FINANCIAL STABILITY REPORT 2021

FMA

Financial Market Authority
Liechtenstein

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PREFACE

In this publication, the Liechtenstein Financial Market Authority (FMA) presents its fourth annual Financial Stability Report on the financial sector in Liechtenstein. Since Liechtenstein does not have a national central bank, the FMA is legally responsible to contribute to the stability of the financial system in accordance with the Financial Market Supervision Act (FMA Act, Art. 4).

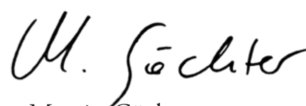
Financial stability can be defined in many ways. Most importantly, financial stability is a necessary condition for the efficient allocation of resources in an economy, the management of risks and the absorption of shocks. The stability of the financial system also ensures access to finance and credit for households and businesses both during booms and recessions and even in the case of severe macroeconomic shocks. While this report covers Liechtenstein's whole financial sector, it particularly focuses on the banking sector, as empirical evidence from previous crises suggests that financial stability goes hand in hand with a stable banking sector.

This year's Financial Stability Report puts a special focus on the implications of the COVID-19 pandemic. As a small and open economy, Liechtenstein was strongly affected by the global economic downturn, with plummeting export activity at the start of global recession. However the Liechtenstein economy in general and the financial sector more specifically have shown remarkable resilience in this highly challenging environment. Similar to earlier global downturns, the strength of the domestic labor market has not only supported the economic recovery, but also had a stabilizing effect on the financial sector. The financial sector strongly benefited from high capital and liquidity buffers during the crisis, contributing to strong confidence among clients and further supporting Liechtenstein's reputation as a stable financial center.

Overall, our analysis concludes that Liechtenstein's financial sector is sound and stable. Nevertheless, macroprudential policy must remain vigilant in face of some recent global and domestic developments. At the global level, the low interest rate environment, increasing inflation rates and stretched valuations both in stock and bond markets may be associated with increasing challenges for financial intermediaries going forward. From a domestic perspective, the high indebtedness of private households in light of increasing mortgage debt deserves closer attention.

The current policy framework – with regular meetings and discussions in the Financial Stability Council – has turned out to be very helpful to tackle remaining policy issues, as it has also facilitated the cooperation and exchange among responsible institutions. In light of the large role of the financial sector and its significance for the economy as a whole, a regular and careful analysis of the various risk factors is indispensable to be able to react in a timely manner if deemed necessary.

Mario Gassner
Chief Executive Officer



Martin Gächter
Head of Financial Stability/Macroprudential Supervision

EXECUTIVE SUMMARY

Main findings

Overall, the financial stability outlook has improved since last year's Financial Stability Report. The faster than expected economic recovery over the past few months has led to a brighter outlook in the real economy which is associated with lower risks of widespread defaults in the non-financial sector. As a result, near-term vulnerabilities have also decreased for the financial sector, with profitability indicators in European banking sectors mostly back at pre-crisis levels. Nevertheless, the financial stability outlook remains highly uncertain, as it strongly depends on the future development of the COVID-19 pandemic and indicators have recently pointed to a weakening global recovery.

While Liechtenstein's GDP declined sharply at the beginning of the COVID-19 pandemic, the economy has recovered faster and more strongly relative to other countries. While Liechtenstein's GDP is normally characterized by higher volatility compared to larger economies, the sharp recession during the global pandemic was a remarkable exception. The quick rebound in external demand, on the back of the strong recovery in global trade starting in the second half of 2020, was particularly important for Liechtenstein, not only because of the small size of the economy and the minor role of domestic demand, but also because the industrial sector is by far the largest one in the economy. As a result, and contrary to most European economies, Liechtenstein's GDP has recovered to pre-crisis levels already in the first quarter of 2021. Once again, Liechtenstein's economy has shown high resilience to the severe global shock, also due to some crucial structural characteristics, including an extremely resilient labor market.

Despite the brightening economic outlook since the start of the year, the pandemic leaves behind a legacy of longer-term vulnerabilities amid significant debt accumulation. Far higher debt levels across sectors – non-financial corporations, households and sovereigns – will require robust economic growth as well as loose financial conditions to remain sustainable. In the current environment, both the economic outlook as well as the near-term path of monetary policy among major central banks are fraught with high uncertainty. In particular, the high inflation pressure, especially in the US, and the increasing tail-risk of those inflation pressures turning out not to be transitory, imply that debt sustainability across countries and sectors may become a pressing issue earlier than currently expected by financial markets. In particular, a sharp rise in financing costs amidst lower than expected economic growth could put sovereign debt dynamics on an unfavorable trajectory, and may trigger renewed concerns of debt sustainability among highly indebted sovereigns.

In light of significant inflation pressures, a further tightening of monetary policy seems likely, particularly in the United States. In the US, a tapering of monthly asset purchases in the near future seems likely in light of a strong recovery and headline inflation rates substantially exceeding the Fed's target. While monetary policy in the euro area as well as in the Swiss franc currency area is expected to remain more accommodative, as price pressures are more muted than in the US, a tightening of US monetary policy may have global implications. A repricing in the US bond market, similar to the developments in 2013 during the "taper tantrum", could be associated with a repricing of risks across the globe, with significant consequences not only for financial markets, but also for the real economy.

Financial markets are vulnerable to repricing if global liquidity conditions change. Increased risk taking in recent months in an environment of extremely low risk-free interest rates has increased medium-term vulnerabilities in both bond and equity markets. The continued search for yield is associated with higher financial asset prices, raising overvaluation concerns despite the strong economic recovery and a strong rebound in corporate earnings. Low real yields and elevated valuations imply a risk of sharp asset price corrections in both equity and bond markets which appear to be vulnerable to both interest rate and growth shocks. Vulnerabilities could materialize in case of tighter financial conditions (e.g. a change in market expectations regarding future monetary policy), a premature withdrawal of government support to the corporate sector, and a re-intensification of the spread of the pandemic.

Imbalances in real estate markets have also increased across European countries. Favorable lending conditions, excess savings accumulated during the pandemic, and a possible change in preferences due to the desire for more space as people work from home are fueling demand for residential real estate. In contrast, the housing supply remains limited despite the recovery in residential construction, leading to sharply increasing house prices across European countries. Recent developments therefore imply risks of property price corrections in some of the countries, which would be associated with adverse effects on the respective economies. While there are no price indices available for the domestic market, increasing imbalances – in line with surrounding countries – can also not be ruled out in Liechtenstein, necessitating a regular monitoring of the market in the near future.

While the overall debt level in Liechtenstein's economy remains low, high household indebtedness has become a structural feature of Liechtenstein's economy. Contrary to other countries, household indebtedness in Liechtenstein and Switzerland has continued its upward trend after the global financial crisis. Negative base rates in recent years implied strong incentives for households to take up credit or to abstain from amortizations. In this context, the FMA has conducted an in-depth risk analysis on vulnerabilities in Liechtenstein's real estate and mortgage market based on a new granular data set at the household level. While the analysis concludes that risks are rather limited in the short run, additional measures are deemed sensible to address the risks in the medium term.

The COVID-19 pandemic has reinforced the challenges to business models of banks, insurers and pension schemes. While banks' equity price valuations in Europe are back to pre-pandemic levels, reflecting a recovery in bank profitability outlooks, many structural issues remain. In general, profitability across European banking sectors remains subdued in light of the low interest rate environment, elevated cost-to-income ratios and an expected deterioration in asset quality. Depressed risk premia also led to loosening credit standards and rising levels of debt among high-yield borrowers. In Europe, nonbanks continue to absorb the bulk of the record-high issuance in high-yield bonds, leading to substantial credit risks and high duration exposures in the non-banking sector. As a result, investment funds' portfolios are vulnerable to interest rate shocks, and low liquidity buffers may force funds to liquidate assets to meet investor redemptions in stress periods, with such procyclical behavior potentially amplify-

ing financial market shocks. In general, while Liechtenstein's banking and insurance sectors are less vulnerable to the low interest rate environment than their peers in other European countries, the global pandemic and its implications are nevertheless associated with increasing challenges in terms of profitability for the years ahead.

Banks' profitability has remained stable during the COVID-19 pandemic and continues to benefit from strong growth in foreign markets. Remarkably, and contrary to banks in the euro area and the United States, the decline in profitability in Liechtenstein's banking sector during 2020 was limited. Instead, the banking sector continued its growth path, reaching new record levels in terms of assets under management (AuM) in June 2021. The significant increase over the past year is partly due to positive market developments, but it is also supported by substantial new net money inflows, with the increase mainly driven by foreign subsidiaries. Despite the strong growth in AuM as well as banks' balance sheets, the banking sector increased its capitalization level, with the CET1 ratio standing at 22.3% in June 2021. The banking sector has once again benefited from strong capital and liquidity indicators during the crisis, as perceived stability, high reputation and trust among clients fostered new net money inflows and the increase in business volumes. The low interest rate environment and increasing financial market risks will nevertheless be associated with significant challenges for the banking sector in terms of profitability in the next few years. Against this background, an improvement in terms of efficiency is particularly important to keep administration costs in check, thus, supporting profitability in the medium to long term.

Climate change will also play an increasingly important role in the years to come. Floods in central and northern Europe and wildfires across southern Europe during the last months are expected to have been significant loss events, with the frequency and intensity of extreme weather events increasing over the last few years. While Liechtenstein's non-life insurance sector was less affected so far, these occurrences point to a changing environment characterized by higher risks of large loss events. In this context, it is important that insurance undertakings remain ahead of the curve by developing concepts how to explicitly consider the impact of climate change on their respective business models, also to make sure that combined ratios remain at sustainable levels. Physical and transition risks relating to climate change will be increasingly relevant for financial stability assessments, both for the banking and the non-banking sector. Precautions in this direction are even more important against the background of the low-yield environment, although the Liechtenstein insurance sector is less affected than their peers in other countries, thanks to a large share of unit-linked life insurances where the risk of the investment remains with the policy holder.

Financial intermediaries have to brace themselves for cyber incidents, making sure that business continuity is guaranteed even in the case of a cyber-attack. According to recent data, significant cyber incidents are on the rise among banks in the euro area. Cyber attacks can lead to widespread interruptions in operations, which could turn out as catastrophic when occuring in the financial sector. Cyber incidents therefore pose a systemic risk to the financial system with the potential to disrupt critical financial services and operations. Due to the pan-

demic, vulnerabilities of financial infrastructure to cyber incidents may have increased, also in light of the rise in teleworking, and financial intermediaries have to make sure that business continuity is guaranteed even in the case of a severe cyber-attack.

Strengthening international cooperation and compliance with international and European standards in financial market regulation remains crucial. Although the regulatory pressure is challenging both for financial intermediaries and national regulators, the implementation of international standards is without any alternative, particularly for small and open economies with a large financial sector. Thus, being part of a transparent international regulatory framework, such as the European Economic Area (EEA), plays a key role to ensure legal certainty, international integration and market access for Liechtenstein's financial intermediaries. In this context, a further deepening of the collaboration with relevant European authorities and the implementation of the relevant European Systemic Risk Board (ESRB) recommendations is important. The implementation of relevant international standards, not only in the banking, but also in the non-bank financial sector, is crucial to mitigate reputation risks and associated spill-over effects within the financial sector. In this context, the FMA also explicitly welcomes the initiative by the government to consider a membership in the International Monetary Fund (IMF).

Macroprudential authorities have continued their ambitious work program in the past year. In light of the large financial sector and its significance for the economy as a whole, macroprudential supervision and policy plays a key role in Liechtenstein. In absence of a national central bank, ensuring financial stability is legally defined as part of the FMA's mandate. Based on the findings of the FMA's financial stability analyses and the subsequent discussion among relevant authorities, the FSC proposes and publishes macroprudential measures, recommendations and warnings. In the context of the implementation of the CRD V/CRR II package in Liechtenstein, the FSC has proposed a comprehensive recalibration of the capital buffer framework for the banking sector. In particular, a sectoral systemic risk buffer (SyRB) focusing on exposures to the domestic real estate sector will lead to slightly higher capital buffer requirements in the whole banking sector. Besides that, the intensive work on various ESRB recommendations has continued, with the implementation of the recommendation focusing on "closing real estate data gaps" (ESRB/2016/1) having the potential to significantly improve the risk monitoring framework going forward. As intended, the creation of the FSC in 2019 has considerably strengthened the collaboration between the FMA and the Ministry of Finance on financial stability issues, with the regular exchange of views on current systemic risks promoting financial stability in Liechtenstein.

Recommendations

Even though the global economy has shown a strong recovery since the start of the year, the COVID-19 pandemic is associated with increased vulnerabilities in the longer term. Debt levels have increased sharply across sectors and countries since the start of the economic downturn in March 2020, and uncertainty remains high in an environment of slowing growth and increasing inflationary pressures. Against this background, the FMA recommends to financial intermediaries in the whole financial sector to mitigate the associated risks, particularly by focusing on the following measures:

– The whole financial sector should focus on maintaining a well-developed risk management framework amidst high financial market and policy uncertainty with regard to increasing interest rate and inflation risks;

– Financial intermediaries should closely monitor financial innovations that could possibly become relevant to their business models, such as crypto assets, and adapt their business strategy accordingly if deemed necessary;

– Market participants should carefully analyze threats from potential cyber incidents and develop mitigation strategies to address the associated cyber risks to guarantee business continuity;

– Financial intermediaries are advised to further develop and implement strategies to deal with the structural challenges of digitalization and climate change;

– All financial intermediaries are advised to further improve and enhance the quality of reporting data in line with European regulation.

Despite high capital and liquidity ratios, the COVID-19 pandemic has reinforced challenges of domestic banks' business models. Liechtenstein banks, particularly the smaller institutions, are facing increasing profitability and efficiency pressures resulting from the "lower for longer" interest rate environment and mounting regulatory pressure. In addition, growing imbalances in the residential real estate sector cannot be ruled out in Liechtenstein in light of high and still rising household indebtedness. Therefore, given the identified risks in an environment characterized by high and persistent uncertainty, both regarding the further course of the COVID-19 pandemic as well as its effects on the banking sector, the FMA recommends to banks to take the following actions:

– Focus on maintaining a solid capital base by ensuring cautious dividend distributions and limiting share buybacks and other pay-outs which are associated with lower capital ratios;

– Apply sustainable lending standards, in particular for real estate lending;

– Focus on borrowers' solvency, specifically after the termination of COVID-19-related fiscal support measures, such as loan guarantees;

– Address the issue of cost inefficiencies in light of the currently difficult circumstances, increasing competition and the low interest rate environment, to safeguard banks' profitability in the longer term;

– Enhance the understanding for possible dependencies from critical financial market infrastructure and consider possible alternatives in the respective business continuity plans.

While the non-bank financial sector stands on a stable footing, it also faces persistent challenges arising from elevated financial market risks, the low interest rate environment, cyber incidents as well as climate-related risks. The insurance sector is facing increasing challenges in terms of profitability, while climate-related costs resulting from large loss events will also play a central role in the coming years. Moreover, investment funds' portfolios are prone to growing inflation and interest rate risks, while investor redemptions in times of stress could potentially be harmful in light of low liquidity buffers. As for pension funds, elevated financial market risks associated with the low interest rate environment, combined with challenges from demographic dynamics related to an aging society have to be taken into account. Against this background, the FMA recommends to financial intermediaries, and in particular to non-banks, to take the following measures:

– Insurances should aim at maintaining a reasonable level of profitability while refraining from increased risk taking in view of the low interest rate environment;

– The insurance sector should provision adequately for climate-related losses by explicitly considering the impact of climate change on their business models;

– In determining the respective technical interest rates and conversion rates, pension funds should ensure sustainable coverage ratios also in the medium and long term by explicitly considering both elevated financial market risks and changes in demographic dynamics;

– Investment funds are advised to further build up liquidity buffers to be able to fulfill client's redemption needs even in the case of significant market movements, such as sharp drops in asset prices and high levels of market volatility.

The large size of the domestic financial sector and its important contribution to the economy as a whole requires a strong macroprudential supervision and policy framework in Liechtenstein. As explained in the following report, systemic risks in Liechtenstein's financial sector have remained relatively low, and the comprehensive macroprudential supervision and policy framework in Liechtenstein has turned out to be very helpful during the crisis to ensure a coordinated policy response across authorities. Nonetheless, safeguarding financial stability always remains work in progress, and some important issues are still to be addressed by policy-makers. Hence, also in light of identified vulnerabilities, the FMA recommends to relevant macroprudential authorities in Liechtenstein to take the following measures:

– Continue the intense and ambitious work program of the Financial Stability Council (FSC) by continuing the well-working cooperation among all relevant authorities. By further enhancing the systemic risk identification and mitigation framework, financial stability at the national level can also be safeguarded in the medium and long term;

– Address the identified medium-term vulnerabilities related to the high household indebtedness by:

  - improving data availability with respect to banks' lending standards (particularly in the framework of the newly implemented ESRB recommendation ESRB/2016/14) to ensure an effective monitoring of risks arising from the residential real estate sector;
  - promoting risk awareness among borrowers and lenders and enhancing sustainable lending standards in close collaboration with the domestic banking association;
  - considering to strengthen borrower-based macroprudential instruments, particularly with regard to income-based instruments.
- Keep up the successful and ambitious path of implementing relevant ESRB recommendations in Liechtenstein;
- Step up the efforts in the field of bank resolution by finalizing resolution plans to ensure planning certainty for the banking sector and, in particular, for systemically important institutions;
- Continue the monitoring of financial stability implications of the COVID-19-related developments, as associated risks could potentially be reinforced by the termination of fiscal support measures;
- Consider the risks arising from the low interest rate environment to the financial sector and propose additional risk-mitigating measures in case of a prolonged period of ultra-low interest rates if deemed necessary;
- Establish a comprehensive systemic risk framework also in the non-bank financial sector in light of regulatory plans to extend the macroprudential policy toolkit towards the non-bank financial sector;
- Actively support the preparations of the government regarding its initiative to consider a membership in the International Monetary Fund (IMF);
- Further develop stress testing approaches by simulating various stress scenarios focusing on different shocks and risk categories;
- Further strengthen cooperation and compliance with international and European authorities and standards in financial market regulation;
- Map the dependencies of the financial sector from the financial market infrastructure, also from a cross-border perspective, and analyze the associated risks.

MACROECONOMIC ENVIRONMENT AND FINANCIAL MARKET DEVELOPMENTS

International environment

While the economic recovery has gathered pace in the last few quarters, the outlook is still characterized by high uncertainty. Increasing vaccination levels and looser containment measures have led to a rebound in economic activity in recent quarters. While Europe is still lagging behind the United States (US) in terms of its economic recovery, growth in the second quarter of 2021 has picked up both in the euro area (+2.0% q-o-q) as well as in Switzerland (+1.8%). Nevertheless, and contrary to the US, European economies have not yet reached pre-crisis levels in terms of GDP (Figure 1). Instead, Liechtenstein has reached its pre-crisis level of GDP already in the first quarter of 2021, according to calculations by the Liechtenstein Institute, as the economy benefited from a strong recovery in global trade, and thus, external demand.

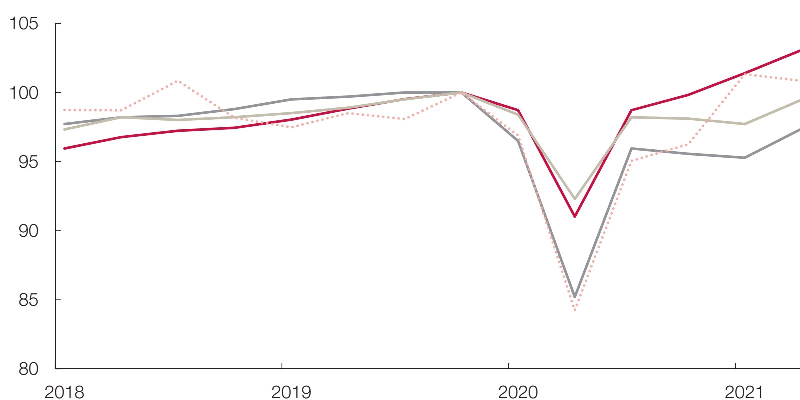


Figure 1
Real GDP
(index, 2019 Q4 = 100)
Sources: National sources, Bloomberg.

The brighter economic outlook in recent quarters is associated with declining vulnerabilities in the real economy and increasing corporate profits, also leading to lower systemic risk in the financial sector across countries. At the same time, the recovery is still dependent on continued monetary and fiscal policy support measures, and uncertainty remains elevated in light of increasing new infections in recent months on account of new virus variants. So far, amidst increasing vaccination rates, hospitalizations have remained at contained levels in major economies, thereby reducing the need to impose further restrictions. Nevertheless, the recovery remains uneven across countries and sectors, and corporate debt levels have increased most strongly among companies characterized by high pre-crisis debt levels and low profitability, further adding to uncertainties going forward.

