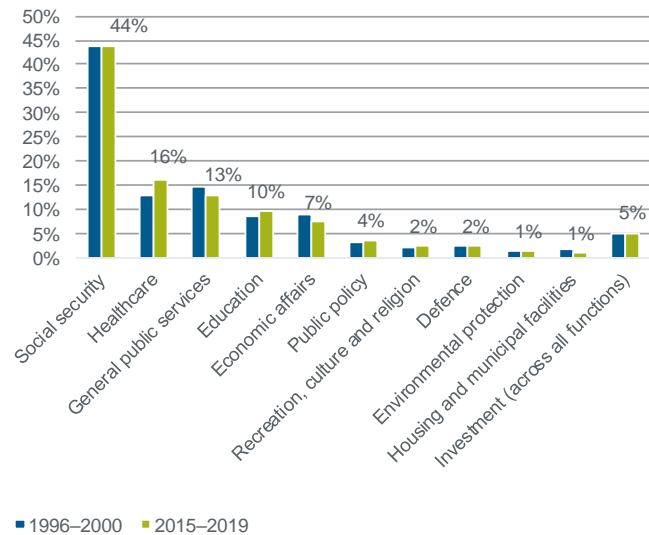
The allocation of total government expenditure in accordance with the expenditure items defined by the OECD shows above all a high proportion of social expenditure (Figure 2).⁵ With close to 44% of total expenditure, social expenditure such as old age and survivor pensions, family and children or unemployment benefits is the largest expenditure category by a wide margin. Healthcare expenditure (16%) and expenditure on general public services (13%) follow at some distance and they comprise very diverse positions from general administrative expenditure to funds for international cooperation. Germany uses just under 10% of government expenditure for education and training. The category of economic affairs, which includes subsidies as well as infrastructure expenditure on transport or communications, accounts for 7%. All other expenditure categories are in the low single digit percentage range. Around 5% of government expenditure is booked as investment across functions.

The proportion of healthcare (+27%) and education expenditure (+11%) has grown most in the course of the past 20 years. The share of social protection expenditure, in turn, has remained constant despite the ageing population.⁶ The main expenditure shares that have fallen are housing and community amenities (-52%), economic affairs (-18%), environmental protection (-16%) and general public services (-12%). After several years of low investment, the share of investment expenditure across all functions (5%) was successively raised from 2017 and was therefore 5% higher between 2015 and 2019 than in the late 1990s.

An international comparison of the 25 high-income OECD countries places Germany's government expenditure in mid-range. The EU countries generally have high government expenditure ratios, while the Anglo-Saxon high-income countries and the Asian countries from the comparison group have lower government expenditure ratios.

Figure 2: Composition of government expenditure by function

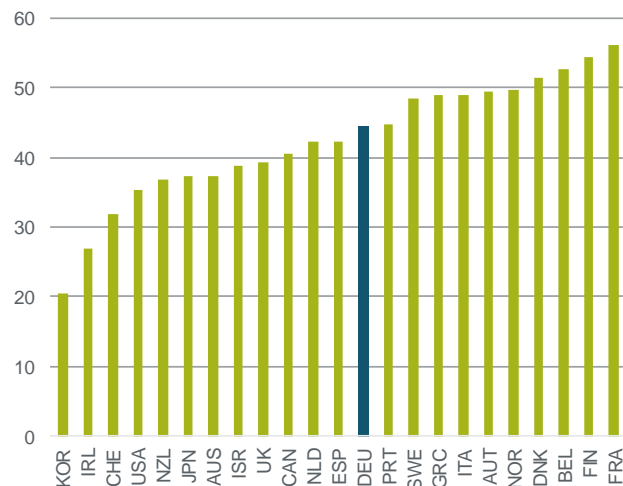
Shares in government expenditure according to the Classification of Functions of Government (COFOG). Also shown is the share of investment in government expenditure.