Early indicators and global merchandise trade numbers point to a weakening of the global recovery. Current projections suggest a strong recovery for the second half of 2021, with the euro area economy already exceeding pre-crisis levels of GDP by the end of the year, significantly earlier than forecasted at the start of the year. Nevertheless, short-term indicators point to a more uncertain development of the global recovery. For instance, global Purchasing Manager Indices (PMI) have declined substantially from their high levels in May, albeit remaining significantly above the positive growth-threshold of 50. While this drop is also due to technical reasons and

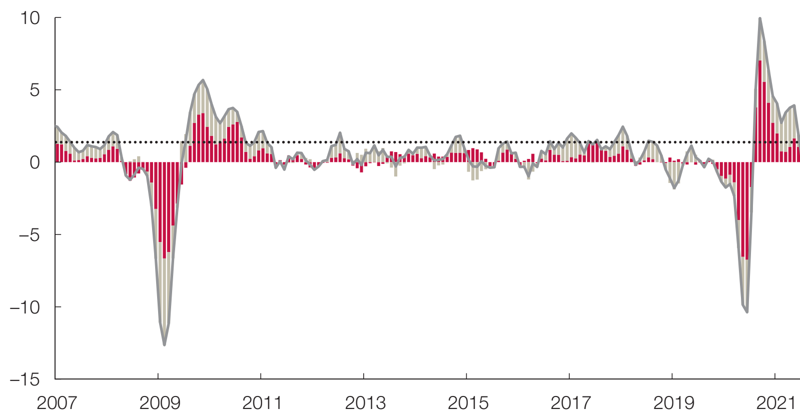


Figure 2
Global merchandise trade (3m-o-3m global import growth in percent)
Sources: CPB Netherlands.
Contributions in percentage points.

can at least partly be explained by the definition of the index, it cannot be ruled out that the developments sound the bell for weakening growth rates, as the catch-up effects are levelling off and the global economy is also struggling against supply bottlenecks in the industrial sector. Against this backdrop, global trade activity has weakened substantially since the start of the summer, with global merchandise import growth falling back into negative territory in July and August (Figure 2). Supply bottlenecks are both due to shortness of supplies in certain raw materials or components (e.g. semiconductors), as well as in transport capacities, which can also be observed by reference to the significant rise in the Baltic Dry Index, an important measure of demand for shipping capacity versus the supply of dry bulk carriers, since the beginning of the year.

Labor markets have recovered significantly since last year. At the start of the pandemic, labor markets were particularly affected, with rocketing unemployment rates in the US, and to a lesser extent – thanks to functioning short-term working schemes – also in Europe. Unemployment rates increased tempo-

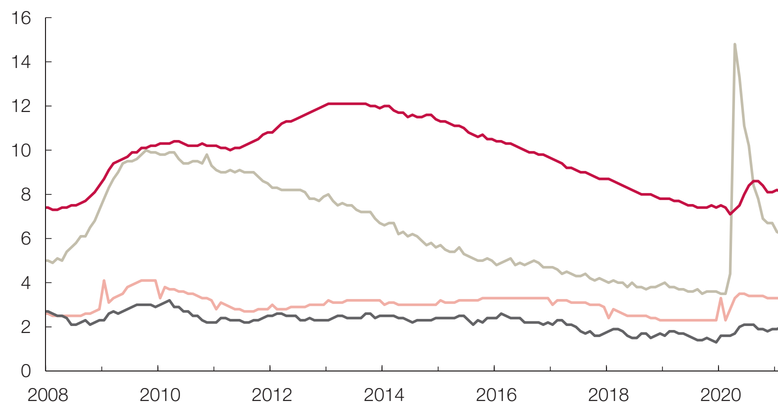


Figure 3
Unemployment rates (percent)
Sources: National sources, Bloomberg.

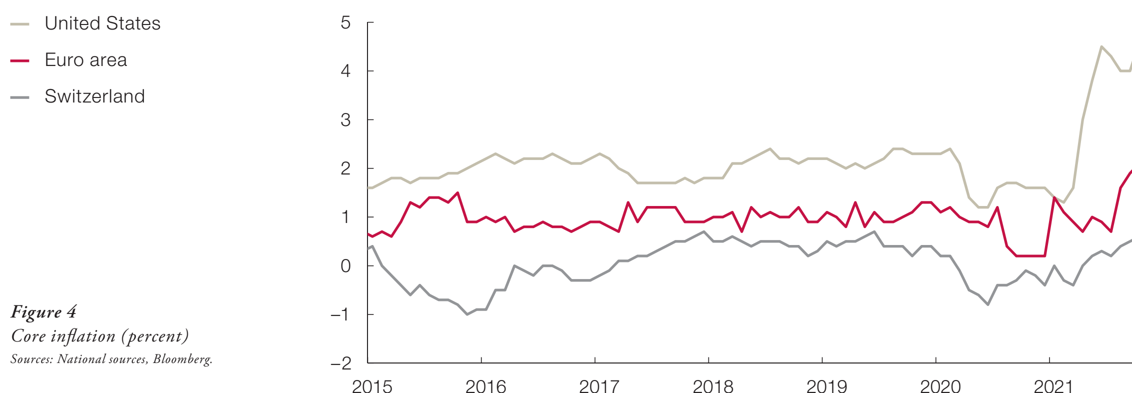


Figure 4
Core inflation (percent)
Sources: National sources, Bloomberg.

rarily to 14.8% in the US and 8.6% in the euro area. In Switzerland (3.1%) and Liechtenstein (2.1%), on the contrary, the increase in unemployment rates was relatively limited. Since then, labor markets have recovered substantially, with current levels in the US and the euro area not far away from levels prior to the crisis. The resilience of European labor markets, both in the euro area and in Switzerland as well as Liechtenstein, is also due to well-designed fiscal policy measures, which safeguarded jobs during the heights of the pandemic, particularly with comprehensive short-time working arrangements.

Inflation pressures have significantly increased in the last few months, particularly in the US. In light of strong base effects of higher energy prices, headline inflation rates in the US have reached levels last seen in the early 1990s. Annual inflation, as measured by the consumer price index (CPI), increased to 5.0% in May, and has remained above this threshold ever since, amounting to 6.2% in October. Price dynamics in the euro area and in Switzerland have remained more muted, with a limited increase to 4.1% (euro area) and 1.2% (Switzerland) in October. The difference between the two sides of the Atlantic becomes even more obvious when considering underlying inflation pressures, as measured by core inflation. Core inflation excludes volatile price components such as energy and food prices. As shown in Figure 4, the increase in core inflation in the euro area (2.1% in October) and Switzerland (0.6%) is less pronounced, hardly exceeding pre-crisis levels. In the United States, however, core inflation rates have remained elevated since the strong increases beginning in April and amounted to 4.6% in October. Recent developments have raised questions about the temporary nature of the inflation increase, particularly in the US economy. Further developments crucially depend on inflation expectations and future wage increases, which could possibly trigger a sustained wage-price spiral, in turn, leading to persistently higher inflation rates. Such a tail risk scenario would be associated with increasing vulnerabilities both in the real economy and financial markets, as a tightening of monetary policy would become more likely, leading to higher risk premia, lower investment activities and corrections in both equity and bond markets.

BOX 1

Liechtenstein's economic recovery from the COVID-19 pandemic

The COVID-19 pandemic and the containment measures put in place were associated with a sharp decline of economic activity worldwide and resulted in the sharpest recession since World War II. Even though the world economy has experienced pronounced rebound effects in the second half of 2020, real global GDP featured the lowest annual growth rate since the beginning of the World Bank data series in 1961. The world economy contracted by –3.6% in 2020, compared to a decrease of –1.7% in 2009, at the peak of the global financial crisis. The simultaneous occurrence of shocks both on the demand and the supply side is a specific feature of the COVID-19 crisis and distinguishes the recession 2020 from other historic recessions (see Brunhart, Gächter and Geiger 2020). Yet, the negative supply effects have turned out to be less pronounced compared to the demand side effects in the first wave of the pandemic, while supply shortages have dominated in the economic recovery phase.

Figure B1.1
Real GDP
(annual growth rates in percent)
Sources: Office of Statistics, Liechtenstein Institute, SECO, OECD.

The decline of Liechtenstein's real GDP in 2020 was less severe than during the global financial crisis. The flash estimate of Liechtenstein's real GDP in 2020, based on latest data vintages, suggests a decline by –5.5% relative to the previous year (Brunhart and Geiger 2020), which is comparable to the recession in 1975 in the wake of the first oil shock (1975: –6.3%), while GDP growth was considerably more affected during the global financial crisis (GFC, 2009: –11.3%), as evident in Figure B1.1.

In contrast to other severe international recessions, Liechtenstein's COVID-19 related drop in economic activity was comparable to the macroeconomic shock in other countries. Real GDP growth volatility in Liechtenstein is very high compared to larger economies (more than twice as high as in the surrounding countries), as shown in Figure B1.1. The reasons for this structural difference to other (larger) countries are manifold, as explained in the Financial Stability Report 2019 (p. 19). Given this characteristic,

BOX 1

Figure B1.2
Liechtenstein's real GDP (CHF million)
Source: Liechtenstein Institute.
Figures are seasonally and calendar adjusted.

it is surprising that Liechtenstein's GDP decline in 2020 was not more pronounced than in its larger neighboring countries or the OECD average. In a similar vein, the fact that the pandemic shock in Liechtenstein was significantly weaker than during the GFC in 2008/09 – this observation also holds for important aggregates other than GDP – is remarkable.

Some important structural factors have contributed to the remarkable resilience of the economy during the pandemic. One important factor why very small economies like Liechtenstein typically exhibit higher economic volatility is the small domestic market, i.e. domestic demand cannot act as a buffer against international shocks. During the current pandemic, however, this stabilizing feature of larger domestic markets could not take effect, because the pandemic has not only affected international trade, but also domestic demand through uncertainty on the one hand, and through strict containment measures on the other. As a result, even larger countries, which benefited from strong domestic demand in other recessions, experienced a dramatic drop in output. To put it differently, larger economies for once were hit by a recession in a way that smaller countries usually are. Furthermore, Liechtenstein's financial sector, with its high relevance for employment and GDP, has been very stable during the pandemic (in sharp contrast to the GFC in 2008/09). Finally, the sectors that were hit hardest by the containment measures, i.e. retail, hospitality, tourism or the cultural/entertainment sector, have a relatively low contribution to Liechtenstein's GDP in comparison to other countries.

To obtain a detailed view on the dynamics of the pandemic, quarterly GDP figures have to be estimated for Liechtenstein. Official GDP figures for Liechtenstein are currently available up to 2019, and only in annual and nominal form. Quarterly numbers as well as the most current annual GDP figures therefore have to be estimated. This is done by applying a temporal disaggregation method following a variant of Chow and Lin (1971), which estimates a regression relation between Liechtenstein's annual GDP and economic variables that are available on a sub-annual basis and highly correlated with annual GDP (for methodological explanations see Brunhart 2020). Using this regression relation, and by taking into account the annual aggregation constraint (quarters must sum up to the annual GDP

BOX 1

— Liechtenstein
— Switzerland
— Austria
— Germany
— OECD

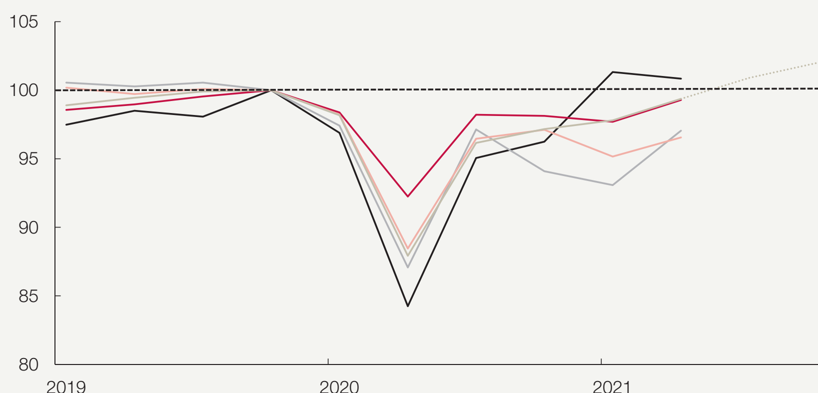


Figure B1.3
Real GDP (index, 2019 Q4 = 100)
Sources: Liechtenstein Institute, SECO, OECD. Figures are seasonally adjusted, 2021 Q3 and 2021 Q4 are OECD forecasts.

benchmark), the sub-annual GDP dynamic is being estimated for the years 1998 to 2019. The model also allows us to extrapolate quarterly numbers for the years 2020 and 2021, where the official annual GDP benchmark is not yet available. Annual real GDP along with the estimated quarterly figures are presented in Figure B1.2. The annual GDP of 2020 is estimated as a sum of the estimated quarterly figures of the same year.

Liechtenstein experienced a strong economic recovery in the second half of 2020, which has continued so far in the first half of 2021. A broad range of indicators, including export/import data, the business cycle indicator "KonSens", other relevant economic indicators and the quarterly GDP estimates indicate a fast and broad recovery in Liechtenstein from the deep recession of the first two quarters of 2020 (with estimated quarterly seasonally-adjusted real GDP growth rates of –3.1% and –13.1%). According to the GDP estimates, Liechtenstein has reached the pre-crisis level of the fourth quarter 2019 already in the first quarter of 2021, which is earlier than in the neighboring countries shown in Figure B1.3, as those countries still lack behind the pre-crisis level in mid-2021. The seasonally-adjusted real GDP growth rates are estimated at +12.8% (third quarter 2020, Q3-2020), +1.3% (Q4-2020), +5.3% (Q1-2021) and –0.5% (Q2-2021). The supply side measures imposed by Liechtenstein's government (particularly the short-time work scheme), the expansive monetary policy by the Swiss National Bank (SNB) and foreign fiscal policy supported the Liechtenstein economy in mitigating the pandemic induced shocks and enabling a quick recovery (see Brunhart and Geiger 2020). Furthermore, the stable labor market (see Box 2) and the export industry's high sensitivity to the international business cycle (Geiger and Hasler 2021) are two further important driving factors behind Liechtenstein's faster recovery.

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Economic developments in Liechtenstein

In contrast to most other economies, the drop in Liechtenstein's GDP during the COVID-19 pandemic was less severe than during the global financial crisis. According to calculations by the Liechtenstein Institute, Liechtenstein's GDP declined by –5.5% in 2020, much less than during the global financial crisis, when GDP collapsed by more than 11%. As explained in detail in Box 1, the relatively good performance of Liechtenstein's economy during the COVID-19 pandemic is due to various factors. Contrary to other recessions, due to the restrictive containment measures, even large economies were not able to offset the external shock by stable domestic demand. While fiscal support measures had a lower volume in Liechtenstein compared to other countries (amounting to approx. 2% of GDP), short-term working arrangements were very successful in supporting the labor market, and thereby also stabilized the economy as a whole.

Figure 5
KonSens – a cyclical indicator for Liechtenstein (index)
Source: Liechtenstein Institute.

Cyclical indicators point to a strong recovery of economic activity. The KonSens, a quarterly, coincident composite indicator for Liechtenstein's business cycle, rebounded significantly from an all-time-low of –4.5 in the second quarter of 2020, despite some recent weekening in the third quarter of 2021 (Figure 5). Since the indicator abstracts from the long-run growth trend, it can be interpreted as a cyclical indicator signaling whether growth is above or below average relative to the historical time series. Business sentiment has also recovered substantially, returning to pre-crisis levels in the second quarter. In line with early indicators, a backcast of quarterly GDP numbers – as official GDP data are only available in annual terms and the current time series ends in 2019 – by the Liechtenstein Institute suggests that the domestic economy has reached its pre-crisis level already in the first quarter of 2021, significantly earlier than most other European economies (see also Box 1). Current data therefore suggests that Liechtenstein was not only less affected by the global recession during the COVID-19 pandemic, than during the global financial crisis, but it has also recovered more strongly since its cyclical trough in the second quarter of 2020 relative to other economies.

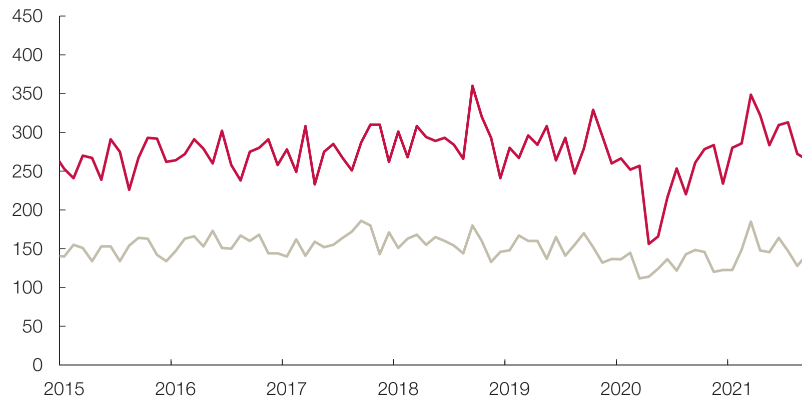

Figure 6
Merchandise trade in Liechtenstein (CHF million)
Source: Office of Statistics.

While merchandise exports were severely hit during the first wave in early 2020, Liechtenstein's economy has benefited from a strong recovery in external demand since the second half of 2020. While global trade plummeted in the first of half 2020, the industrial sector – and thus, global trade activity – was less affected than the services sector by the second and third waves of the pandemic during the winter months of 2020/21. Good exports have recovered quickly in the second half of 2020, and available numbers for the first few months in 2021 point to strong export demand, even suggesting certain catch-up effects (Figure 6). The quick rebound in external demand is particularly important for Liechtenstein, not only because of the small size of the economy and the associated minor role of domestic demand, but also because the industrial sector is by far the most important one in the economy, contributing about 42% to GDP (i.e. about twice as much as the financial sector).

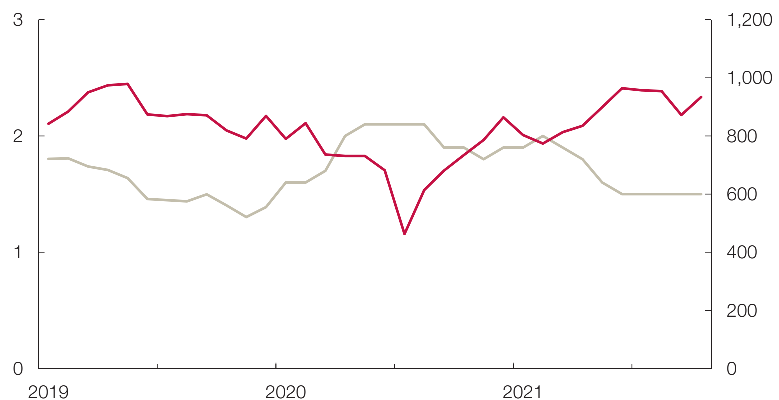

Figure 7
Liechtenstein's labor market (percent; number of vacancies)
Sources: Office of Statistics, AMS.

Once again, Liechtenstein's labor market showed its remarkable resilience in economic downturns during the recent global recession. Thanks to a highly competitive economy, total employment (40,328 employees at end-2020) exceeds the number of inhabitants (39,055) in Liechtenstein. More than half of employees are commuters, mostly living in Switzerland and Austria. Liechtenstein's labor market is highly resilient, with unemployment rates and employment growth hardly related to the business cycle. Contrary to GDP, which is highly volatile compared to other countries[1], the labor market is characterized by a remarkable resilience, even in crisis times. This general observation was once again confirmed in the COVID-19-related recession in 2020. The unemployment rate only increased marginally to 2.1%, before quickly falling back to pre-crisis levels, amounting to 1.5% in October (Figure 7). In a similar vein, job vacancies rebounded sharply after an initial downturn in the first wave of the pandemic, and returned to pre-crisis levels already by the end of last year. One plausible explanation for the stabilizing role of the labor market over the business cycle is the structural shortage of skilled labor in a highly competitive economy, as explained in detail in Box 2. The tight labor market may also explain the high innovation capacity of Liechtenstein's corporate sector. According to a recent analysis by the World Economic Forum[2], while technological progress naturally fuels productivity growth, tight labor markets function as a catalyst to put new technology at work, as firms typically need to make better use of technology when hiring new employees is not possible. In this context, Liechtenstein's economy stands out with its high expenditures for research and development (R&D), amounting to 5.6% of GDP, almost entirely by the private sector. As a result, the economy is also extraordinarily innovative, by far exceeding the number of new patent applications (per 1000 inhabitants) of other innovative countries like Switzerland or Sweden.

1 *For a detailed analysis of the underlying drivers of GDP volatility in Liechtenstein, see Box 1 in the Financial Stability Report 2019.*

2 *World Economic Forum (2021). The secret of productivity growth is not technology, https://www.weforum.org/agenda/2021/08/the-secret-of-productivity-growth-is-not-technology/.*

BOX 2

Okun's law and Liechtenstein's highly resilient labor market[3]

Against the backdrop of its highly competitive industrial and financial sectors, Liechtenstein's economy has been characterized by high and increasing labor demand, by far exceeding domestic labor supply. The economy thus heavily relies on commuters from abroad, most importantly from its neighboring countries Switzerland, Austria, and Germany. As a result of strong and relatively stable employment growth, total employment has exceeded the number of inhabitants since 2017. Another remarkable feature of Liechtenstein's labor market is the weak relationship between employment and economic activity, which is associated with a highly resilient labor market even in sharp economic downturns. Employment also remained relatively stable in the sharp recession caused by the global pandemic, with a decrease in full time equivalents of –0.8% in 2020 (compared to –1.8% in 2009 during the global financial crisis).

Generally, business cycle dynamics are important drivers of employment, an empirical observation often referred to as "Okun's Law". While employment typically decreases in recessions, additional workers are hired during boom periods. As Liechtenstein is characterized by a very volatile business cycle relative to other developed economies (see also Box 1 and the remarks in last year's Financial Stability Report), one could assume – also from the perspective of "Okun's Law", a basic macroeconomic concept (Okun, 1962) – that employment in Liechtenstein may also be subject to marked fluctuations. However, as explained in detail below, employment in Liechtenstein is largely unaffected by short-term changes in economic activity.

While there is a significant link between real GDP and employment in Switzerland and in EU countries, the two variables are virtually uncorrelated in Liechtenstein. Table B2.1 shows the standard deviations of employment and real GDP as well as the corresponding correlation coefficients for Liechtenstein, Switzerland and the EU average. In Liechtenstein, the standard deviation of real GDP is very high compared to Switzerland and the EU, indicating pronounced business cycle volatility. By contrast, the standard deviation of employment is of similar magnitude as in Switzerland and in the EU average. The dynamics of the two series are uncorrelated in Liechtenstein, while we observe a positive correlation in line with "Okun's law" for both Switzerland and the EU.