Source: OECD

Figure 3: International comparison

Government expenditure relative to GDP in 25 OECD countries, median value 2015-2019



Source: IMF WEO April 2021

Overall government efficiency is hard to measure

The international comparison with a relatively homogeneous group of countries is a common approach to estimating government expenditure efficiency.⁷ In general, efficiency describes the ability to avoid waste in achieving a desired result. Therefore, government expenditure is efficient when the maximum possible output is achieved with the resources used (output efficiency). It also means that a particular output level is generated with the least amount of resources (input efficiency). Through an international comparison, countries with an optimal input-output combination can thus define the benchmark for estimating the efficiency reserves in Germany. One of several challenges in assessing the efficiency of government expenditure, however, is how to quantify the output achieved, as it is typically not traded at market prices (see box). In economic computations it is booked by expenditures incurred and hence excludes efficiency aspects by definition.⁸ Suitable output indicators must therefore be used as substitutes.

The difficulty of measuring efficiency

International comparative efficiency analyses present several difficulties (Mandel et al. 2008). We mention these here briefly and take them into account as much as possible in the following analysis.

Given that many activities are paid for from not just public but private funds, a comparable input measurement is itself no trivial matter. If they receive mixed funding, either a homogeneous sample must be used or private expenditures would have to be included in the computation – which often do not exist.

Governments direct their expenditures at different objectives but these are only partly quantified (in education expenditure, for example, general education and specialist knowledge in contrast with the rather competency-oriented PISA results). The informative value of the output assessment therefore depends heavily on the informative value of the available output indicators.

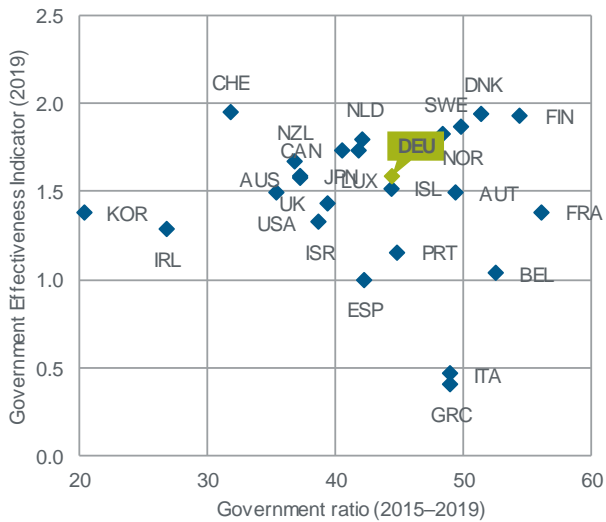
Current government expenditure is not the sole factor responsible for the outputs in the functions of government. Rather, these are usually also shaped by certain conditions. To the extent that these are environmental factors which the government cannot influence, that can distort the efficiency analysis. To a certain degree, however, different underlying conditions can be equalised by taking into account the longer-term government expenditure and by using a homogeneous country sample. Besides, conditions that are influenced by regulations or administrative practices are precisely the key to efficient results.

The World Bank developed the Government Effectiveness Indicator to compare the general output of different governments or state administrations. It measures the perceived quality of public services and infrastructure, the quality of the civil service and its independence, the quality of policy formulation and implementation and the credibility of the government. It is calculated on the basis of different sub-indicators

which in turn are based on various surveys among the population and experts.⁹ Germany is in midfield within the comparison group of OECD countries previously used. Switzerland and the northern European countries achieve the highest scores.

Taking into account the funds spent to achieve this output on the basis of the government expenditure ratio (Figure 4), we now have a rough indication of overall government efficiency: Germany appears to have upside potential because some countries such as Canada, the Netherlands and, above all, Switzerland achieve higher outputs in the effectiveness indicator with lower government expenditure ratios. With respect to pure input efficiency, South Korea in particular performs well. Although its output is merely in the lower mid-range, in return it uses the lowest amount of resources by a considerable margin.

Figure 4: Government effectiveness and expenditure ratio



Source: World Bank, IMF

Ultimately, however, a general assessment of efficiency based on the Government Effectiveness Indicator is of only limited informative value. After all, it completely leaves out certain government objectives, such as social balance, and is unable to measure the different prioritisation of partial objectives. Assessing efficiency in individual expenditure categories is more promising in this respect. Furthermore, in this way it is also easier to identify specific potential for improvement. Given the difficulties described above such as, in particular, the availability of suitable output indicators, education expenditure above all is relatively well suited for an international comparative efficiency analysis. In the following we also analyse the efficiency of infrastructure expenditure, although the informative value of the output indicators has certain limitations.