	Standard deviation		
	Real GDP	Employment	Correlation
Liechtenstein	3.3%	1.1%	–0.03
Switzerland	1.4%	0.6%	0.57
EU average	2.3%	1.6%	0.44

Table B2.1
Real GDP and employment
Sources: Office of Statistics, Federal Office of Statistics, SECO, Eurostat, Liechtenstein Institute.
Numbers are based on seasonally adjusted growth rates from 2005 to 2020.

3 *The box builds on Brunhart and Lehmann (2021).*

BOX 2

One explanation for the missing link between employment and the business cycle is a shortage of skilled labor. In addition to labor market regulations, the decoupling of the business cycle and employment can be explained by hiring costs associated with search frictions that tend to have increased over the last decades (Ball, Leigh and Loungani, 2017). Developed economies are characterized by a high degree of differentiation giving rise to highly specialized jobs. Skilled labor that meets the corresponding job requirements is often difficult to acquire, which gives rise to labor hoarding motives.

The Swiss Employment Barometer indicates that skilled labor is especially difficult to find in sectors such as metal or machinery industries, which are relatively large in Liechtenstein. Against this background, it is plausible that the decoupling between employment and business cycle dynamics progressed in a stronger manner and earlier in Liechtenstein compared to other advanced economies. Moreover, the fact that the number of residence permits is restricted in Liechtenstein is a further factor complicating the acquisition of skilled labor.

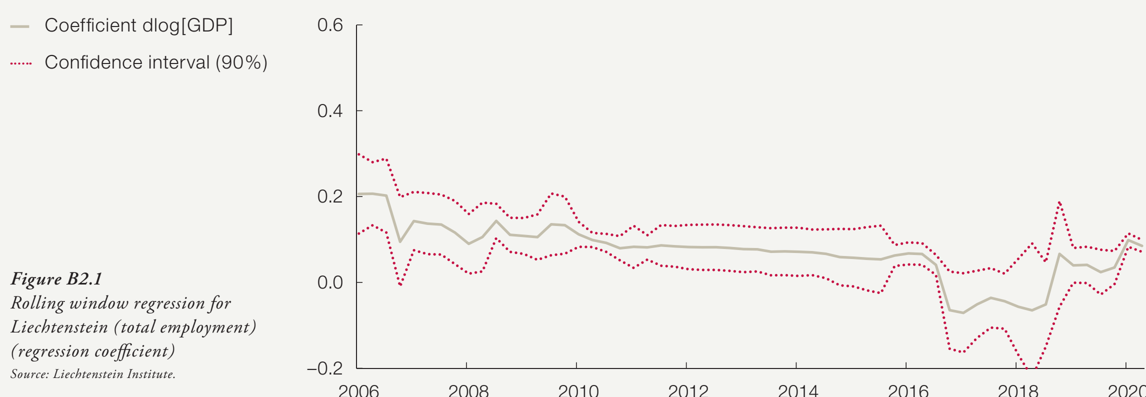

Figure B2.1
Rolling window regression for Liechtenstein (total employment) (regression coefficient)
Source: Liechtenstein Institute.

In Liechtenstein and Switzerland, employment dynamics have increasingly decoupled from the business cycle. In line with labor hoarding motives that become more relevant over time in light of increasing differentiation, the relationship between real GDP and employment has weakened considerably over the last two decades. Figures B2.1 and B2.2 show coefficients of real GDP on employment (both in log-differences) with the corresponding confidence intervals from 8-year rolling-window-estimations. Coefficients for Liechtenstein are shown in Figure B2.1, for Switzerland in Figure B2.2. The results illustrate how the partial effect of changes in GDP affect changes in employment (average of four consecutive quarters) over time. While the relationship is generally weaker in Liechtenstein compared to Switzerland, the effect of GDP changes on employment has diminished in both countries over the last few years.

A similar development can be observed for inward commuters, indicating that labor hoarding motives are active for both domestic employees and for commuters from abroad. Liechtenstein's economy is characterized by a very large share of commuters from abroad relative to total employment (approx. 56% of employees were inward commuters in 2019). Notably, it appears that the relationship between

BOX 2

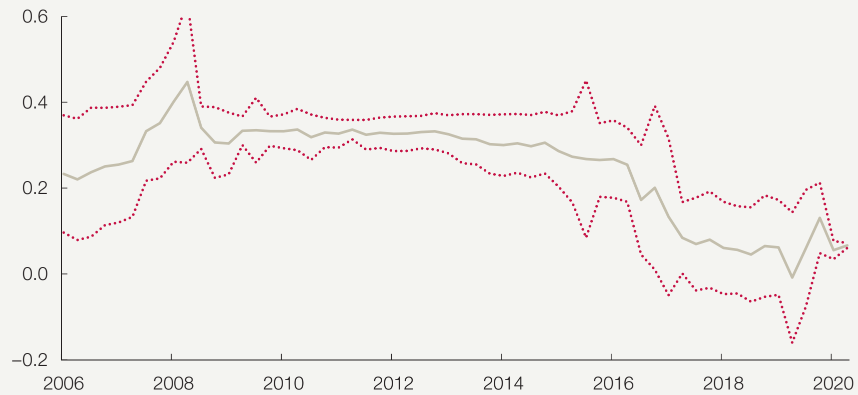

Figure B2.2
Rolling window regression for Switzerland (total employment) (regression coefficient)
Source: Liechtenstein Institute.

employment and GDP dynamics has converged for inward commuters compared to total employment, with very low elasticities of both total employment and the number of inward commuting employees to underlying GDP dynamics (see Figures B2.1 and B2.3). This indicates that labor hoarding motives are active for both domestic and foreign employees.

The highly resilient labor market is an important factor contributing to the high level of financial stability in Liechtenstein's economy. Business cycle theory suggests that real developments can be amplified through a financial acceleration mechanism. One important transmission channel in this respect is that business cycle downswings may lead to job losses that in turn affect borrowers' balance sheets. In case of stable employment, even in periods of high volatility in economic activity, the negative feedback loops between the real and financial sector is much weaker, enhancing financial stability. The highly resilient labor market is also an important factor in the context of the high indebtedness of private households in Liechtenstein, as stable labor income (and extremely low unemployment rates) are associated with a high level of creditworthiness among borrowers.

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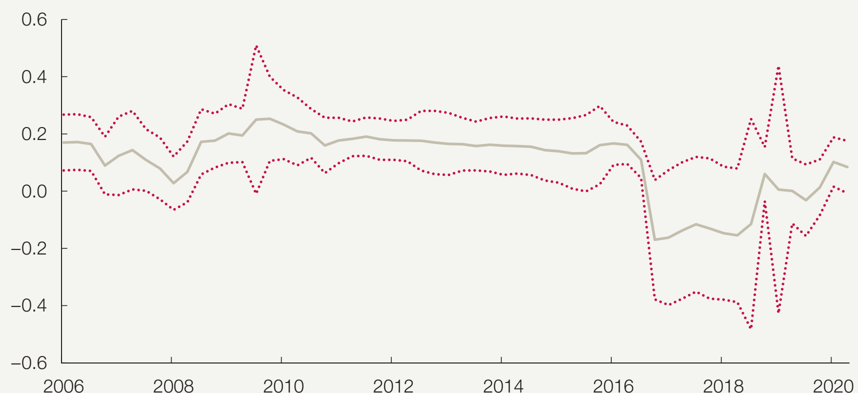

Figure B2.3
Rolling window regression for Liechtenstein (inward commuters) (regression coefficient)
Source: Liechtenstein Institute.

Structural characteristics of Liechtenstein's economy have crucially contributed to its strength during the global pandemic. Liechtenstein's resilience to global macroeconomic shocks, as observed over the last decades, results from important structural specifics of the economy. First, Liechtenstein's industrial and manufacturing sector is remarkably innovative, also in light of extremely high private spending on research and development, and includes highly successful niche players in global markets. In light of the small domestic market, companies are used to compete against global market leaders and have to remain flexible to adjust to new structural circumstances, also to keep step with the strong appreciation of the Swiss franc. Second, high equity ratios among non-financial corporations (NFC), due to respective tax incentives, as well as zero debt (and high financial reserves) in the public sector contribute to a high level of resilience of the economy. Third, the highly specialized economy benefits from its strong international integration, including full access to the European Single Market through its membership in the European Economic Area (EEA), as well as to Switzerland, based on its customs union with Switzerland since 1923. The currency union with Switzerland and the associated membership in the Swiss franc currency area also contributes significantly to the stability of both the financial sector and the economy as a whole. Finally, private wealth and incomes are very high, with Liechtenstein's Gross National Income (GNI) per capita being among the highest in the world. High incomes and wealth increase the resilience of private households and the economy, as temporary shocks can be better cushioned. Strong capital and liquidity indicators in the banking sector also support the economy's stability, as unexpected adverse developments can be absorbed by the financial sector without any negative implications for credit supply or financial stability.

A growth-at-risk analysis for Liechtenstein suggests a benign outlook for the next few quarters (Box 3). Various international institutions and central banks regularly publish growth-at-risk estimates to assess the likelihood of extreme events in economic growth. Since deteriorating financial conditions increase the likelihood of tail events, a key role of macroprudential policy is to prevent a sharp deterioration of financial conditions. Therefore, growth-at-risk is also an implicit measure of financial stability and systemic risk. Box 3 applies the growth-at-risk concept to Liechtenstein. The results suggest that downside risks to GDP growth in the next few quarters are relatively low in Liechtenstein, also in light of favorable financing conditions and a strong global recovery in economic activity.

BOX 3

Applying the growth-at-risk framework to the case of Liechtenstein

Recent research suggests a strong link between macro-financial conditions and future downside risks to economic growth. By estimating worst-case scenarios of future GDP growth, the concept to explicitly consider current financial conditions for assessing risks to economic activity was pioneered and popularized by the International Monetary Fund (IMF). While standard forecasts usually focus on the expected value of GDP growth, the growth-at-risk (GaR) concept – as originally introduced by Adrian et al. (2019, 2020) – puts a particular emphasis on the probability and magnitude of potential adverse outcomes. By using quantile regression methods, the GaR concept focuses on the downside risk implied by the conditional forecast through the estimation of a particular low quantile of the projected GDP growth rate distribution over a given time horizon.

The empirical growth-at-risk (GaR) approach has recently gained traction among policy-makers as an intuitive concept to quantify systemic risk. Various international institutions as well as central banks regularly publish GaR estimates to assess the likelihood of extreme events in economic growth. Since deteriorating financial conditions increase the likelihood of tail events, a key role of macroprudential policy is to prevent a sharp deterioration of financial conditions. Therefore, GaR is also an implicit measure of financial stability and systemic risk. This box applies the GaR concept to Liechtenstein and shows that – similar to other countries – high global financial market stress is associated with elevated levels of downside risks in Liechtenstein's economy.

Figure B3.1
Real GDP growth and global financial market stress (annualized growth in percent; index)
Sources: FMA, Office of Financial Research.

Figure B3.1 illustrates the empirical link between global financial market stress and GDP growth in Liechtenstein; negative spikes in annualized real GDP growth tend to coincide with high financial market stress. To further illustrate this non-linear relationship, Figure B3.2 shows the unconditional distribution of annual GDP growth for Liechtenstein. A striking feature – which is typical for small economies – is the large spread of the distribution as a result of high GDP volatility. Furthermore, the distribution is clearly non-normal and left-skewed, with a heavy and long tail on the left-hand side. This distributional characteristic is even more pronounced when conditioning on periods of above-average financial stress one year earlier. This indicates that financial stress has a disproportionately negative effect on the

BOX 3

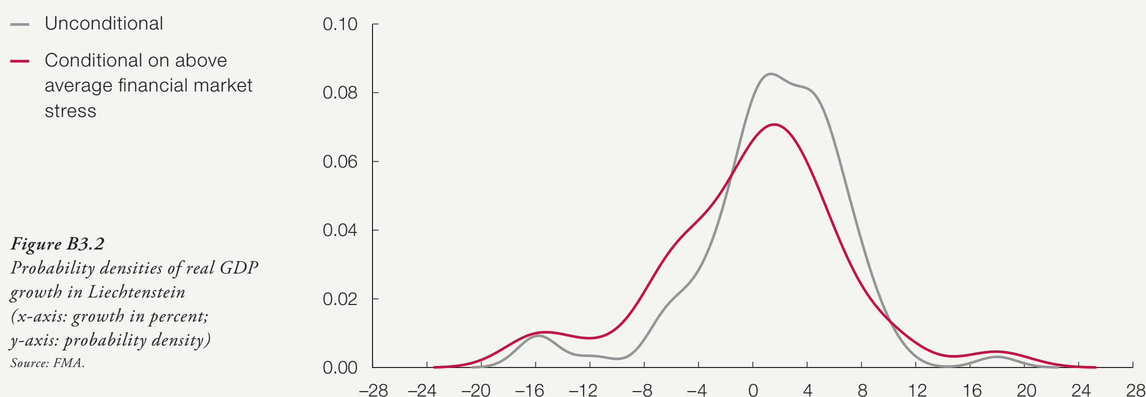

Figure B3.2
Probability densities of real GDP growth in Liechtenstein (x-axis: growth in percent; y-axis: probability density)
Source: FMA.

left tail of the GDP growth distribution. Hence, financial stress empirically increases the probability of extremely negative GDP growth scenarios.

Due to structural factors, Liechtenstein's GaR estimates are lower than in other countries, pointing to significant downside risks to growth. Figure B3.3 shows the time series evolution of the predicted GaR one year ahead for Liechtenstein, Switzerland, Germany and the United States. The predicted GaR measures the conditional probability that the actual growth rate falls below the illustrated GaR threshold, calculated in percentage terms (e.g., 10%). The results are estimated by using the Office of Financial Research's global financial market stress index, the quarterly temporally disaggregated GDP estimated by the Liechtenstein Institute and by applying quantile regressions. Strikingly, Liechtenstein's GaR is much lower compared to other countries, pointing to elevated downside risks for economic growth. Gächter, Geiger and Hasler (2021) highlight structural characteristics as a driving factor of such cross-country differences. In particular, a high degree of trade openness and a large financial sector is associated with respective risks to future growth, i.e. a lower GaR estimate. On the other hand, high government effectiveness and, in the short-run, large public expenditures lead to a higher (i.e. less negative) GaR. In the case of Liechtenstein, high levels of trade openness (also due to the small size of the economy and the large industrial sector) as well as the large financial sector result in lower GaR estimates compared to other countries. This is also well in line with empirical studies focusing on determinants of GDP volatility. In this context, Box 1 in the FMA's Financial Stability Report 2019 identified trade openness and the large financial sector as important drivers of Liechtenstein's GDP volatility.

In the current phase of a strong economic recovery, downside risks to growth are relatively low. Figure B3.4 shows the predicted densities of annualized GDP growth for the first quarter of 2022 in comparison to the predicted density of the first quarter of 2009, at the height of the global financial crisis. While classic linear regression allows us to estimate the expected value of future GDP growth, quantile regressions enable us to estimate the impact of financial stress on different percentiles of the future GDP growth distribution. After estimating the quantile regressions, we apply a Kernel density function to recover the full GDP growth distribution from the predicted percentiles. The predicted density for 2022-Q1 uses the latest available data, while the

BOX 3

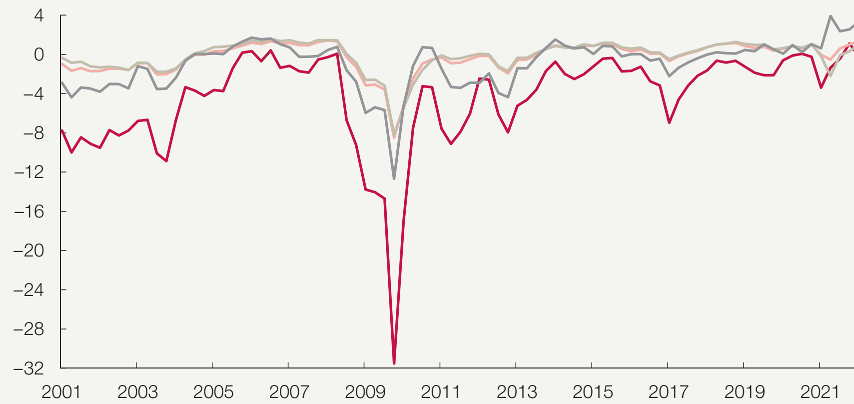

Figure B3.3
Estimated growth-at-risk one year ahead (percent)
Source: FMA.

predicted density for the first quarter of 2009 uses data from one year before. In contrast to 2008, our model does not predict fat tails for the left or right-hand side of the distribution in the current environment. Instead, Figure B3.4 shows a shift to the right of the distribution, i.e. the probability of positive GDP growth is high in the current recovery phase which can at least partly be attributed to the catch-up effect following the COVID-19 crisis.

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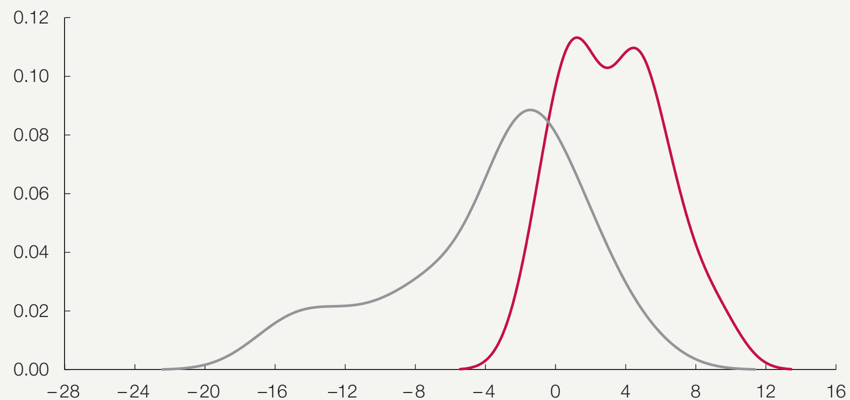


Figure B3.4
Predicted probability density for Liechtenstein's GDP growth (probability density; growth in percent)
Source: FMA.

Financial market developments

Global stock markets recovered quickly after the initial shock at the start of the pandemic, with equity indices moving from record to record over the last few months. In light of the strong recovery in the real economy and the associated increase in earnings across countries and sectors, stock market indices have rallied in the past one and a half years (Figure 8). In an environment of extremely favorable financing conditions, the search for yield has intensified amidst improved risk sentiment, also leading to substantial equity funds inflows. Despite the brighter outlook in the global economy and the corresponding recovery in revenues, these buoyant financial market developments are highly dependent on low financing costs and continued public support measures, with the uncertainty surrounding the outlook remaining at elevated levels.

S&P 500
Eurostoxx 50
FTSE 100
DAX
SMI
MSCI World

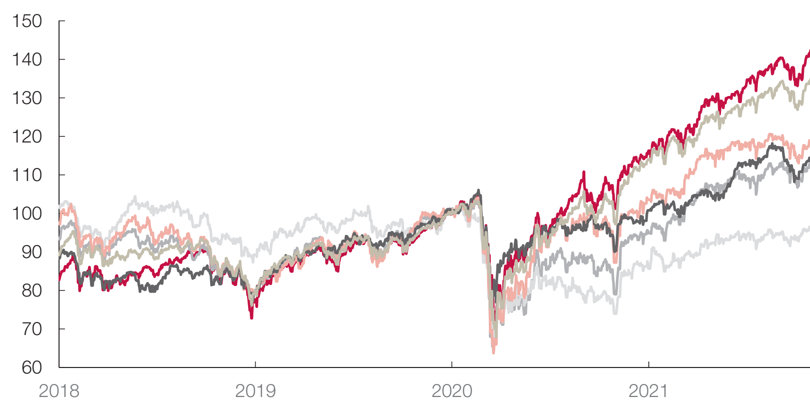


Figure 8
Global stock markets
(index; 01.01.2020 = 100)
Source: Bloomberg.

Indicators point to stretched equity valuations, particularly in the United States. The cyclically adjusted price-to-earnings ratio (CAPE), a common indicator for the valuations of stocks, has increased to more than 38 for the S&P 500, about double the long-term average, significantly above the levels prior the global financial crisis and not far below the levels preceding the burst of the Dot-com bubble 20 years ago (Figure 9). Similar indicators for the Eurostoxx index also point to the highest level since the global financial crisis, albeit at lower levels compared to the United States. When the opportunity costs of holding risk-free assets, i.e. the general level of interest rates, is taken into consideration, valuations look somewhat less stretched. More precisely, the "excess CAPE yield" is defined as the difference between the inverted CAPE ratio and the 10-year inflation-adjusted interest rate, thus, explicitly considering the currently low level of interest rates. While overvaluations seem more limited when using this measure, critics may argue that this indicator compares one overvalued asset class with another. Valuation measures thus point to considerable downside risks, as equity markets appear to be vulnerable to both interest rate and growth shocks alike.

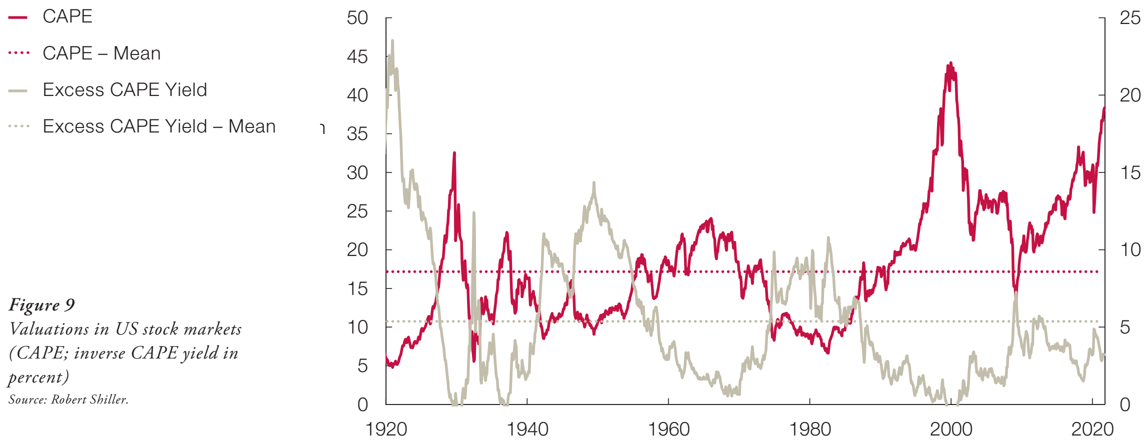


Figure 9
Valuations in US stock markets (CAPE; inverse CAPE yield in percent)
Source: Robert Shiller.

While tail risks may have reached record levels, implied volatility has receded along with the recovery in stock indices. At the height of the COVID-related downturn, stock market volatility in the United States, as measured by the CBOE Volatility Index (VIX), reached levels last seen during the global financial crisis. Since then, however, implied stock market volatility has diminished with the general rebound in financial market prices, albeit remaining at slightly higher levels than prior to the global pandemic. At the same time, investor nervousness is evident in increased demand for insurance against sharp downturns. In this context, the CBOE Skew Index – measuring the difference between the cost of derivatives that protect against large declines in the S&P 500 and those that offer benefits from a large rally – has increased to historically high levels in recent months (Figure 10), i.e. investors are willing to pay more for insurance against market corrections. It seems that the combination of historically low real yields and elevated valuations makes both bond and equity markets particularly vulnerable to interest rate or growth shocks, and while investors may remain overweight in equities, they nevertheless seem to be aware of the underlying risks. In this context, markets currently appear ill-prepared particularly for the tail risk of non-transitory inflation.

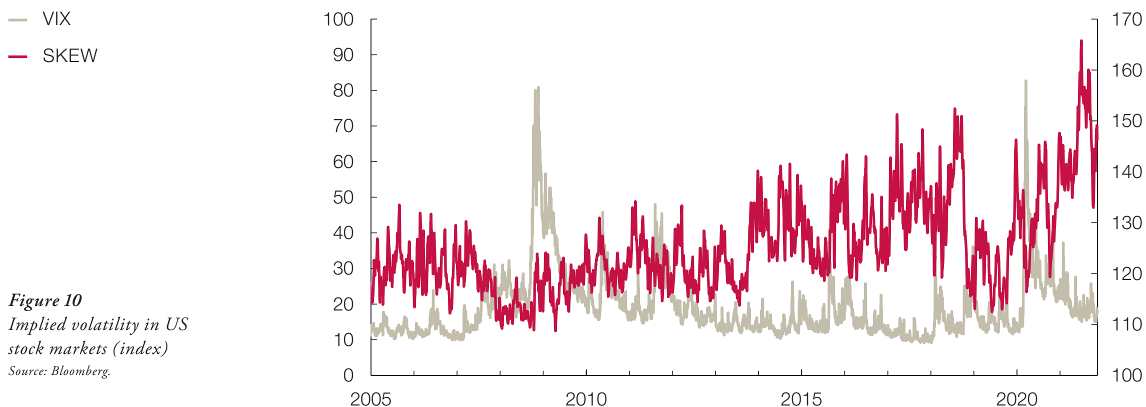


Figure 10
Implied volatility in US stock markets (index)
Source: Bloomberg.

The uncommon disconnect between inflation and interest rate developments in the United States also point to increasing imbalances in financial markets. Naturally, long-term interest rates and core inflation are normally strongly correlated, as investors request higher nominal yields in case of higher inflation pressure. This empirical link does not seem to hold true at the moment, as recent months constitute striking outliers in the relationship between the two variables (Figure 11). The current divergence between inflation and long-term interest rates – as well as between real yields and break-even inflation rates – raise concerns over a possible abrupt increase in nominal government bond yields, particularly in the US. Break-even inflation rates (expected inflation derived from 10-year bonds) continued to trend higher, while real yields fell to historical lows. Historically, such a decoupling of established empirical relationships was often associated with sudden corrections leading to an abrupt increase in interest rates. The absence of an obvious fundamental catalyst for the decline in sovereign bond yields – with the exception of the extraordinarily expansionary monetary policy stance – amidst improving economic fundamentals suggests that there are significant risks that yields could move higher, particularly when the current inflation increase turns out not to be entirely temporary.

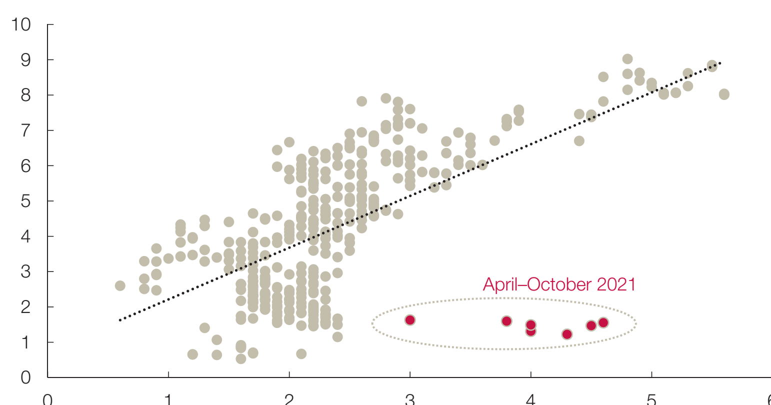


Figure 11
Divergence between inflation and interest rate developments in the US (x-axis: core inflation; y-axis: interest rate on 10-year sovereign bonds)
Source: Bloomberg, own illustration.

Continued monetary policy support has not only kept sovereign bond yields, but also risk premia at very low levels. A fall in real yields to new lows, last seen in the early 1980s, amidst continuously high inflation have fueled concerns about stagflation in recent weeks. In this environment, it is increasingly difficult for fixed income investors to protect the purchasing power of their capital, resulting in a broad-based narrowing of corporate bond spreads to below pre-pandemic levels. The low-yield environment has contributed to increased risk taking, with corporate bond spreads continuing their decline (Figure 12) and investment funds shifting their bond holdings towards lower-rated debt instruments. Gross and net issuance by the euro area high yield NFC sector is on course to hit record levels this year, although rating agencies report a deterioration in lending standards on high-yield deals. The major

central banks, particularly the Fed and the ECB, continued their extraordinarily expansionary monetary policy by resuming their respective asset purchase programs (Figure 13). Over the summer, net issuance by the Treasury were lower than monthly Fed purchases, offering some plausible explanation for the downward pressure on yields despite increasing inflation strain.

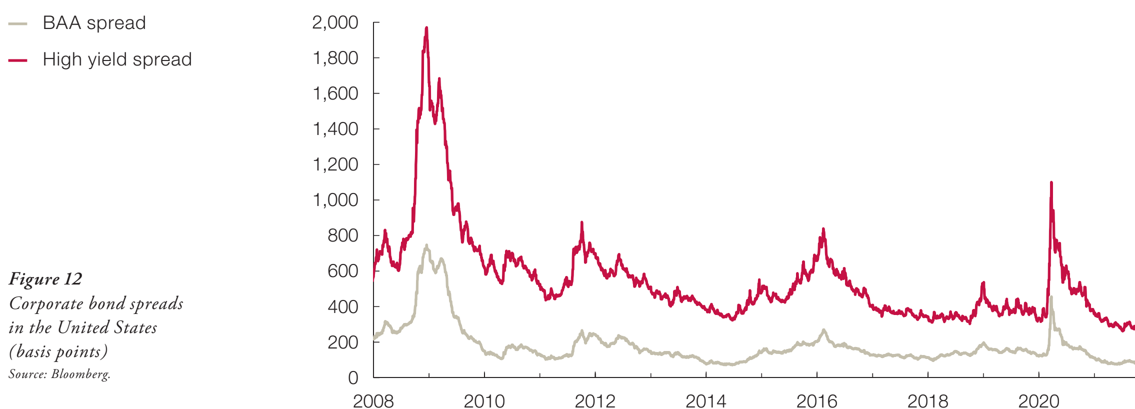


Figure 12
Corporate bond spreads in the United States (basis points)
Source: Bloomberg.

In light of significant inflation pressures, a tightening of monetary policy seems likely, particularly in the United States. In the US, the tapering of asset purchases, currently running at USD 120 billion per month, is starting in November 2021. While the drawdown of the Treasury General Account has significantly contributed to higher liquidity levels over the summer, this effect is now fading und could instead become liquidity draining, possibly reinforcing the effect of the tapering announcement by the Fed. In absence of an offsetting boost to global liquidity, this could contribute to an increase in yields and prove disruptive for riskier assets. According to current projections by Federal Open Market Committee (FOMC) members, a first step in interest rates seems likely already in 2022, followed by 2–3 interest rate rises in 2023. On the contrary, monetary policy in the euro area as well as in the Swiss franc currency area is expected to remain more accommodative, as price pressures are more muted than in the US.

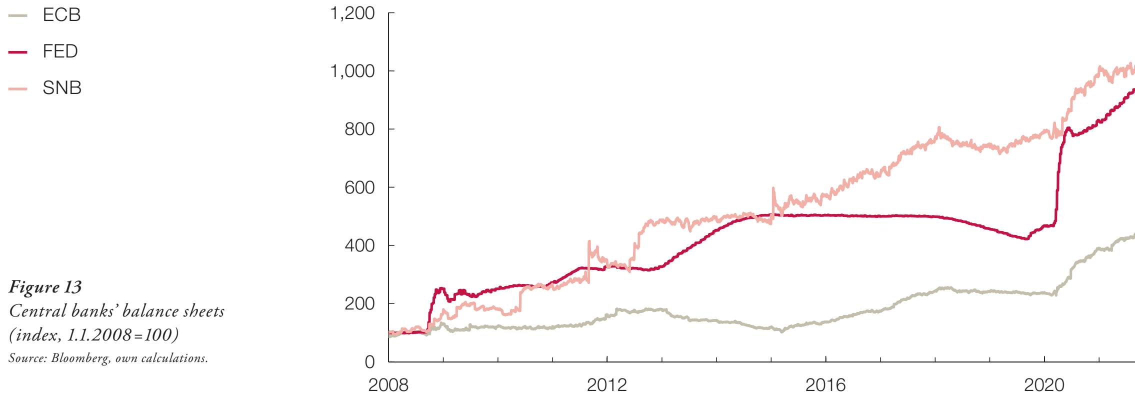


Figure 13
Central banks' balance sheets (index, 1.1.2008 = 100)
Source: Bloomberg, own calculations.

A future repricing in the US bond market may have global implications. In light of high inflation and the strong divergence between inflation and interest rate developments, the US bond markets remain vulnerable to changes in inflation expectations. During the 2013 "taper tantrum", the sharp increase in US bond yields sparked a broad repricing of risk around the world. Against this background, a repricing in the US bond market could be associated with strong stock market corrections and a repricing in corporate bond spreads around the world, with significant consequences not only for financial markets, but also for the real economy.

LIECHTENSTEIN'S NON-FINANCIAL SECTOR

Overview and international comparison

Overall, Liechtenstein's economy is characterized by very low levels of indebtedness. The total debt-to-GDP ratio – defined as the sum of the indebtedness of both the (non-financial) private and public sector to GDP – is relatively low in Liechtenstein, estimated at 163% of GDP at the end of 2020 (Figure 14) and has changed only marginally relative to the previous year. In contrast to the very detailed public sector accounts, data on private indebtedness – both for non-financial corporations (NFCs) and private households – does not exist in a standard consolidated form for Liechtenstein. Against this backdrop, numbers and statistics in this chapter are based on various data sources, including tax statistics, cross-border claims and liabilities as reported in the BIS Locational Banking Statistics and the FMA's internal supervisory reporting.

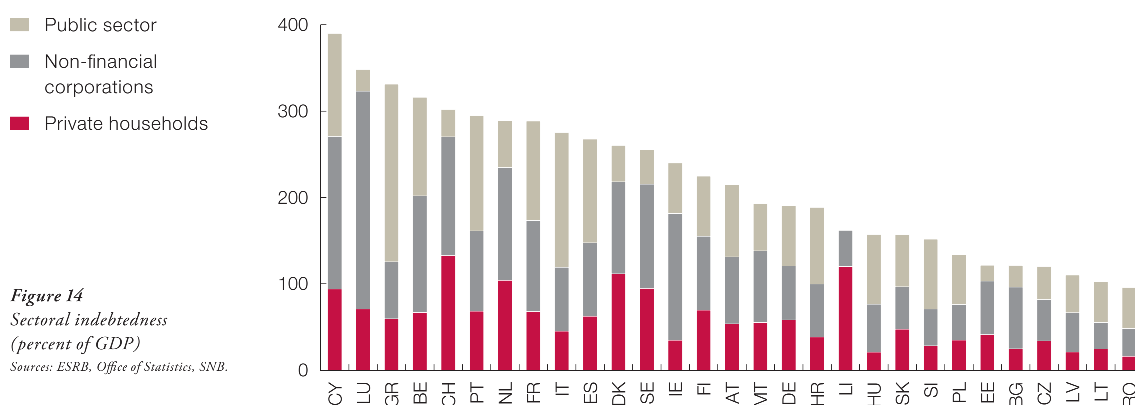


Figure 14
Sectoral indebtedness (percent of GDP)
Sources: ESRB, Office of Statistics, SNB.

Private indebtedness is, however, highly concentrated in the household sector. According to recent estimates, private household indebtedness amounted to approx. 120% of GDP at the end of the year 2020. While Switzerland shows a slightly higher figure (133%), Liechtenstein ranks highest among all EEA countries, with Denmark (112%) and the Netherlands (104%) also showing relatively high levels of household debt. However, the high headline number in Liechtenstein is not directly comparable to other countries due to differences in data sources, and thus, in the underlying definitions of the variables. Nevertheless, the elevated level of household debt is one of the main systemic risks in Liechtenstein, and has therefore remained a strong focus of macroprudential supervision and policy over the last few years. In contrast, the NFC sector is characterized by high equity and low debt, also due to corresponding tax incentives. In total, the NFC debt-to-GDP ratio is estimated at approximately 42% of GDP at the end of 2020. This estimate is based on banks' regulatory reporting on exposures of Liechtenstein banks towards the domestic NFC sector on the one hand, and on data on cross-border liabilities of Liechtenstein NFCs towards foreign lenders, as reported by the BIS, on the other. Besides this low level of indebtedness in the NFC sector, sound public finances also contribute to the stability of the

economy. The public sector has virtually zero debt, but large financial reserves. Even in 2020, when the COVID-19 pandemic led to a sharp global recession, the public budget recorded a surplus. While this was partly due to a one-off effect in tax revenues, public finances over the last years were generally characterized by a very prudent fiscal policy approach, which remains an important factor of stability for the financial sector and the economy as a whole.

The overall level of debt in the non-financial sector has remained remarkably low, particularly when considering Liechtenstein's high level of economic development. Economic literature on the finance-growth nexus suggests a strong and robust positive relationship between financial development (i.e. financial deepening which is associated with increasing levels of debt) and economic growth.[4] Higher levels of economic development, as typically measured by GDP per capita (p.c.) levels, are, therefore, associated with higher levels of debt, as the financial sector is more developed. As explained in detail in last year's Financial Stability Report[5], Liechtenstein is an outlier in this empirical relationship, as the high GDP p.c. levels are accompanied by relatively low levels of indebtedness of the non-financial sector. This is insofar interesting, as empirical research has shown that rising levels of financial development and debt are not only associated with higher growth rates and incomes, but also with higher costs in the case of a banking crisis.[6] Higher levels of debt are, thus, not only linked to higher prosperity, but also increase the risk of financial crises. This general relationship may also explain one important factor for the high degree of stability in Liechtenstein's economy and its financial sector. As the country is characterized by low levels of indebtedness in the economy, according to empirical research, it is not surprising that Liechtenstein has not experienced any systemic crisis in the last few decades. Even in challenging episodes such as the global financial crisis in 2008/09 or the Swiss real estate crisis in the early 1990s, the banking sector remained stable and was able to fulfill its important role as a lender to the real economy at all times.

Private households

High levels of household indebtedness have become a structural characteristic of Liechtenstein's economy. Based on data from tax statistics, which is adjusted for persons who do not have their permanent residency in Liechtenstein, and additional data from banks' regulatory reporting for the last two years, we estimate household indebtedness at the end of 2020 at around CHF 7.8 billion or about 120% of GDP. In this context, it is important to emphasize that available numbers are likely to slightly overestimate household debt, as the definition is broader than standard definitions in other countries, e.g. in Eurostat data. More precisely, household debt statistics are typically calculated on a consolidated basis (i.e. credit within the household sector is not con-

4 *For an overview of this strand of literature, see Levine, R. (2005). Finance and growth: Theory and evidence. In: Aghion, P., Durlauf, S. (Eds.): Handbook of Economic Growth, pp. 865–934.*

5 *Financial Stability Report 2020, p. 34 ff.*

6 *See Breitenlechner, M., Gächter, M. and Sindermann, F. (2015). The finance-growth nexus in crisis. Economics Letters, 132, 31–33.*

sidered). On the contrary, debt statistics in Liechtenstein are based on tax statements, and credit within the household sector (even within a family) is recognized as a liability. Estimations based on alternative data sources, namely the sum of domestic banks' loans to private households in Liechtenstein and cross-border claims of foreign banks towards Liechtenstein households according to BIS data, result in a somewhat lower estimate, but are still comparable in terms of magnitude.

Contrary to the developments in the United States and the euro area, household indebtedness in Liechtenstein and Switzerland has continued its upward trend after the global financial crisis. Figure 15 shows the development of household debt-to-GDP ratios in the United States, the euro area, Switzerland and Liechtenstein. Interestingly, household indebtedness decreased significantly in the last decade in the United States following the burst of the subprime bubble in 2007/08. Notwithstanding some apparent real estate booms and high debt levels in some countries prior to the global financial crisis, particularly in Spain, household debt in the euro area has remained below the levels in other countries in aggregate terms. In the Swiss franc currency area, which showed high resilience during both the global financial crisis and the euro area sovereign debt crisis, debt levels have continued their upward trend in the last decade, also on the back of the low interest rate environment. Negative base rates in recent years implied strong incentives for households to take up credit (or to abstain from amortizations). While the decrease in interest rates implied some windfall gains particularly for the household sector, the large majority of credits (and mortgages) exhibit fixed interest rates, leading to a gradual pass-through of interest rate changes over time.

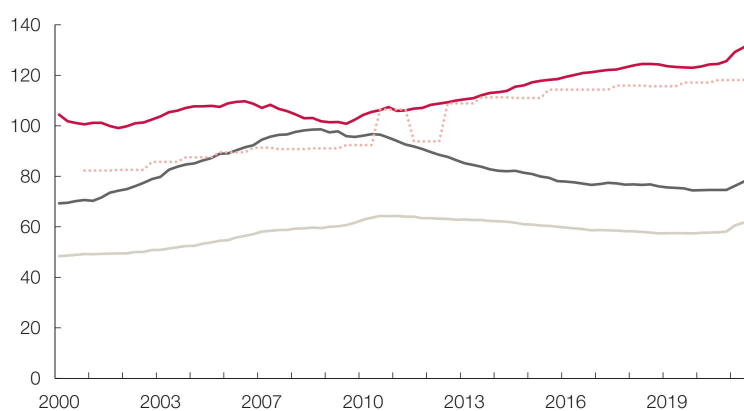


Figure 15
Household indebtedness (percent of GDP)
Sources: BIS, Office of Statistics, FMA.

The moderate, but continuous rise in household indebtedness must be monitored closely going forward. According to slightly revised data, household indebtedness increased from around 82% in 2000 to 120% of GDP in 2020. Against the backdrop of structurally high household indebtedness, a profound analysis on the underlying risks is important to facilitate a timely reaction of macroprudential policy if deemed necessary. In this context, the FMA has conducted an in-depth risk analysis on vulnerabilities in Liechtenstein's real estate and mortgage market, based on a new data set including granular data at the household level. The report, which also included a list of recommendations how to address the identified risks in the medium term, was published in October 2021.[7] Box 4 includes a short summary of the corresponding risk analysis, which concludes that systemic risks are assessed to be rather limited in the short run, but additional measures are deemed sensible to address the identified risks in the medium term.

Some structural characteristics imply that risks may be lower than suggested by the reported standard indicators. The small size of the country, combined with a strong economy and legal restrictions regarding the purchase of real estate, may lead to a lower probability of a sustained price decline in real estate compared to other countries. In a similar vein, low levels of debt in the economy, thanks to a very sound non-financial corporate sector and high financial reserves in the public sector, strong collateral in light of moderate loan-to-value (LTV) ratios and relatively low mortgage growth in recent years point to limited risks in the short term. An abrupt interest rate increase also seems less likely in the Swiss franc currency area compared to other countries, and a high share of fixed interest rate mortgages ensures that a rise in interest rates would not hit all borrowers at once, but rather gradually over time. In addition, a remarkably stable and resilient economy – particularly regarding the labor market (see also Box 2) – with high disposable income and high levels of household wealth additionally contribute to a mitigation of risks. Nevertheless, the high stock of household debt is associated with substantial systemic risks in the medium term. Against this backdrop, macroprudential policy is called upon to regularly monitor the systemic risks associated with high levels of household indebtedness, and to propose the activation of additional policy instruments if deemed necessary.