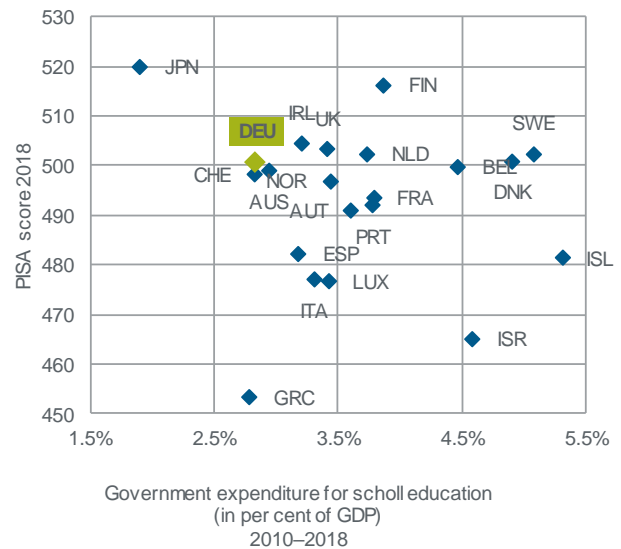
Education expenditure is relatively efficient ...

The findings of the PISA study provide a generally accepted standard for the international comparison of educational services. On the basis of representative random samples, the

PISA assessment framework captures 15-year-old students' knowledge and skills in reading, mathematical and scientific literacy. To be sure, it does not directly map educational goals such as general cultural or political education or foreign language or social skills. But the basic skills assessed under PISA have the advantage of enabling better comparability and form the basis for accessing other educational areas. Besides providing a relatively informative output indicator, measuring efficiency in the education sector is also made easier by relatively clearly attributable government expenditure, as most OECD countries have specific data on government spending on preschool, primary and secondary school education.¹⁰ Although private expenditure can also distort the comparison in the field of education, up to the age of 15 years it is likely to play a rather subordinate role in the high-income countries under consideration.

Figure 5: Efficiency of education expenditure

Average PISA score in the categories reading, mathematical and scientific literacy; government expenditure on preschool, primary and secondary school education.



Source: OECD

A simple comparison of the PISA findings in relation to education expenditure in the 2010–2018 period (Figure 5), that is during the school years of the assessed students, shows relatively high efficiency in Germany's education system. To be sure, Germany was only in mid-range under the most recent PISA assessment carried out in 2018 but education expenditure up to secondary level is also among the lowest in the comparison group – just 2.8% of Germany's GDP. Only Japan achieved better results with less expenditure, however, the country's rather performance-oriented learning culture possibly played a role as well. Finland, on the other hand, the country with the second-best PISA results, spends a full one percentage point more on school education. A current study that is based on more complex methods also indicates high efficiency of education expenditure in Germany. Thus, Cepparulo and Mourre (2020) determined on the basis of a data envelopment analysis (DEA) adjusted for outliers that Germany achieves its PISA results with the highest efficiency of all EU countries. When

expanded by other less easily comparable performance indicators, such as educational qualifications achieved, the same study places Germany in the upper midfield. Dutu and Sicari (2016) for their part focus on education expenditure per student instead of the typically used GDP-weighted government expenditure. Besides, they control for an index of average economic, social and cultural status. Although this methodology positions Germany in the upper midfield of the OECD countries, the findings also indicate that the same level of expenditure would enable a 6% performance increase or, while maintaining the same performance level, even a 60% cost reduction. The fact that the expenditure variation in this approach is heavily influenced by different income levels also merits consideration, however.