Income levels in Liechtenstein are significantly higher than in other countries with similar levels of household debt-to-GDP ratios. As explained in the previous section, higher levels of economic development are typically associated with increased financial deepening, and thus, higher levels of overall debt in the economy. This link also applies to sectoral debt in the private household sector, as shown in Figure 16. The simple illustration, however, also shows that Liechtenstein – together with other countries like Luxembourg or Ireland – exhibit significantly higher levels of income (as measured by GDP p.c.) than countries with similar levels of household debt. Once again, this underlines the special case of Liechtenstein, and one should be cautious in drawing premature conclusions based on standard indicators in comparison to other countries.

7 *The report – which is only available in German – can be accessed on the FMA website. www.fma-li.li/de/fma/publikationen/hypothekar-und-immobilienmarkt-liechtenstein.html*

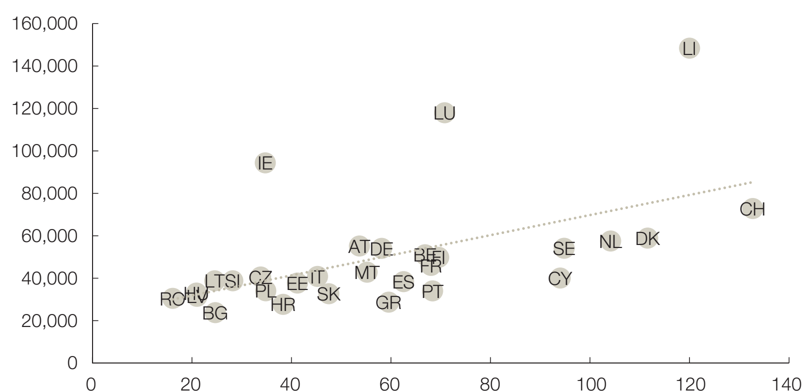


Figure 16
Household debt-to-GDP ratios and GDP p.c. (x-axis: percent of GDP; y-axis: GDP p.c. in PPP)*
Sources: IMF, Office of Statistics, own calculations.
**PPP stand for purchasing power parity, i.e. GDP p.c. levels are corrected for price level differences and are measured in international US-dollars.*

In Liechtenstein, procyclical effects of a downturn in the financial cycle would also be significantly weaker than in other countries, limiting potential adverse effects on the economy. Domestic demand plays a relatively minor role in Liechtenstein's extremely small and open economy. Thus, even a marked increase of the households' saving rate would have negligible demand effects, thus, limiting the impact on the broader economy. While vulnerabilities related to the high household indebtedness are assessed to be limited in the short term, the identified risks should be addressed by targeted macroprudential measures aiming at dampening the upward trend in household indebtedness in the next few years.

BOX 4

Vulnerabilities in Liechtenstein's residential real estate (RRE) market[8]

In light of the high indebtedness of private households, vulnerabilities in Liechtenstein's real estate market are an important policy issue. With a debt ratio of 120% of GDP at the end of 2020, Liechtenstein exhibits the highest level of indebtedness in the private household sector among EEA countries, only slightly lower than in Switzerland (133%). The high debt ratio, mainly due to mortgage loans, implies certain vulnerabilities for households against unexpected macroeconomic shocks, such as an abrupt increase in interest rates, unemployment or a decline in real estate prices.

Building on the methodology proposed by the ESRB, the following risk assessment is based on three different perspectives. First, the "collateral stretch" examines various price and other indicators to evaluate whether available data suggest an overvaluation in the RRE market. Second, the "funding stretch" looks at the credit market and considers various indicators from the banking sector to assess the sustainability of current credit developments. Third, the "household stretch" assesses vulnerabilities in the household sector by closely investigating the balance sheet conditions of households.

Liechtenstein's real estate sector is characterized by some structural specifics complicating a comprehensive comparison with other countries. Legal restrictions on the purchase of real estate – in absence of a legitimate interest, e.g. in case of already existing property – lead to relatively low market activity. In 2020, a total of 945 real estate transfers took place, slightly more than 2019 (881) and 2018 (776). However, less than half of the transactions were purchases. As a transfer of property within the family or an "equivalent" barter of property is not subject to approval, many real estate transactions are not purchases, but transfers by barter, donation or heritage. In light of methodological difficulties associated with the very low number of purchase transactions, there are no price indices available, neither for house purchases nor rents. The risk assessment in the "collateral stretch" category therefore relies on estimated prices from expert assessments, as well as complementary data on building activity and vacancy rates.

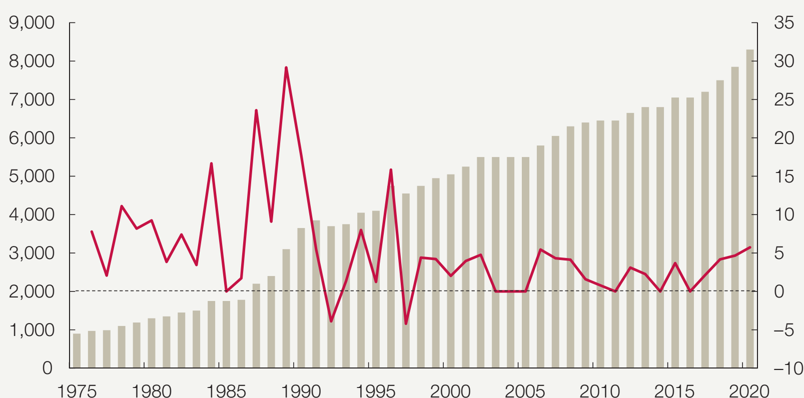


Figure B4.1
*Land prices in Schaan**
*(CHF/Klafter**;*
annual growth in percent)
Sources: Peter Konrad, FMA.
**Schaan is the largest community in Liechtenstein, price dynamics can be assumed to be relatively representative for the whole country.*
***The "Klafter" was the common area measure in Liechtenstein until a few years ago. One Klafter corresponds to approx. 3.6 square metres.*

8 *This box is based on a report published by the FMA in October (available in German only): "Immobilien- und Hypothekarrisiken in Liechtenstein: Risiken aus Sicht der Finanzstabilität".*

BOX 4

While land prices, based on expert assessments, have continuously increased in the last few decades, data suggests weakening price dynamics since the turn of the millennium. The increase in land prices in Liechtenstein is not surprising in light of its special characteristics, as land is obviously a scarce resource in such a small country. Past crises, including the real estate downturn in Switzerland in the early 1990s and the global financial crisis in 2008/09, were not associated with any adverse effect on Liechtenstein's RRE market. The almost linear trend in land prices since the 1970s implies that annual increases in percentage terms have considerably weakened since 2000. Over the last 20 years, annual price increases amounted to a moderate 2.5% in nominal terms on average, although price dynamics may have accelerated somewhat during the COVID-19 pandemic (see Figure B4.1). Apartment prices, also according to expert assessments, have shown an even weaker price development, with an annual (nominal) increase of slightly more than 1% since 2000. Overall, despite of data availability issues, the moderate price increases in the last 20 years suggest that the imbalances in terms of price overvaluations in the RRE sector may be quite limited in Liechtenstein.

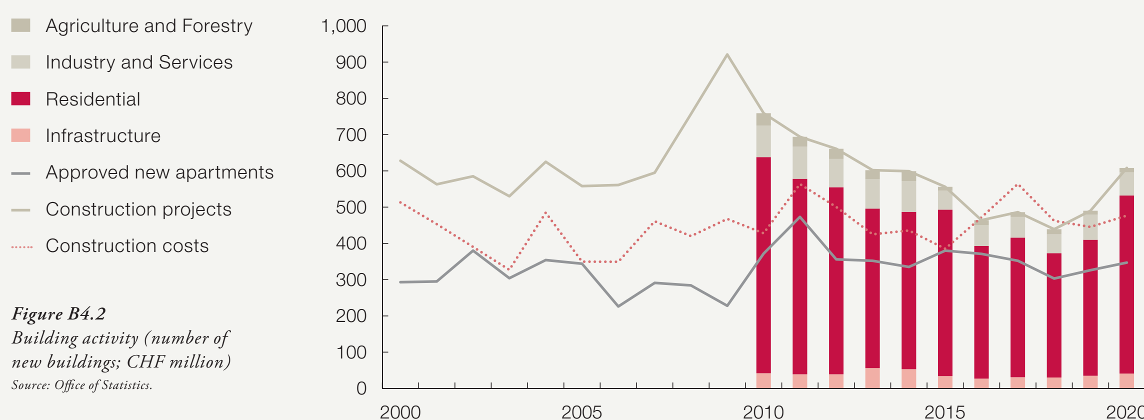


Figure B4.2
Building activity (number of new buildings; CHF million)
Source: Office of Statistics.

Additional indicators such as building activity and vacancy rates confirm the overall assessment of relatively low risks in the "collateral stretch". Building activity has followed a slight downward trend in recent years. The total number of construction projects has peaked at 921 in 2009, and has followed a downward trend in recent years, although the last year was characterized by a slight uptick with 608 new projects in 2020. While the annual number of approved new apartments also increased slightly to 347, up from 326 in 2019, building activity has weakened in the last few years (see Figure B4.2). Total construction costs have remained broadly stable at CHF 477 million in 2020. The number of vacant apartments, declining from 830 to 812 in 2020, and slightly decreasing vacancy rates over recent years confirm the overall assessment that Liechtenstein's RRE market was not characterized by a boom or price exaggerations in the last few years.

Notwithstanding the relatively large stock of mortgage loans in banks' balance sheets, risks in the "funding stretch" category have remained low. When looking at the volume of domestic RRE loans in banks' balance sheet relative to the country's GDP

BOX 4

(85%), Liechtenstein ranks fourth among European countries, clearly behind Switzerland and on an equal footing with Sweden, Denmark, Norway and the Netherlands. While this figure would even be higher when taking into account cross-border credits to Switzerland, it is important to emphasize that Liechtenstein's banking sector is very large relative to GDP, with the assets of the banking sector corresponding to roughly 15 times the country's GDP. Against this backdrop, it becomes obvious that the total volume of mortgage loans relative to banks' balance sheets is less of a cause for concern. Although mortgage loans are an important income source for some Liechtenstein banks, they do not constitute the main source for profitability, as banks mainly focus on private banking services (see also chapter 4).

Despite a slight increase in 2020, mortgage credit growth has remained low in recent years. Historical time series of mortgage loans include cross-border credit to Switzerland (i.e. loans of Liechtenstein banks to the whole Swiss franc currency area), while Liechtenstein and Switzerland are reported separately since 2016. Headline numbers show that mortgage loan growth has declined markedly from 8.8% in 2010 to 0.7% in 2019, with a slight uptick to 2.5% in 2020. Annual growth in RRE loans in Liechtenstein was even weaker, amounting to 1.1%, a significant decrease relative to the previous year (3.1%). Mortgage credit growth, thus, does not point to increasing imbalances in Liechtenstein (see Figure B4.3).

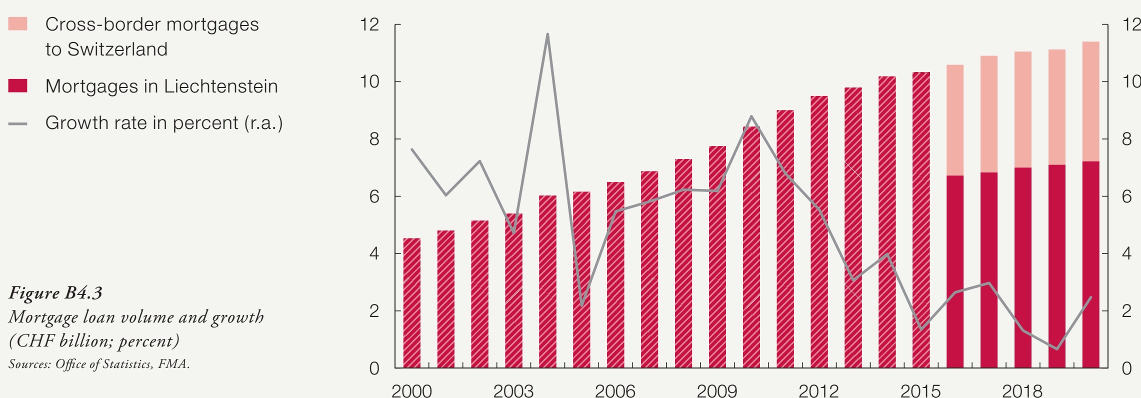


Figure B4.3
Mortgage loan volume and growth (CHF billion; percent)
Sources: Office of Statistics, FMA.

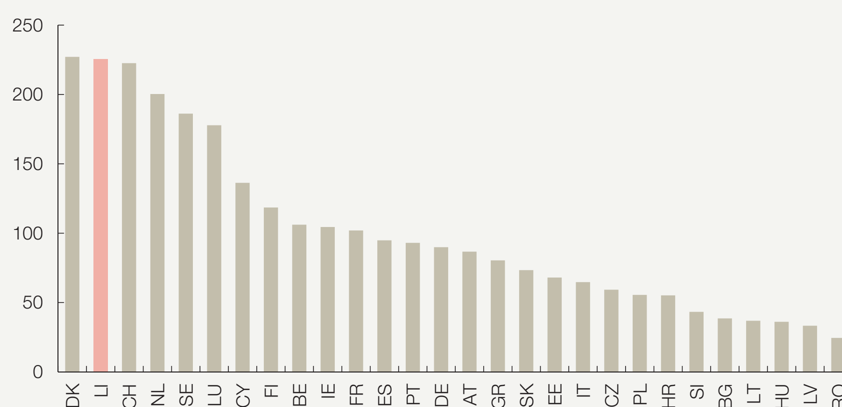
Overall, risks in the "funding stretch" category are assessed to be low in light of moderate credit growth in recent years and a banking sector characterized by high capital and liquidity indicators. In total, the CET1 capital ratio in Liechtenstein's banking sector amounted to 22.3% in June 2021, well above the European average. From a liquidity perspective, in light of their business model focusing on private banking services, banks are characterized by abundant deposits, resulting in an extremely low loan-to-deposit ratio of 65%. This implies that the banking sector is largely independent from wholesale funding markets. Against this background, funding risks are assessed to be relatively low, particularly in comparison with other peer countries.

In light of the relatively high stock of household debt, vulnerabilities of households are the main cause of concern. Private household indebtedness relative to disposable income is an important indi-

BOX 4

cator for the sustainability of household debt. On average, this ratio stands just above 100% among EEA countries (plus Switzerland), with particularly high figures in Denmark (227%), Liechtenstein (226%), Switzerland (223%) and the Netherlands (200%, see Figure B4.4), i.e. countries with varying forms of tax incentives in the context of tax deductibility of mortgage interest rates. This simple comparison identifies vulnerabilities of households as one of the main risks in Liechtenstein's RRE market.

Figure B4.4
Private household debt relative to disposable income (percent of disposable income)
Sources: ESRB, OECD, Office of Statistics, own calculations.



In assessing the underlying risks in the household sector, the distribution of debt across households may be even more relevant than aggregated debt levels. Based on tax statistics, a special analysis suggests that debt is quite unevenly distributed across households. About 42% of households have no debt, with another 13% exhibiting debt lower than CHF 100,000. At the top of the distribution, 14% of households report debt between CHF 500,000 and CHF 1 million, with still 9% of households – or almost 1500 households in absolute terms – having debt exceeding CHF 1 million. In fact, a closer analysis shows that a significant share of aggregate debt is concentrated among a few households. More precisely, slightly more than 300 households show debt levels exceeding CHF 3 million, and the total debt of those same households sum up to approx. CHF 2.4 billion, i.e. roughly a third of total (aggregated) household debt in Liechtenstein. While a closer analysis would be necessary to draw general conclusions, anecdotal evidence suggests that household debt at the very top of the distribution is closely linked to the corporate sector rather than to mortgage debt. While private households (or natural persons) have to pay income tax on an assumed return on their net wealth (currently 4%), the corporate sector enjoys an equity interest deduction (also amounting to 4%), potentially leading to a shift of corporate to household debt in Liechtenstein's tax statistics. Against this background, households at the top of the debt distribution are not the main concern in Liechtenstein, and overall debt levels may be overestimated relative to other countries due to the respective tax incentives.

Lending standards in terms of loan-to-value (LTV) ratios of Liechtenstein banks have remained prudent. The majority of RRE loans – about 61% – exhibit an LTV ratio of below 66⅔ percent. A further 38% of the total volume of RRE mortgages has an LTV ratio of between 66⅔ and 80 percent, with less than 1% exceeding an LTV ratio of 80 percent.

BOX 4

Overall, the LTV of all RRE mortgages in Liechtenstein amounted to 48.8% at the end of 2020, and the share of new RRE mortgages exceeding an LTV ratio of 80 percent is virtually zero. Still, despite the prudent lending standards in terms of LTV, a closer analysis suggests that there is a significant share of households exhibiting negative net financial wealth, making them dependent from bank financing and, thus, potentially vulnerable to macroeconomic shocks.

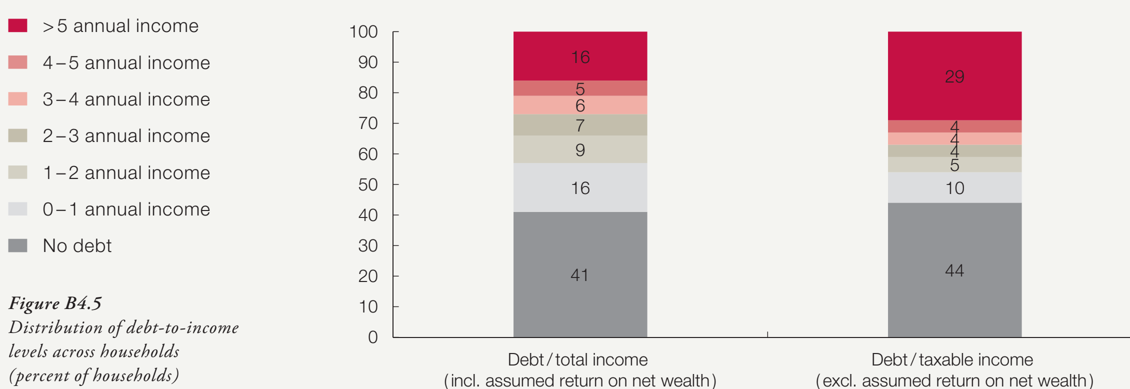


Figure B4.5
Distribution of debt-to-income levels across households (percent of households)
Source: Office of Statistics, own calculations.

A distributional perspective on mortgage affordability and debt-to-income levels suggests certain vulnerabilities in the household sector. Data based on tax statistics suggests a significant share of households having relatively high debt-to-income (DTI) levels. Depending on the exact definition of income (total income including the assumed return on net wealth vs. taxable income excluding the assumed return on net wealth), between 16% and 29% of households have debts exceeding their annual income by a factor of five or more (see Figure B4.5). Similar conclusions can be drawn from banks’ regulatory reporting. Parallel to LTV ratios, where banks have to report “exception-to-policy” (ETP) loans when exceeding an LTV ratio of 80 percent, banks also have to report loans as ETP when breaching their internal guidelines with respect to mortgage affordability. While there are no exact quantitative legal guidelines for such internal restrictions, banks usually verify whether an interest rate increase to 4.5% or 5% would imply a debt service burden exceeding a third of household income. While the assumptions of such a “mini stress test” are quite severe in light of the current low interest rate environment and a long history of low interest rates in Swiss francs, it is, nevertheless, remarkable that around 23% of total RRE loans in Liechtenstein belong to this ETP category, well in line with the findings based on tax statistics. While LTV ratios have remained relatively low, DTI figures and the reported numbers on mortgage affordability imply that a significant share of Liechtenstein households could be vulnerable to an abrupt increase in interest rates or any other unexpected macroeconomic shock.

Overall, while risks are relatively low from a collateral and funding perspective, household vulnerabilities are still assessed to be significant. While

BOX 4

the lack of comprehensive data with respect to price developments, both for rents as well as transactions, complicates the respective risk assessment, available data based on expert assessments do not point to a real estate boom in Liechtenstein in recent years. From a funding stretch perspective, low mortgage loan growth, high capital and liquidity in the banking sector and a comparatively minor role of mortgages in banks' overall business model also suggests low risks from a funding perspective. On the contrary, headline indicators in households' balance sheets point to considerable risks in the "household stretch" category in the medium term.

When assessing the risks in the household sector, some additional important risk-mitigating factors in Liechtenstein's RRE sector have to be considered. The Liechtenstein RRE sector is characterized by certain specifics that exacerbate a comparison with other countries. First, in light of the small country size and the strong economy, the space that is available in Liechtenstein is quite limited, and a prolonged price decline in the housing market may therefore be less probable than in other countries. In this context, demand for real estate that is available for sale has remained continuously high in the last few decades. At the same time, legal restrictions on the purchase of real estate are associated with quite low market activity. Furthermore, the number of persons that are allowed to establish their main residence in Liechtenstein is severely limited. Demand for such approvals would be substantial due to the relatively moderate taxation in Liechtenstein. Both the legal restrictions on the purchase of real estate as well as immigration restrictions imply that any materialization of risks in the housing market could be targeted with specific relaxations of the corresponding limitations, resulting in additional room of manoeuvre in the case of a crisis. Second, Liechtenstein's labor market is extremely resilient against recessions, with more employees than inhabitants and virtually zero correlation between employment and GDP growth (see also Box 2). High job security and continuously low unemployment rates, also thanks to an extremely flexible labor market, over the past decades lead to high planning certainty for households in Liechtenstein in terms of household income, implying that the sustainable level of household debt is higher than in other countries. Third, relatively low taxation on household income leads to higher disposable income, which is also associated with higher sustainable levels of household debt relative to other countries with higher tax rates. Fourth, the overall level of indebtedness in the economy is extremely low in light of virtually zero public debt (but large public financial reserves) and low debt of non-financial corporations (NFCs), not least due to corresponding tax incentives. Fifth, banks follow prudent lending standards in terms of loan-to-value (LTV) ratios and asset quality has continued to be favourable, with non-performing loan (NPL) ratios remaining at very low levels. Sixth, an abrupt increase in interest rates is less likely in the Swiss Franc currency area than in other currencies, at least when looking at the track-record of the SNB in terms of price stability and the conduct of monetary policy. Furthermore, the large share of fixed interest rate mortgages implies that an abrupt interest rate increase – e. g. due to a repricing of global risk premia or a faster monetary tightening in light of higher inflation rates – would not affect Liechtenstein's households immediately, but only gradually over time. Such additional time for adjustment, both for the household sector and the banks facing the corresponding credit risk, is an important risk mitigating factor in the case of Liechtenstein, as the impact would take full effect only gradually with the renewal of expiring mortgages. Finally, high household debt is accompanied by high household wealth, and data from tax statistics suggest that households in the highest debt decile also show the

BOX 4

highest (net) wealth. After carefully considering all these arguments, it may be concluded that the overall risk level in Liechtenstein's RRE and mortgage sector is currently not regarded as a cause of concern in the short term. Nevertheless, it is beyond dispute that the high indebtedness of private households requires an open discussion on how to address the related systemic risks in the medium term.

Targeted policy measures have been in place since 2015. To counter the boom in real estate and increase in mortgage growth following the global financial crisis, the legal framework regarding owner's equity, affordability and amortization was adjusted in 2015. In general, the LTV ratio for RRE mortgages and income property must not exceed 80%. In exceptional cases ("exceptions-to-policy", ETP), where the LTV ratio exceeds 80%, banks have substantially higher reporting requirements on the corresponding loans. Additionally, at loan origination, a long-term imputed interest rate (usually amounting to between 4.5% and 5%) aims at ensuring affordability of new loans, and new mortgages have to be amortized to a maximum LTV ratio of 66⅔ percent within 20 years. Furthermore, the risk weights for RRE loans are slightly more restrictive than in the CRR framework. For mortgages with an LTV between 66⅔ and 80 percent, risk weights amount to 50% (instead of 35%), while mortgages with an LTV larger than 80% lead to risk weights of 100% (in line with the CRR). Combined with the macroprudential capital buffer requirements in the banking sector, Liechtenstein has an effective and transparent policy-mix in place which has significantly contributed to a mitigation of risks in the RRE sector in recent years.

While the current policy-mix is generally assessed to be "largely appropriate", the in-depth analysis still identifies potential room for improvement. First, data availability has to be improved. While the comprehensive implementation of the ESRB recommendation on closing data gaps in real estate (ESRB/2016/14 as amended) is an important step to increase data availability with regard to lending standards, the report also proposes to conduct a feasibility study on calculating an official real estate price index for Liechtenstein. Second, risk awareness both among lenders and borrowers have to be increased. While the public discussion based on the publication of the report and the associated public event has already had a positive effect on public risk awareness, banks play a particularly important role in advising their clients about possible risks of high indebtedness. In this context, the report proposes to elaborate on guidelines how banks may advise their clients with respect to possible amortization possibilities as well as the (virtually non-existent) tax incentives of holding high levels of debt. Finally, the report recommends a strengthening of the existing borrower-based measures in Liechtenstein, particularly with regard to income-based instruments. In this context, a legal basis for a transparent set of macroprudential borrower-based measures should be considered. Alternatively, at least in the transition period, various "soft law" measures could be considered, e.g. a recommendation by the FSC on expectations regarding banks' lending standards or stronger self-regulating elements by the banking sector by committing itself to even tighter lending standards, in particular with respect to maximum debt-to-income indicators. The dialogue with the largest banks as well as the bankers' association has already started, and first signs point to an effective and targeted discussion between the private sector and policy-makers. Further details about the proposed policy measures are available in the FMA report on developments in Liechtenstein's real estate and mortgage market, which was recently published in October 2021.

Non-financial corporations

Liechtenstein's NFC sector is characterized by high equity and low debt. Similar to the household sector, no consolidated debt statistics are available for the domestic NFC sector. Instead, leverage in the corporate sector can be estimated based on supervisory statistics (i.e. exposures of Liechtenstein banks to the domestic NFC sector), complemented by the volume of issued bonds by NFCs and cross-border claims from foreign banks towards Liechtenstein NFCs. Total debt of the NFC sector amounted to approximately CHF 2.7 billion at the end of 2020, corresponding to about 42% of GDP. Less than half of this debt is held by domestic banks (approx. CHF 1.2 billion), with credit from foreign banks (approx. CHF 1.1 billion) and, to a lesser extent, international debt securities issued by the domestic NFC sector (approx. CHF 0.5 billion) also playing a significant role in terms of NFC financing. As shown in Figure 17, the indebtedness of the NFC sector, estimated at around 42% of GDP by end 2020, is remarkably low in international comparison, with the United States (79%), the euro area (107%) and Switzerland (131%) exceeding this number by far.

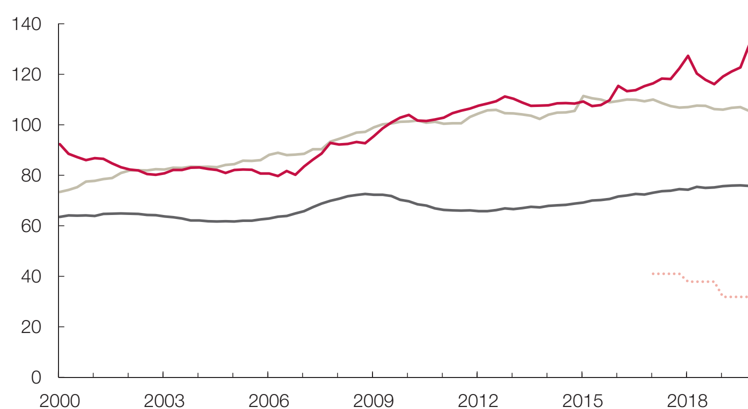


Figure 17
Indebtedness of non-financial corporations (percent of GDP)
Sources: BIS, Office of Statistics, FMA, own calculations.

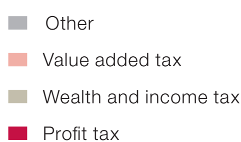
The low indebtedness of the NFC sector is also a result of specific tax incentives rewarding high levels of equity. As equity costs of (currently) up to 4% are tax-deductible, Liechtenstein's corporate tax framework incentivizes high levels of equity in the corporate sector. More precisely, since high equity reduces the corporate tax on profits, companies have strong incentives to keep their leverage low, i.e. balance sheets of the corporate sector typically feature high equity and relatively low debt, contributing to the stability of the corporate sector and the economy as a whole.

Stability of the NFC sector is key for Liechtenstein's economy, as the manufacturing and industrial sector is about twice as large as the financial sector in terms of GDP contribution. In contrast to other financial centers, Liechtenstein's economy is well diversified, with the manufacturing and industrial sector's share in GDP amounting to approx.

42%. The industrial sector is dominated by the globally competitive machinery industry (machinery, engines, tool building) which contributes more than 16% to GDP. The financial services sector, even when including legal and tax advice as well as auditing, contribute about 22% to GDP, and is thus roughly half the size of the industrial sector according to the 2018 national accounts.

Public sector

Notwithstanding the significant additional expenditures in light of the COVID-19 pandemic, Liechtenstein's public sector is expected to report a budget surplus in 2020. To cushion the economic consequences of the COVID-19 pandemic, the government, in conjunction with parliament, adopted a comprehensive fiscal support package already in March 2020. The fiscal measures, which were further extended by municipalities' budget, resulted in fiscal stimulus measures amounting to around 2% of GDP (or CHF 130 million). The primary objective of the support measures was the safeguarding of jobs, securing livelihoods and mitigating the consequences for the economy. While the largest part in terms of volume was provided for a comprehensive furlough scheme to dampen the effects of the recession on the labor market, the fiscal package also included a bridging loan facility to avoid possible liquidity shortages among SMEs, direct support for self-employed people and small enterprises, as well as the possibility to defer tax and social security payments. Despite of these extra expenditures in light of the global pandemic, and an extraordinary expenditure of CHF 100 million to increase reserves in the social security system, the budget balance on the state level remained significantly positive in 2020.[9] In light of a one-off profit tax revenue of approximately CHF 300 million (Figure 18), the budget



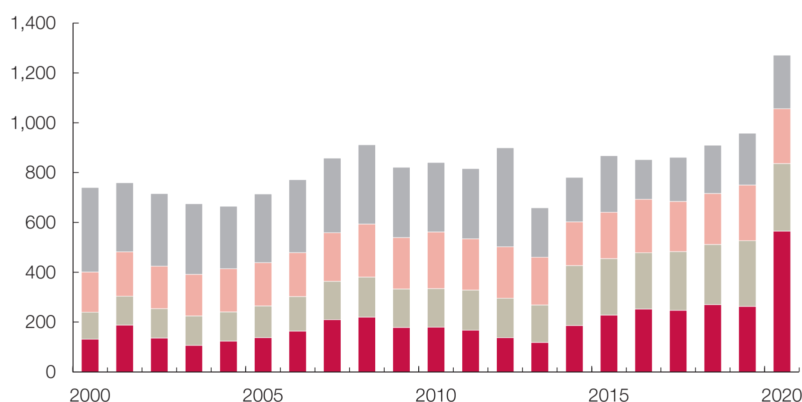


Figure 18
Revenues by tax type (CHF million)
Source: Office of Statistics.

9 *Numbers for the general government level are not yet available for 2020, as explained in the following paragraph.*

balance on the state level closed with a significant surplus of CHF 304 million (almost 5% of GDP, including both an operating surplus of CHF 158 million as well as investment income of CHF 146 million thanks to the high level of financial reserves). Overall, the one-off influx of tax revenue more than offset the fiscal costs of the government's support packages and the pandemic-related shortfalls in revenues. Fiscal numbers for the general government level, including the community level and social insurances, for the year 2020 will become available in early 2022.

Sound public finances have become an important structural characteristic of Liechtenstein's economy. Liechtenstein's public finances are characterized by virtually zero debt and large financial reserves. Sound public finances and the preservation of high financial reserves to cushion for unforeseen shocks to the economy are generally uncontroversial among all political parties in parliament. Following an ambitious structural reform package after the global financial crisis, the Liechtenstein government successfully cut government expenditures while gradually increasing revenues. As a result, Liechtenstein has reported budget surpluses since 2014 (Figure 19), and has regularly outperformed its budgetary plans in recent years. In 2019, on the back of both strong tax revenues and a significant contribution from investment income, the budget surplus at the general government level increased to 3.7% (up from 3.0% in the previous year). In 2019, total gross debt of the public sector amounted to CHF 37 million or 0.6% of GDP, while it recorded large financial reserves. At end-2019, net financial reserves at the general government level amounted to CHF 6.7 billion, a significant increase relative to the previous year and slightly exceeding Liechtenstein's GDP in the same year. Total net financial reserves at the general government level are distributed among the state level (CHF 2.5 billion), the community level (CHF 0.7 billion) and social insurances (CHF 3.5 billion).

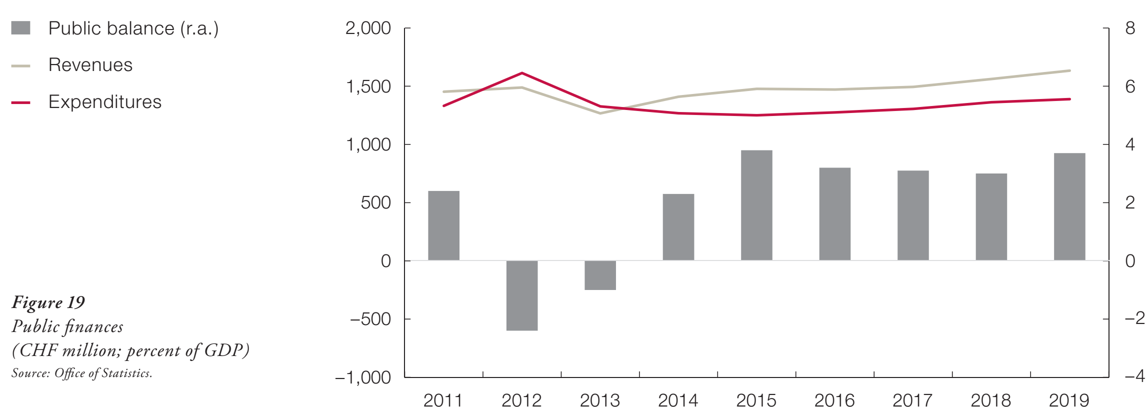


Figure 19
Public finances
(CHF million; percent of GDP)
Source: Office of Statistics.

Today's sound public finances reflect a fast and decisive implementation of necessary structural reforms and an efficient decision-making in economic policy during the last decade. Thereby, the public sector has repeatedly confirmed its flexibility to adapt to new circumstances and its high political effectiveness in implementing structural reforms. On the back of an ambitious structural reform agenda, the level of public expenditures has remained at the lowest level among all European countries, amounting to only 20.9% of GDP in 2019.

Contrary to other parts of the economy, data on public finances are widely available and very detailed. Public expenditures are very transparent in Liechtenstein, both at the state and community level. The comprehensive reporting combined with strong elements of direct democracy in the political system lead to a close surveillance of public finances by the public. Against the background of the comprehensive data sources and the very sound fiscal policy approach in recent years, an in-depth analysis of the public sector – which is quite common in other countries, in particular, to examine public debt sustainability – seems unnecessary in the context of this report.

The fiscal policy approach in Liechtenstein significantly differs from other countries, as countercyclical policy would be mostly ineffective in light of the extremely small and open economy. Besides the remarkable soundness of public finances, the special focus of fiscal policy in Liechtenstein should also be emphasized in this context. While fiscal policy in other countries typically focuses on countercyclical policy measures, and, thus, acts hand-in-hand with monetary policy to stabilize the business cycle, the role of fiscal policy in Liechtenstein is somewhat different. Since domestic demand plays only a minor role in the extremely small and open economy, any growth-enhancing fiscal policies – both at the revenue or expenditure side – have very limited effects on the demand side, i.e. the multiplier effect would be extremely small. While the COVID-19 related fiscal support measures were exceptional in some instances, as policy-makers also focused on the mitigation of the consequences of the recession, predominantly by safeguarding jobs through a comprehensive furlough scheme, the focus of fiscal policy in normal times is quite different. In general, fiscal policy in Liechtenstein focuses on very sound public finances on the one hand, also to remain independent from global debt markets, and on structural reforms on the other hand, to create the best possible conditions facilitating growth in the private corporate sector. Furthermore, the remarkably strong asset position of the public sector, at the state and community level as well as in social insurances, implies ample room of maneuver in the case of external shocks. In this regard, the very sound public finances are an important stability anchor for the whole economy.

LIECHTENSTEIN'S BANKING SECTOR

Structural features

As the banking sector as a whole as well as the biggest banks are very large relative to Liechtenstein's GDP, a strong focus on macroprudential supervision is important to safeguard financial stability. Total assets of Liechtenstein's banking sector, which is mainly under domestic ownership, continued to increase to a record high and amounted to CHF 97.5 billion at the consolidated level in June 2021 (compared to CHF 74.8 billion on the individual bank level), corresponding to roughly 15 times the country's GDP. Furthermore, the large banking sector is highly concentrated, with three domestic ("other") systemically important institutions (O-SIIs) representing over 90% of total assets of the banking sector. Hence, the related "too-big-to-fail" (TBTF) problem and the resulting moral hazard issue at the national level need to be addressed in order to mitigate risks for Liechtenstein's economy.

Since the publication of the previous Financial Stability Report (FSR) in November 2020, the banking sector has been further consolidated, as two small banks surrendered their banking licenses, citing increased regulatory pressure and internal restructuring of the parent company as the main reasons. As a result, the total number of banks in Liechtenstein decreased to 12 institutions. The three O-SIIs in Liechtenstein's banking sector are not only extremely large in relation to Liechtenstein's small economy, but also the three largest institutions relative to the respective headquarter country's GDP in the entire EEA.[10] At the same time, their level of capitalization is well above-average (Figure 20). Against this background, a stable banking sector is key for the whole economy, even though total assets of the three largest banks remain relatively small in comparison to large European banks. Consequently, both the large banking sector as well as the dominating role of these three institutions has to be considered in the design and application of macroprudential instruments.

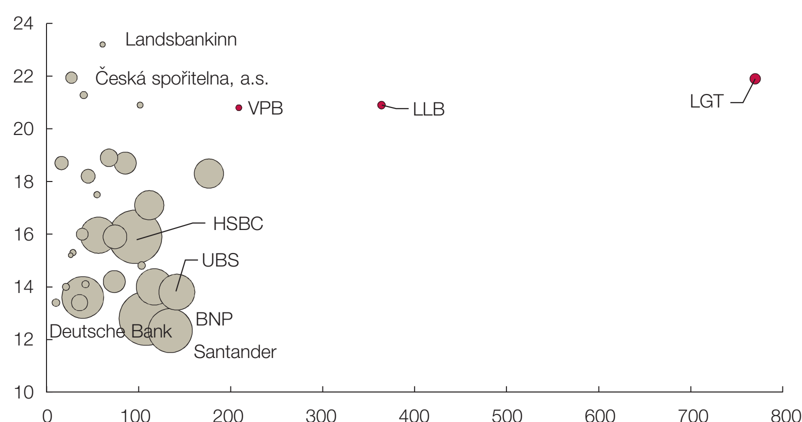


Figure 20
Banks' capitalization and size (y-axis: CET1 ratio; x-axis: assets as percent of the country's GDP; size of circle: total assets in logs)
Sources: Bloomberg, banks' annual reports, FMA, Eurostat. Sample: Besides Liechtenstein (where all three O-SIIs are shown), only the biggest G-SII or O-SII in each EEA country and Switzerland is considered, respectively. The size of the circle is proportional to total assets.

10 *This stylized fact is mainly due to the small country size and the associated low GDP in a cross-country comparison, as total assets of Liechtenstein's O-SIIs are still relatively small compared to large European banks.*

Liechtenstein banks' business model mainly focuses on private banking and wealth management services. The specificities of the business model of Liechtenstein banks is clearly visible when taking a look at their income statements. A simple comparison between global systemically important institutions (G-SIIs) and Liechtenstein's O-SII's (Figure 21) shows significant differences in terms of income sources. For banks focusing on private banking, fee and commission income plays a significantly larger role in their income distribution. In 2020, 44.2% of total income of the three largest Liechtenstein banks was attributed to fee and commission income, while only 36.1% were attributed to interest income. Contrary to the domestic banks' business model, fee and commission income (28.8%) played a much smaller role for G-SIIs, while interest income is by far the main income source for G-SIIs, standing at 48.2% in 2020.

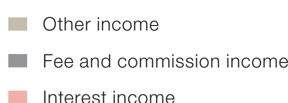


Figure 21
Income sources of Liechtenstein banks compared to global systemically important institutions (G-SIIs) (percent)
Sources: FMA, annual reports.

These figures underline that private banking and wealth management services are the most important source of earnings for Liechtenstein's banking sector. Liechtenstein banks have traditionally relied on private banking and wealth management activities, but have avoided the riskier field of investment banking. Against the background of the low interest rate environment both in Europe and in the Swiss franc currency area, the lower significance of interest income is currently advantageous from a regulatory and profitability perspective and implies that Liechtenstein banks are not as vulnerable to a decline in interest rate margins as banks in other countries. As explained in Box 5, interest rate risks in the banking book are also assessed to be limited in Liechtenstein. Other income refers to income from securities, financial transactions, real estate and other ordinary income. Looking ahead, following international banking trends, sustainable finance is also becoming increasingly important for Liechtenstein banks both from a client perspective as well as from a risk mitigation perspective (see also Box 9).

Profitability

Banks' profits have remained stable during the COVID-19 pandemic and continue to benefit from strong growth in foreign markets. While earnings before tax (EBT) decreased by approx. 15% from 2019 to 2020, EBT has recovered during 2021, with earnings in the first semester recording a 6.5% year-on-year increase. Nevertheless, profits in recent years, standing at CHF 541.9 million in 2020, still lack considerably behind earnings before the global financial crisis (CHF 861.6 million in 2007). Profitability remained subdued for some years following the crisis, not only due to the sluggish global recovery, but also due to increasing international regulatory pressure, leading to additional expenses for banks. It is also of note that the earnings of the banking sector, contrary to the global financial crisis in 2008, did hardly suffer during the COVID-19 pandemic and have shown a quick recovery (see also Figure 23). While profitability of domestic banks has recovered substantially in the past years following a major decrease in 2008, the contribution of foreign group companies has become increasingly important for the banking sector, making up 55.3% of total EBT in the first half of 2021.

During the COVID-19 pandemic, assets under management (AuM) have continued their upward trend. Thanks to Liechtenstein's membership in the European Economic Area (EEA), banks enjoy full access to the European Single Market. Some banks are additionally active outside the EEA with subsidiaries and branches in Switzerland, the Middle East and Asia. After some difficult years following the global financial crisis, AuM (Figure 22) have followed a positive development over the last few years, which is driven by net money inflows, acquisitions abroad and positive market developments. AuM of Liechtenstein banks are well diversified across the globe, highlighting the international interconnectedness of the domestic banking sector. Given the safe-haven nature of the Liechtenstein banking sector, net money inflows have been positive throughout 2020, resulting in a total inflow of CHF 17.7 billion. In the first two quarters of 2021, net new money inflows amounted to CHF 18.2 billion, with banks reporting a record high of AuM of CHF 412.4 billion in June 2021.