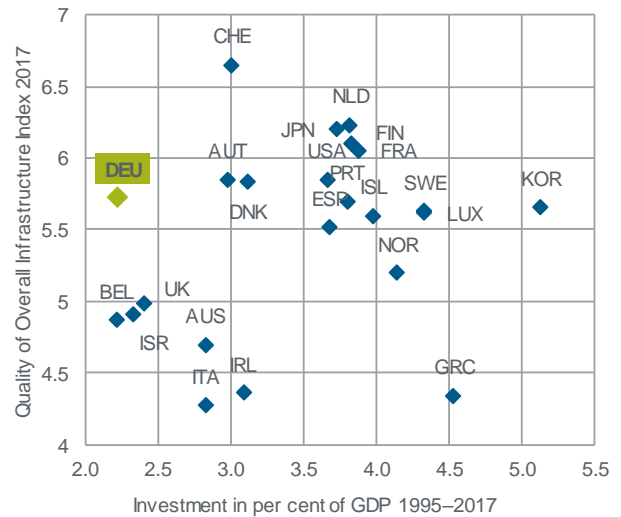
... and so is infrastructure expenditure

Besides education, the provision of public infrastructure such as roads, communications or energy networks is one of the core functions of government. The necessary public investment expenditure has risen in Germany since 2017 but remained relatively low in 2019, at 2.5% of GDP. However, there are no test results as there are in PISA to compare the quality of infrastructure across its breadth. We therefore need to use the Quality of Overall Infrastructure Index, which is measured as part of a transnational non-representative survey of managers from the private sector.¹¹ Measured against the subjective assessment captured by the index, Germany has dropped to a merely mid-range position among OECD countries after the assessment of its infrastructure fell sharply since the end of the 2000s.¹² Taking into account the very low average government expenditure since 1995, however, the result is nonetheless efficient (Figure 6) because all other countries with similar investment expenditure levels achieve much lower index values. Other studies also arrived at this finding. Alfonso and Kazemi (2016) also focused on the Overall Infrastructure Index and found that Germany and Switzerland were the most efficient in developing their infrastructure. Cepparulo and Mourre (2020) have determined that after Cyprus, Germany comes in second-best among the EU countries, although the study also takes into account five other partial measures of infrastructure, such as the number of internet connections per inhabitant and the length of the road network. They used a DEA method, however, to estimate that there is great room for further efficiency improvements in Germany as well.

Conclusion: efficiency should be closely monitored

The data analysed here show that there appears to be no obvious positive correlation between the amounts of government expenditure and the measured output. This is partly due to the weaknesses of the output indicators and environmental factors. Despite all limitations, however, the observable point clouds are also a sign that what matters is not just the amounts spent but how efficiently they are spent. In Germany, this appears to be working relatively well for overall education and infrastructure expenditure. While the country does not achieve top scores in an international comparison, it does achieve high outputs for the relatively low amounts of funds it spends on both sectors.

Figure 6: Efficiency of investment



Source: WEF, OECD

Given the need for consolidation after the coronavirus crisis, it is now advisable to leverage the remaining efficiency reserves. Above all, however, the challenge is to efficiently implement additional expenditures made necessary by past investment gaps, digitalisation, the transition to climate neutrality and adaptation to climate change. In the education sector, Germany should also not be content with a median score given the technology-intensive orientation¹³ currently underway. Even if the share of education expenditure has already grown significantly in the past decades, even more may need to be spent here.

As the economic literature contains indications that higher expenditures are usually carried out with less efficiency than lower expenditures, however, upscaling poses a great challenge.¹⁴ Particularly in the current circumstances, the situation is exacerbated by the problem of high capacity utilisation by construction firms and crafts businesses, the skills shortage¹⁵ and global shortages of numerous materials as a result of the coronavirus crisis.¹⁶ In addition to directly hampering production, this leads to higher prices, pushing up the costs of infrastructure projects. An anticyclical approach would therefore be desirable but is hampered by the urgency of many investment needs and the often limited time horizon of promotional programmes.

One important approach would be to improve the conditions for long-term investment planning in municipalities, for example by providing a steadier flow of promotional funds.¹⁷ Other approaches being considered involve improving the cost-effectiveness of government administration in a narrower sense.¹⁸ For example, mandatory cost-effectiveness comparisons could be introduced for public sector projects, and political programmes could be evaluated ex ante more often. The neutrality of cost-effectiveness analyses could be ensured by independent competence centres.¹⁹ The coronavirus crisis provided conclusive evidence that greater digitalisation of public offices can lead to more efficiency²⁰.