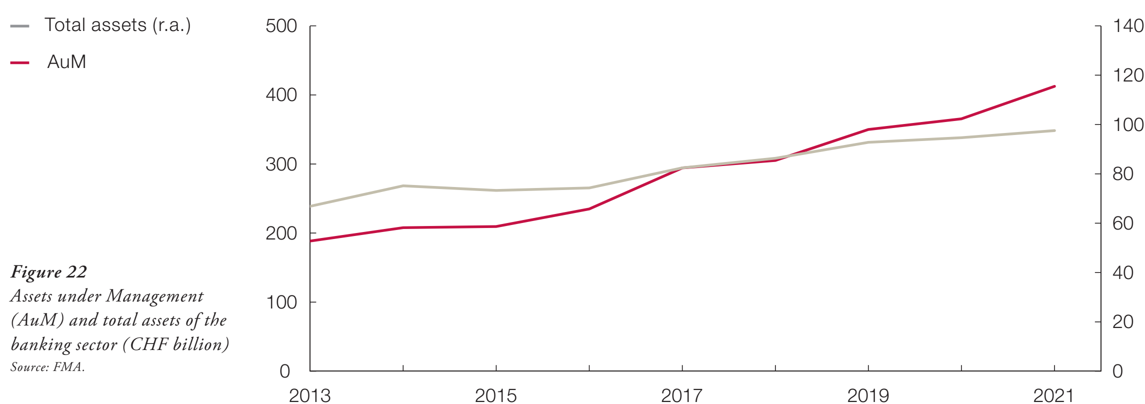


Figure 22
Assets under Management (AuM) and total assets of the banking sector (CHF billion)
Source: FMA.

Profitability indicators of Liechtenstein banks have remained remarkably stable during the recent recession. Despite having specialized business models, Liechtenstein banks do not rank among the most profitable ones in comparison to other European banks, but are around the EU average. The tax system incentivizes high equity rates, which is also an important factor for the high capitalization of the banking sector, which significantly exceeds regulatory capital requirements. At the same time, however, high equity ratios dampen key profitability indicators such as the return on equity (RoE). Due to the specialized business models of Liechtenstein banks, RoE remained very stable during the COVID-19 pandemic and the related global economic downturn. While the RoE in the US and the EU plummeted in the first half of 2020, RoE for the domestic banking sector remained stable and even increased to 8.1% in the first quarter of 2020, before returning to 6.6% in June 2021. The temporary downturn in the third quarter of 2020 is attributed to a one-off acquisition event not related to the COVID-19 pandemic and does not have a negative structural effect on RoE in Liechtenstein. Despite of stable profitability indicators, however, the "lower for longer" environment will continue to pose challenges to Liechtenstein banks going forward, particularly for smaller domestic banks.

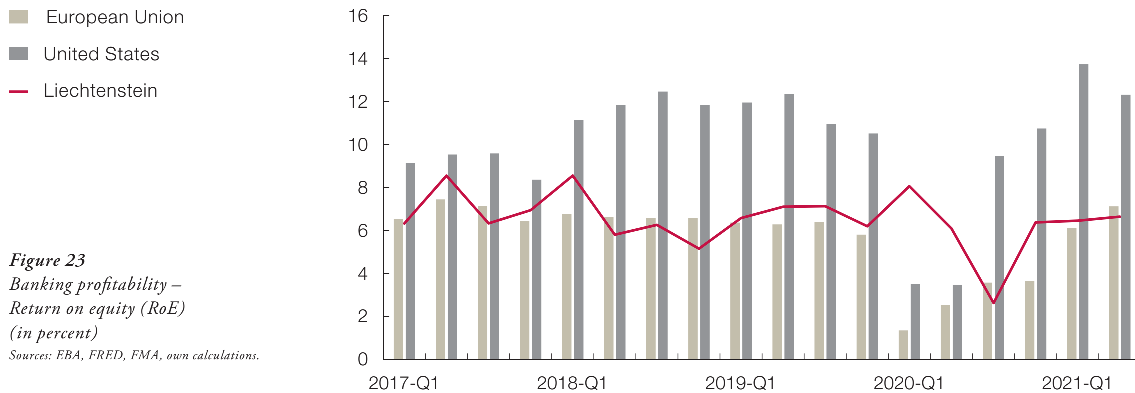


Figure 23
Banking profitability – Return on equity (RoE) (in percent)
Sources: EBA, FRED, FMA, own calculations.

Efficiency indicators do not only reflect the high regulatory pressure, but also point to further room for improvement. The relatively high cost-to-income ratio (CIR), standing at 69.3% by mid-2021, has decreased somewhat in recent years in Liechtenstein, while still remaining at elevated levels. However, this high value must be put into perspective, as private banking and wealth management are very staff-intensive businesses and, thus, associated with high labor costs. The high regulatory pressure has been extremely challenging, in particular, for smaller banks, and related expenses – e.g. compliance costs – have pushed the CIR upwards. Staff costs in compliance, especially in the anti-money-laundering and regulatory units, internal audit as well as risk management have increased significantly over the last

years. Global competition will remain challenging, however, and the underperformance with regard to this specific efficiency indicator suggests further room for improvement. Overall, despite some heterogeneity across individual banks, Liechtenstein's banking sector is fairly profitable, while showing high stability also in high-volatility episodes such as the COVID-19 pandemic. A sustained reduction of the CIR and a strengthening of the structural efficiency in the banking sector will remain a key challenge for the coming years.

BOX 5

Interest rate risks in the banking book (IRRBB)

In 2019, the FMA introduced new reporting standards related to banks' interest rate risks in the banking book (IRRBB), which can negatively impact banks' capital base if they become excessive. According to the capital requirements Directive ("CRD"), all banks are identifying, measuring, monitoring and controlling their IRRBB. In line with global and European standards, IRRBB refer to the current and prospective market risk to the bank's capital and earnings position arising from changes in interest rates that affect banking book positions, e.g. loans. When interest rates increase, the present value as well as the duration of future cash flows – and, therefore, the economic value of fixed-interest exposures – may change. Interest-sensitive bank assets decline in value when market interest rates increase. These losses on market-priced assets are absorbed by the banks' capital. In addition, the movement of interest rates affects the interest rate-sensitive income and expenses of a bank, having a direct impact on their net interest income ("NII"). Additionally, these stock and flow risks are closely interlinked, further complicating the respective analysis.

The FMA supervises the IRRBB of domestic banks as part of their internal Pillar 2 calculations on an ongoing basis, in the context of the annual Supervisory Review and Evaluation Process (SREP). The methodological approach of the SREP is highly standardized at the European level. Regarding the IRRBB, the EBA published updated guidelines on the management of interest rate risk arising from non-trading book activities in 2018[11], which considers the respective global standards of the Basel Committee on Banking Supervision (BCBS).[12] The updated guidelines include two predefined thresholds for the measurement of the change in economic value of equity. The first threshold originates from the CRD and assumes that institutions calculate the impact of parallel changes in interest rates of +/–200 basis points (bp) on their own funds. If the decline in economic value is greater than 20% of an institution's own funds, the institution needs to inform the competent authority immediately. As regards the second threshold, originating from the BCBS standards, the institutions are expected to calculate the impact of six predefined shock scenarios on their own funds. If the decline in economic value is greater than 15% of the institution's Tier 1 capital under the scenarios, the institution needs to inform the competent authority. Thus, the simulation results together with the predefined thresholds serve as supervisory early warning signals. To verify the results of these shock scenarios calculated by domestic institutions, the FMA also estimates the above-mentioned shocks and their respective impact on banks' capital base on a quarterly basis.

The FMA considers the necessity of the prudential management of IRRBB through both a stock and flow dimension, which is assessed by the simulation of eight different shocks. To improve benchmarking and allow for peer-reviews in the context of IRRBB, the FMA introduced new reporting standards for Liechtenstein banks in 2019. The instructions[13] accompanying the reporting requirements provide

11 *EBA (2018). Final report: guidelines on the management of interest rate risk arising from non-trading book activities, EBA/GL/2018/02.*

12 *BCBS (2016). Standards: Interest rate risk in the banking book, April 2016.*

13 *FMA-Wegleitung 2019/11.*

BOX 5

further guidance for reporting banks and disclose supervisory expectations on a granular basis. The respective templates require banks to report all interest-rate-sensitive banking book instruments in significant currencies (e.g. CHF, EUR, USD) within a run-off balance sheet-perspective on a quarterly basis. In addition, Liechtenstein banks simulate and report the outcomes of their interest rate shock scenario analysis with respect to their own funds. Thus, the FMA requires banks to assess, in line with the above-mentioned thresholds, the impact of a +/–200 bp parallel shift in interest rates and, in addition, the following six scenarios:

– parallel shock up
– parallel shock down
– steepener shock (i.e. short rates down and long rates up)
– flattener shock (i.e. short rates up and long rates down)
– short rates shock up
– short rates shock down

The size of each "shock" scenario is predefined in the respective EBA guideline and is based on historical interest rates for selected currencies (as specified in Table B5.1).

	CHF	EUR	USD
Parallel	100	200	200
Short	150	250	300
Long	100	100	150

Table B5.1
Specified size of interest rate shocks (basis points)
Source: EBA.

The results of the interest rate shock scenarios do not point to systemic concerns in Liechtenstein's banking sector, as the decline in economic value of domestic banks' Tier 1 capital across all currencies does not exceed the predefined thresholds for none of the calculated scenarios. Figure B5.1 shows the impact for the different interest rate shock scenarios on domestic banks' Tier 1 capital (aggregated over all currencies and banks). Given the nature of a bank's business model focusing on maturity transformation and the associated interest rate risks, a sudden increase of interest rates (such as in the parallel shock up or a short rates shock up scenario) generates a negative impact on banks' Tier 1 capital (via repricing of assets and increased yield curve risk). On the contrary, decreasing interest rates (in case of a parallel shock down or a short rates shock down) strengthen the economic value of a banks' equity position. However, amendments in the composition and duration of assets and liabilities in banks' balance sheets may change the impact of the shock scenarios over time. For example, the impact of the flattener shock scenario results in a negative impact on domestic banks' own funds until end-2020, while in 2021 the effects on the capital base may even become positive. This could be explained by both a (slight) adjustment of interest rate transformation in banks' business models and/or a change of asset-liability roll-over expectations. Contrary to this, the short rates shock down scenario displays slightly negative effects on domestic banks' Tier 1 capital as of end-2020. In addition, the steepener shock scenario has led to a stronger negative impact on own funds in more recent quarters, due to the simulation of interest rates rising in the long term. Similar results are obtained when the analysis is limited to US dollar positions only. However, the impact of shock scenarios, which are limited to US dollar positions, are smaller in all scenarios.

BOX 5

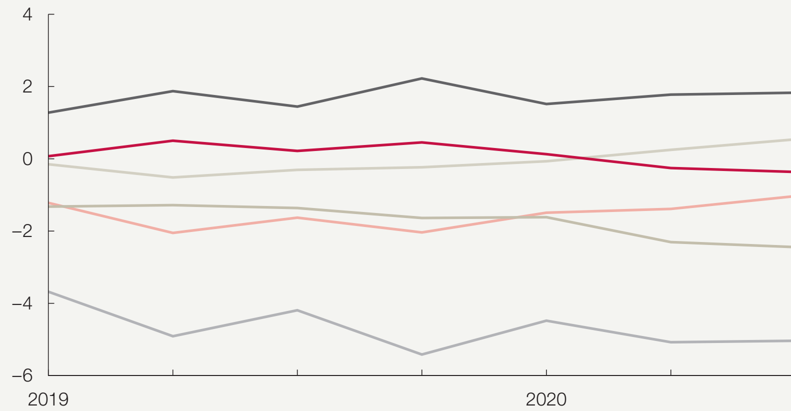


Figure B5.1
Interest rate shock in all currencies (percent of Tier 1 capital)
Source: FMA.

The low interest rate environment challenges the business model and profitability of Liechtenstein's banks. Data from 2020 shows (Figure B5.2) the lowest level of interest income and interest expenses of domestic banks since 2017, while the balance sheet of the entire banking sector grew by 18.3% over the same time horizon. Yet, Liechtenstein banks are still able to hold their interest margin relatively stable. Overall, despite the low interest rate environment, considering the conservative balance sheet structure, the low maturity transformation risk and the strong capital base of the domestic banking sector, Liechtenstein banks are relatively well prepared for sudden changes in the interest rate environment.

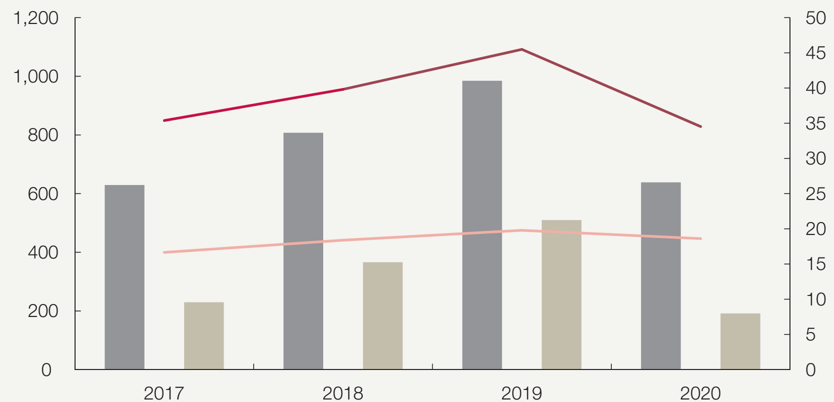


Figure B5.2
Interest income indicators (CHF million; percent)
Source: FMA.

Capitalization and asset quality

Liechtenstein's banking sector has remained well capitalized despite its continuous growth in recent years. On the consolidated level, the Common Equity Tier 1 (CET1) capital ratio stood at 21.8% at the end of 2020 (2019: 20.0%). The increase in capital ratios has continued in 2021, with the CET1 ratio further increasing to 22.3% in June 2021. The capitalization of Liechtenstein banks is substantially higher than the EU average (Figure 24). Assessing the CET1 ratio in more detail (Figure 25), it becomes apparent that the lower CET1 ratios in 2018 and 2019 were mainly driven by an increase in total risk exposures, with growth exceeding the corresponding increase in CET1 capital. Since 2018, CET1 capital has increased steadily, standing at CHF 8.5 billion in aggregate terms in June 2021. The relatively strong increase of the CET1 ratio, by 1.8 percentage points between 2019 and 2020, is both driven by an increase in CET1 capital (CHF 0.5 billion) and a decrease in total risk exposures (CHF 0.8 billion).

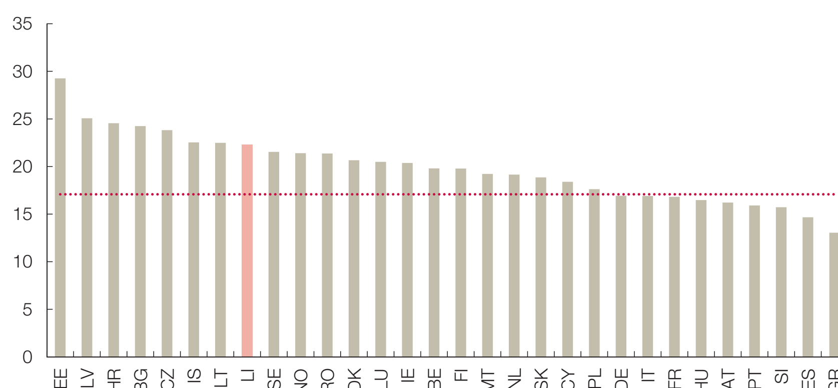


Figure 24
CET1 ratios across EEA countries (percent of RWA, June 2021 or latest available)
Sources: FMA, EBA.

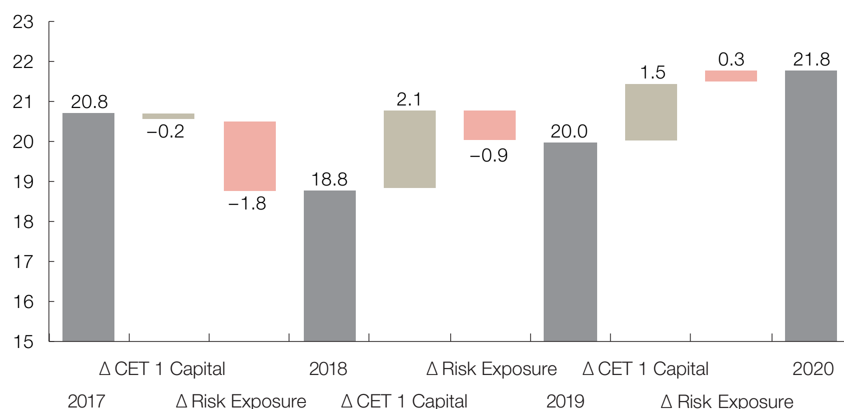


Figure 25
Contributions to changes in the CET1 ratio (percent; percentage points)
Source: FMA.

The high capitalization of the banking sector is also confirmed by the leverage ratio. The FMA has identified the LGT Bank AG, the Liechtensteinische Landesbank AG and the VP Bank AG as O-SIIs in Liechtenstein. While the balance sheets of the three O-SIIs are rather small on an international scale, it is, nevertheless, interesting to compare the capitalization of Liechtenstein's O-SIIs to their peers in other jurisdictions. Liechtenstein's O-SIIs do not only stand out with their CET1 ratios exceeding the 20% threshold, but also based on their high leverage ratios. Since domestic banks apply the standardized approach (StA) to measure credit risks, the ratio of risk-weighted assets (RWA) to total assets is relatively high, amounting to 38.9% in June 2021. The application of the StA for calculating the risk inherent in the banks' exposures implies that the banking sector's capitalization may be underestimated in cross-country comparisons, in particular, relative to banks using the internal ratings-based (IRB) approach. Thus, the difference to EU and Swiss banks is even more pronounced when comparing the corresponding leverage ratios. In Liechtenstein, all three O-SIIs exceed a leverage ratio of 6.5%, which is significantly higher than the minimum requirement.

Asset quality has remained relatively stable despite the COVID-19 pandemic, with non-performing loans (NPLs) continuously staying at low levels. At end-2020, the NPL ratio of the banking sector amounted to less than 0.9%, among the lowest values across European countries. The low level has to be seen in light of the stable development of Liechtenstein's economy in the past few decades despite the global financial crisis and the COVID-19 pandemic. While Liechtenstein's GDP features significant volatility in light of the tiny size of the economy, Liechtenstein never experienced a severe economic crisis, with the housing market even remaining stable during the housing crisis in Switzerland at the beginning of the 1990s. In light of the COVID-19 pandemic, the FMA has recently conducted on-sight inspections in order to monitor asset quality developments and its management in Liechtenstein. Although the NPL ratio has remained at very low levels despite the pandemic, the FMA continues to regularly monitor the asset quality as the adverse effects of the recession may become visible with a significant delay.

Liquidity and funding

The liability side of the balance sheet of Liechtenstein banks primarily relies on deposits. Because of banks' focus on private banking activities, the country's banking sector is relatively abundant with deposits. Total deposits of the banking sector amounted to CHF 76.2 billion in June 2021 on a consolidated basis (which corresponds to 78.1% of total assets). Thus, market-based funding plays a minor role in Liechtenstein, representing only 4% of total liabilities. The remarkably stable funding is also confirmed by the loan-to-deposit ratio, amounting to approximately 65% in June 2021, among the lowest values in Europe, indicating low funding risks for the banking sector.

Standard liquidity indicators also highlight the strong funding base of domestic banks. Liquidity indicators also reflect the strong funding base of Liechtenstein banks, with the average (weighted) liquidity coverage ratio (LCR) amounting to 176.3% in June 2021 (Figure 26). Over time, the LCR in Liechtenstein has remained relatively stable at a high level. Besides the LCR, the net stable funding ratio (NSFR) is another important liquidity indicator. The NSFR focuses on medium and long-term fund-

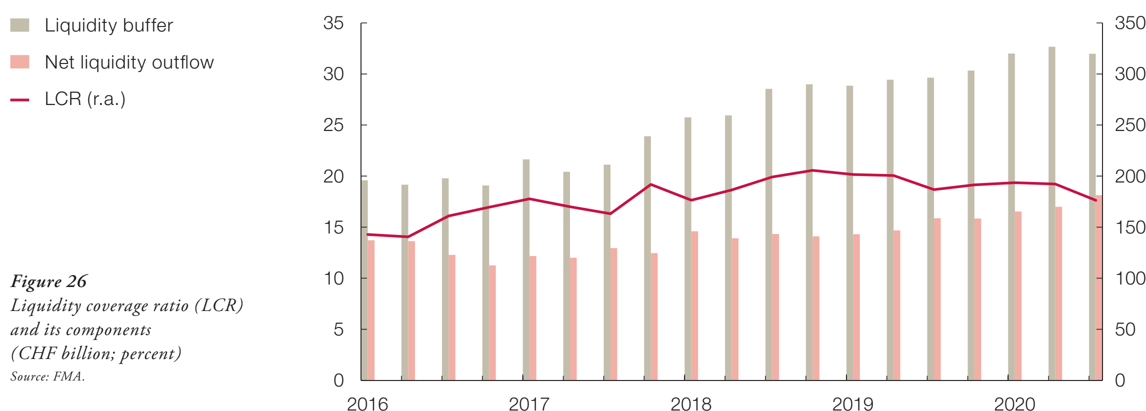


Figure 26
Liquidity coverage ratio (LCR) and its components (CHF billion; percent)
Source: FMA.

ing by comparing available stable funding (ASF) with the requirement of stable funding (RSF). The NSFR will be launched as a binding requirement in the first half of 2022, with the FMA already implementing the respective reporting standards with year-end 2020. Previously, the FMA monitored the NSFR under the assumptions of the Basel standard ("NSFR-proxy"). The results may slightly differ from the future European NSFR according to CRR II. In light of high liquidity buffers, low short-term financing, high capital bases and the vast independence from money market funding of Liechtenstein banks, the average NSFR of Liechtenstein banks is very high (> 200%). This predicts a stable funding base in ordinary as well as in times of stressed funding markets.