In designing investment and promotional programmes it is of fundamental importance to address the critical ancillary conditions and bottlenecks. For example, providing schools with improved digital equipment provides little benefit unless teaching staff are qualified to exploit the potential of the technologies. Furthermore, municipal investment promotion funds do not reach the areas where they are urgently needed unless the planning offices have the necessary human resources and can access necessary co-financing.²¹

Promotional programmes should be designed in such a way that they do not push out other projects that are even more important locally but receive no support. Information advantages at local level and competition for the most efficient solution are actually among the strengths of federal systems such as Germany's. If nationwide support programmes define goals but otherwise build on more local autonomy,²² these strengths can be leveraged even more effectively.

Competition and mutual learning also promote transparency and comparative evaluations of the outputs of states or municipalities. In this regard it would be helpful to undertake a comparison of the efficiency of government expenditure in core functions at state and municipal level as a starting point for addressing best practice and mutual learning. At a more general level, the optimal federal division of functions and responsibilities is an important mechanism for government efficiency in Germany.

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¹ Cf. [German Stability Programme 2021](https://www.bundesfinanzministerium.de) (bundesfinanzministerium.de); Borger, K., Herold, J. G. and Köhler-Geib, F. (2021): *Schuldenbremse: Stärkung oder Belastung für Deutschlands Zukunftsfähigkeit? (Debt brake: a boost or a burden for Germany's sustainability)*, Focus on Economics (forthcoming), KfW Research.

² According to the [KfW Municipal Panel 2021](#), the investment backlog perceived at municipal level stood at EUR 149 billion in 2020. A study by the Macroeconomic Policy Institute (IMK) and the German Economic Institute (IW) in Cologne also included the future investment requirements in the areas of education, transport, communication networks and decarbonisation. The authors estimate the requirement for additional government expenditure over the remainder of the decade at EUR 450 billion in total. Cf. Bardt, H., Dullien, S., Hüther, M. and Rietzler, K. (2019): *For a sound fiscal policy: make investments possible*, IW-Policy Paper 10/19.

³ Cf. Köhler-Geib, F. et al. (2021): [Emerging stronger from the coronavirus crisis – five areas of action for a sustainable transformation](#), Position Paper, KfW Research.

⁴ Cf. Werding, M., Gründer, K., Läßle, B., Lehmann, R., Mosler, M. and Potrafke, N. (2020), *Modellrechnungen für den fünften Tragfähigkeitsbericht des BMF (Model calculations for the fifth sustainability report of the Federal Ministry of Finance – our title translation, in German only)*, ifo Forschungsberichte 111, Endbericht, ifo Institut, Munich; Brand, S. and Steinbrecher, J. (2017): [Das wird teuer! – Kommunale Ausgaben in Zeiten des demografischen Wandels \(This is going to be expensive! – Municipal expenditure in the age of demographic change – our title translation, in German only\)](#), Focus on Economics No. 192, KfW Research.

⁵ Cf. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Classification_of_the_functions_of_government_\(COFOG\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Classification_of_the_functions_of_government_(COFOG))

⁶ This applies to the state as a whole but not to all federal levels. In municipalities the share of social expenditure has risen significantly since the 1990s. Cf. Brand, S. and Steinbrecher, J. (2017), [Rückgang des Investitionsrückstands – Trendwende oder nur Schönwetterlage? \(Declining investment backlog – a trend reversal or just a temporary breather? our title translation, in German only\)](#), Focus on Economics No. 195, KfW Research.

⁷ This principle forms the basis for a number of economic studies, some of which are quoted here: Cf. in particular Cepparulo A. and Mourre, G. (2020): *How and How Much? The Growth-Friendliness of Public Spending through the Lens*, European Economy - Discussion Papers, DG ECFIN, European Commission.; Mandl, U., Dierx, A. and Ilzkovitz, F. (2008): *The effectiveness and efficiency of public spending*, European Economy - Economic Papers, DG ECFIN, European Commission.; Afonso, A., Schuknecht, L. and Tanzi, V. (2005), *Public sector efficiency: an international comparison*, Public Choice 123 (3-4), pp. 321ff.

⁸ Cf. Mandl, U., Dierx, A. and Ilzkovitz, F. (2008): *The effectiveness and efficiency of public spending*, European Economy - Economic Papers, DG ECFIN, European Commission.

⁹ Cf. [The Worldwide Governance Indicators: Methodology and Analytical Issues by Daniel Kaufmann](#), Aart Kraay, Massimo Mastruzzi: SSRN

¹⁰ The US, Canada and South Korea must be excluded here due to lack of data on age-specific education expenditure.

¹¹ It assesses the overall infrastructure on a scale of 1 to 7 but also indicates that this involves areas such as transport, communications, energy etc. The survey was conducted on behalf of the World Economic Forum in order to assess international competitiveness along with a number of other categories. The last time the index was surveyed was in 2017. It is carried out in 148 economies, and on average each country returns 83 valid questionnaires. Cf. [TheGlobalCompetitivenessReport2017–2018AppendixC.pdf](#) (weforum.org)

¹² While Germany's infrastructure was still ranked second in the world by the WEF in 2007, it dropped to only 12th place in 2017. https://govdata360.worldbank.org/indicators/h3dcb11dd?country=DEU&indicator=536&countries=BRA&viz=line_chart&years=2007,2017

¹³ Cf. Zimmermann, V. (2021): [Technologies of the future for Germany: The country is well placed in many areas but some need readjustment](#). Focus on Economics No. 321, KfW Research.

¹⁴ Afonso, A. and Kazemi, M. (2017) *Assessing Public Spending Efficiency in 20 OECD Countries*. In: Böke-meier B., Greiner A. (eds) *Inequality and Finance in Macrodynamics. Dynamic Modeling and Econometrics in Economics and Finance*, vol 23. Springer, Cham. https://doi.org/10.1007/978-3-319-54690-2_2; <https://ideas.repec.org/p/imf/imfwpa/2008-228.html>

¹⁵ Cf. Müller, M. (2021): [Skills shortage is growing despite lockdown – further shortages are imminent](#), KfW-ifo Skilled Labour Barometer: June 2021, KfW Research.

¹⁶ Cf. <https://www.ifo.de/node/64887>

¹⁷ Raffer, C. and Scheller, H. (2021): [KfW Municipal Panel 2021](#), KfW Research (eds.); International Monetary Fund (2015): *Making Public Investment More Efficient*, IMF Staff Report June 11, 2015; Geißler R. (2021): *Ein kommunales Investitionsprogramm für das nächste Jahrzehnt – Die Verfahren sind entscheidend (A municipal investment programme for the next decade – what matters are the processes – our title translation, in German only)*, Dezernat Zukunft Policy Paper.

¹⁸ Mühlenkamp, H. (2016): *Effizienzmessung und quantitative Instrumente zur Effizienzsteigerung im öffentlichen Sektor (Efficiency measurement and quantitative instruments for improving efficiency in the public sector – our title translation, in German only)*, Perspektiven der Wirtschaftspolitik 2016; 17(2): 106–128

¹⁹ Mühlenkamp, H. (2016), *Wirtschaftlichkeitsuntersuchungen bei ÖPP – Zwischen methodischer Konsistenz und interessengeleiteter Ergebnisgestaltung (Cost-efficiency analyses, in PPPs – between methodical consistency and interest-driven outcomes achievement – our title translation, in German only)*; H. Mühlenkamp (ed.): *Öffentlich-Private Partnerschaften – Potentiale und Probleme (Public-private partnerships – potentials and problems – our title translation, in German only)*, Baden-Baden, Nomos, p. 60–85.

²⁰ See e.g. Nationaler Normenkontrollrat (2020): *Monitor Digitale Verwaltung #4*.

²¹ Cf. Raffer, C. and Scheller, H. (2021): KfW Municipal Panel 2021, KfW Research (eds.).

²² Cf. Geißler, R. (2021): Ein kommunales Investitionsprogramm für das nächste Jahrzehnt — Die Verfahren sind entscheidend (*A municipal investment programme for the next decade – what matters are the processes* – our title translation, in German only), Dezernat Zukunft Policy Paper.