Furthermore, the currency treaty between Liechtenstein and Switzerland ensures equivalence of Liechtenstein and Swiss banks in terms of central bank funding from the Swiss National Bank (SNB). Notwithstanding the comfortable liquidity position of Liechtenstein banks, it is important to ensure access to liquidity even in the unlikely case of a crisis. Since Liechtenstein is part of the Swiss franc currency area based on an intergovernmental state treaty, monetary policy is conducted by the Swiss National Bank (SNB). Concerning the Swiss Franc currency area, the SNB has qualified five Swiss banking groups – of which none is headquartered in Liechtenstein – as systemically important. Additionally, the SNB guidelines on monetary policy instruments state explicitly that the emergency liquidity assistance by the SNB requires certain conditions, including that the bank or banking group seeking credit must be of importance for the stability of the financial system. While Liechtenstein banks have access to SNB funding on the same terms as their Swiss counterparts, the SNB guidelines imply that access to emergency liquidity assistance could be limited to some extent for Liechtenstein institutions, at least in comparison to the biggest banks or banking groups in Switzerland. The availability of highly rated securities in banks' balance sheets that can be used as collateral in monetary policy transactions is therefore essential for ensuring banks' liquidity in the unlikely case of a crisis. At the same time, along with their Swiss peers, Liechtenstein banks could make use of the SNB's liquidity-shortage facility and the emergency deposit depot in the case of a crisis, which ensures access to liquidity even in periods of severe liquidity shortage. The banking sector there-

fore benefits from being part of one of the most stable currency areas in the world, with access to central bank funding guaranteed by a corresponding intergovernmental state treaty. One possible solution to address the issue of a lack of access to the emergency liquidity assistance by the SNB would be an IMF accession by Liechtenstein. Thereby, IMF funding would serve as a lender-of-last-resort for the state, which could make this additional liquidity available to the banking sector in times of crisis. Against this background, the government currently considers an accession to the IMF, which would be highly welcome from a financial stability perspective.

LIECHTENSTEIN'S NON-BANK FINANCIAL SECTOR

Insurance sector

Despite the shock related to the COVID-19 pandemic, premium income of insurances in Liechtenstein have remained virtually unchanged in 2020. Until a few years ago, Liechtenstein's insurance sector was dominated by life insurances, which contributed almost 90% of premium income in 2011. Following a decreasing trend of premium income until 2015, the insurance sector has returned to a growth path since 2016. Business models are now much more diversified across sectors, with premium income of non-life insurances exceeding those of life insurances since 2017 (Figure 27).

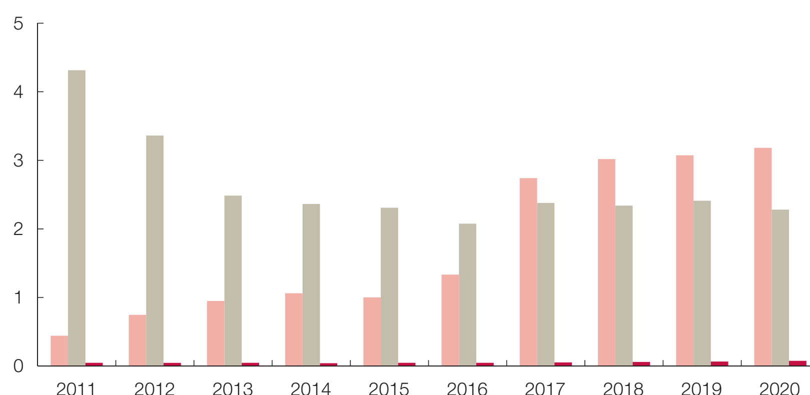


Figure 27
Premium income of insurances in Liechtenstein (CHF billion)
Source: FMA.

While premiums in the non-life sector continued their growth path in 2020 (+3.6% to CHF 3.18 billion), life insurance premiums decreased by –5.4% to CHF 2.28 billion. Reinsurances also showed dynamic growth in the past year (+16.9%), albeit from a relatively low level of premium income (CHF 76 million in 2020). At the end of 2020, 19 life, 14 non-life and 3 reinsurers operated from Liechtenstein. Overall, premium income remained almost unchanged relative to 2019, amounting to CHF 5.54 billion.

Liechtenstein's insurance sector benefits from direct market access to countries of the EEA and to Switzerland. Besides Liechtenstein's EEA membership that ensures market access to the European Single Market, the Direct Insurance Agreement with Switzerland permits Liechtenstein insurers to offer their services also in Switzerland (and vice-versa).

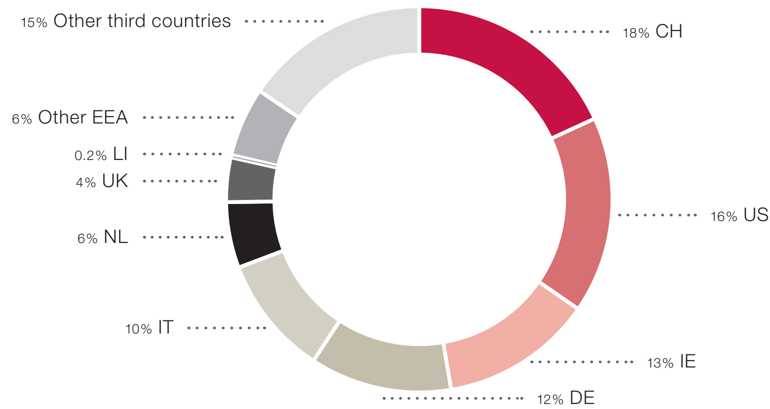


Figure 28
Premium income by country in 2019 (percent)
Source: FMA.

In light of the small domestic market, cross-border provision of services represents the lion's share of insurance revenues. The main markets for Liechtenstein insurance undertakings in 2019 were Switzerland (18% of total premium income), the United States (16%), Ireland (13%), Germany (12%) and Italy (11%). International activities, which are strongly diversified across countries (Figure 28), highlight the attractiveness of Liechtenstein as a location for insurance companies seeking access to both the EEA and Switzerland.

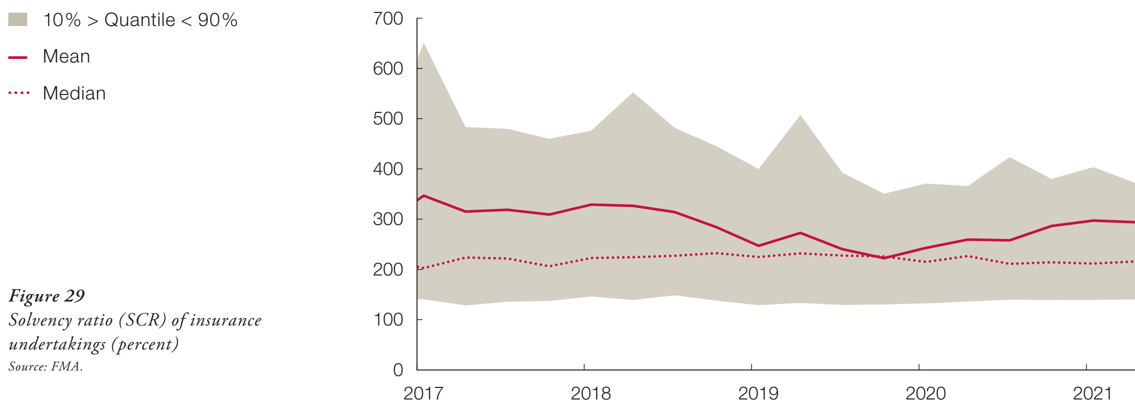


Figure 29
Solvency ratio (SCR) of insurance undertakings (percent)
Source: FMA.

Systemic risks in the insurance sector are assessed to have remained limited. Under the risk-based Solvency II supervisory system, insurance undertakings in the EEA must meet high requirements in terms of capital adequacy to ensure that companies can meet their obligations vis-à-vis policy holders even in extraordinary situations. By the end of June 2021, the median solvency ratio amounted to 216%, remaining fairly stable relative to 2019 (229%) and 2020 (212%). Figure 29 gives an illustration of sol-

vency ratios across the distribution of insurance undertakings in Liechtenstein. By the end of June 2021, all insurance undertakings fulfilled the solvency capital requirements, with the minimum level amounting to 128%. In contrast to other countries, life insurances in Liechtenstein hardly suffer from the low interest rate environment, as guaranteed products are rare in Liechtenstein and the lion's share of capital investments is attributable to investments managed for the account and risk of policy holders as part of unit-linked (i.e. fund-linked) life insurance. In this context, managed capital in the context of unit-linked life insurances in Liechtenstein amounted to approximately CHF 22 billion at the end of 2020. Nevertheless, similar to the situation in other countries, insurances in Liechtenstein are also faced with an increasingly challenging environment in terms of profitability in the last few years.

Pension schemes

Liechtenstein's pension system is built on three pillars. Pillar one includes old age, disability and survivors' insurance and is administered by the state (AHV/IV). This public scheme is complemented by a mandatory occupational pension provision (pillar two), and private pension provision on a supplementary basis (pillar three). The first pillar aims at securing the subsistence level of the insured person and family members in the event of old age, disability, and death. The second pillar is geared towards maintaining the accustomed standard of living after retirement, while the third pillar is an individual, voluntary pension provision, serving to close provision gaps that cannot be covered by the first and second pillars.

For the public pension system (AHV), the year 2020 was characterized by solid investment income and an extraordinary contribution from the state. Following a turbulent year 2018, with the strong financial market correction in December resulting in significantly negative returns in the same year, the return on financial assets amounted to more than 9% in 2019 in light of the positive financial market development, leading to a significant increase in financial reserves. Although the COVID-19 crisis was associated with a sharp drop in financial markets at the start of 2020, the subsequent recovery led to positive investment income for the public pension system for the whole year, with the total return on financial reserves amounting to 2.6%. While the return on financial reserves was lower than in the previous year, financial reserves also benefited from a small increase in contributions (+1.0% to CHF 270.2 million) and an extraordinary state contribution amounting to CHF 100 million, increasing the public contribution to a total of CHF 130.4 million. At the same time, total expenditures also increased by +2.6% to CHF 312.2 million, resulting in a total surplus of CHF 170.5 million.

Structural reforms in previous years imply deficits in the public pension system in the years ahead. As part of the fiscal consolidation package following the public budget deficits in 2012 and 2013, a pension reform was enacted in Liechtenstein. This reform increased the retirement age by one year to 65 and raised the contributions from employers and employees. At the same time, however, it also decreased the state contribution to the public pension system significantly. While the year 2020 marked an exception with an extraordinary state contribution of CHF 100 million, not least due to a positive one-off effect in tax revenues (see chapter 3), it is therefore expected that the expenditures of the public pension system will exceed revenues in

the next years. As expenditures for pensions will exceed the sum of contributions form employees, employers and the state, the structural legal framework implies that the public pension system has to generate positive returns from its investment income to keep financial reserves stable. In 2020, when excluding the extraordinary state contribution (CHF 100 million), this income-expenditure gap (excluding the profit/loss from financial investments, but including the annual ordinary state contribution) amounted to approx. CHF –11.6 million.

Large financial reserves accumulated in the past guarantee a stable public pension system. While the structural reforms imply certain challenges ahead, the public pension system remains on a stable footing, not least due to the large financial reserves of almost CHF 3.5 billion at end-2020, approximately 52% of GDP.[14] As a result, financial reserves could cover pension payments for approximately 11.1 years (up from 10.8 in the previous year). Current projections assume that the income-expenditure gap (excluding investment income) will further widen in the next 20 years, as the share of pensioners will increase relative to the total number of insured individuals. According to the latest projections, dating back to end-2018, the public pension forecasted a decrease of the financial reserves to 4.26 annual expenditures by 2038. As this indicator is below the threshold of 5 annual expenditures in the forecast horizon of 20 years, the government is legally obliged to propose corresponding stabilization measures. While the extraordinary state contribution of 2020 may have mitigated this issue to some extent, it is expected that the government will propose additional measures in the near future to guarantee the stability of public pensions in the long-run. A more detailed analysis is available in the annual report published by the public pension's administration office (AHV).[15]

The occupational pension provision, i.e. the second pillar of the pension system, plays an important role in Liechtenstein to maintain the accustomed standard of living after retirement. The autonomous legal entities in the form of foundations are subject to the Occupational Pensions Act (BPVG) and are supervised by the FMA. Occupational pension provision is funded by employer and employee contributions. The number of entities has decreased over the past few years, from 33 in 2010 to 17 foundations in 2020. This consolidation trend is both due to the challenging financial market environment (i.e. low-interest rate environment) and increased regulatory requirements, leading to higher administration costs. We expect that this consolidation trend will continue in the near future, as larger pension funds can benefit from scale effects. The large pension capital in the second pillar relative to Liechtenstein's GDP underscores the great overall economic importance of the occupational pension scheme. Total assets of the pension scheme amounted to CHF 7.87 billion by end-2020, corresponding to approx. 118% of Liechtenstein's GDP. This figure does not only show the overall well-positioned retirement system in Liechtenstein, but it also emphasizes the significance of the second pillar for the provision of pensions.

14 Since there are no GDP data available for 2020, we calculate the ratio based on internal estimations of potential GDP for 2020.

15 Available on the AHV website, see https://www.ahv.li/fileadmin/user_upload/Dokumente/Ueber/Jahresberichte/AHV-IV-FAK-Jahresbericht--2020.pdf.

Despite the sharp financial market correction at the start of the year, the subsequent recovery was associated with positive returns in 2020. After an extraordinary good year in 2019, with the median investment return amounting to 10% across foundations, 2020 was shaped by the COVID-19 crisis. Following the initial losses in the first quarter, the quick recovery in financial markets led to an overall solid year for the occupational pension system, with the median investment return standing at 3.7%. At the end of 2020, the median cover ratio – i.e. the ratio of available assets to liabilities – stood at 114%, a slight increase from the previous year and a record high since the start of the time series in 2007. Cover ratios of the 17 pension schemes ranged from 100.1% to 127.8% at the end of last year. While these indicators point to an overall stable occupational pension system, similar to other countries, the low interest environment will continue to pose a major challenge in Liechtenstein. With lower returns on assets compared to some years ago, the decreasing trend in conversion rates is set to continue in the years ahead. For a more detailed risk assessment on the occupational pension system, please see the annually published report on pension schemes by the FMA.[16]

Investment funds and asset management companies

Notwithstanding the challenging environment caused by the global pandemic, the investment funds sector continued its growth path in 2020. The fund sector has shown a dynamic development over the past few years, with both the volume as well as the number of funds increasing. Following the market related dip in assets under management (AuM) in 2018 and the dynamic growth in 2019, the past year was characterized by a small increase of 0.9% to CHF 59.1 billion (Figure 30). Alternative Investment Funds (AIF) showed relatively strong growth in AuM (+5.6% to CHF 27.9 billion), while UCITS ("Undertakings for Collective Investments in Transferable Securities", –2.7% to CHF 30.8 billion) and IU ("Investmentunternehmen", –13.0% to CHF 0.46 billion), a domestic fund regime, registered negative growth rates in 2020. The number of sub-funds also increased slightly by 23 to a total number of 763. Overall, the domestic investment funds sector has proved remarkably resilient relative to other countries during the recent COVID-19-related high volatility episode.

16 *The report is available on the FMA website, see https://www.fma-li.li/de/fma/publikationen/betriebliche-personalvorsorge-in-liechtenstein.html.*

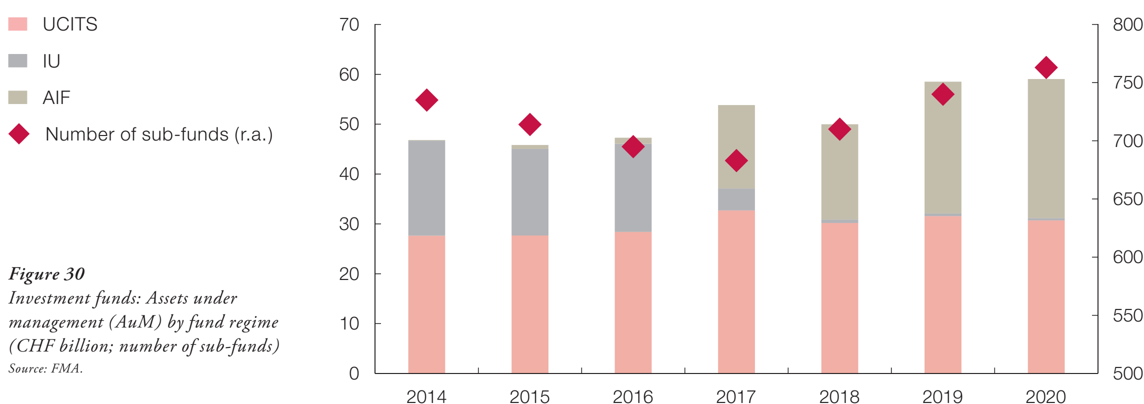


Figure 30
Investment funds: Assets under management (AuM) by fund regime (CHF billion; number of sub-funds)
Source: FMA.

The investment fund sector is closely linked to the banking sector. In Liechtenstein, 16 management companies (ManCos) are authorized to manage investment funds. The ManCos of the three largest banks jointly manage the lion's share of AuM, with the remaining independent ManCos being significantly smaller. The number of employees has remained broadly stable, with 227 employees at the end of 2020 (a decrease by 2 employees relative to 2019).

In light of its strong links to the banking sector, the investment funds sector is relatively low-risk compared to other parts of the financial industry. The largest sub-funds are managed by ManCos tied to Liechtenstein's three largest banking groups, i.e. the sector mainly acts as a complement to the banking sector, with risks remaining relatively limited. While further risk-based indicators on the investment funds sector will become available in the near future, we do not expect to detect major risks in terms of liquidity in the context of the additional risk-based analysis.

Asset management companies (i.e. MiFID investment firms) play a significant role in Liechtenstein, particularly in terms of employment. At the end of 2020, 104 asset management companies (AMCs) reported AuM of CHF 53 billion, of which almost CHF 46 billion were portfolio investments (an increase by about 6% relative to 2019). Roughly half of total assets were hold at domestic banks. AMCs employed about 650 employees in the second half of 2020, corresponding to about 450 full-time equivalents (FTEs), a slight decrease from the previous year. A similar development was registered with regard to the number of client relationship, which decreased from 9732 to 9230 in 2020.

Fiduciary sector

While its importance may have declined to some extent in the past few years, the fiduciary sector still remains an important part of Liechtenstein's financial sector. Publicly available data still lacks detailed information about the fiduciary sector. The number of fiduciaries and fiduciary companies has remained quite stable in the past few years, with a slight decline in 2020 to a total number of 392. In light of a continued downward trend in the total number of foundations and trusts as well as in the

total number of business relationships over the last few years, the relatively stable number of fiduciary and fiduciary companies is somewhat surprising. This development suggests that the business environment is changing structurally. While the business environment may have become more competitive, the increase in regulatory requirements is associated with extra effort – and thus revenues – from existing client relationships, i.e. the fiduciary sector may have become more specialized in recent years. In this context, the well-developed financial center in Liechtenstein – including banks, insurances, investment funds, asset management companies and the fiduciary sector – may enjoy a competitive advantage in certain areas due to its "one-stop-shop" approach, particularly in the area of wealth structuring.

Although a recent revision of the Professional Trustees Act (TrHG) has extended the FMA's supervisory responsibilities in the fiduciary sector, data availability remains an open issue. While the fiduciary sector remains largely self-regulated, with the Liechtenstein Institute of Professional Trustees and Fiduciaries (THK) supervising the duties of the trustees, the new legal provisions – which entered into force in mid-2020 – indeed imply a significant extension of the FMA's responsibilities and aim at facilitating the prevention of abuse and fraud.[17] In this context, governance was a key focus of the revision, and the new law also aims at ensuring the solvency of trustees and trust companies by including a legal obligation of maintaining sufficient financial means. Thereby, the law also includes a mandatory observation of determined principles of accounting according to the Liechtenstein company law (PGR) as well as mandatory external audits. While the respective audit reports have to be submitted to the FMA on an annual basis, the legal revision does not introduce a reporting system for fiduciary companies with regard to prudential indicators, with data availability in the fiduciary sector remaining an open issue even after the submission of audit reports to the FMA in 2023.

Token economy

On 1 January 2020, the new legislation on service providers for Tokens and Trusted Technologies entered into force (TVTG). The new law aims at defining a legal framework for all applications of the token economy in order to ensure legal certainty for new business models. As a major difference to legal approaches in other countries, the FMA registers service providers such as token generators or people who verify the legal capacity and the requirements for the disposal of a token. Besides the registration process, supervision activities based on the TVTG are mostly limited to anti-money laundering. Importantly, the TVTG is applicable in parallel to classic financial market regulation.

Both the number of entities as well as the quantity of services applying for registration has picked up substantially since last year. The TVTG includes a grandfathering period to persons that already carried out an activity that is regulated under the new law. Those service providers could continue to offer their services without registration until the end of the year

17 *For a more detailed explanation regarding the legal revisions, please also see Box 7 in last year's Financial Stability Report.*

2020. During this grandfathering period, a total of 24 entities reported to the FMA that they had already been active in 2019, i.e. intending to make use of the grandfathering period in 2020. In the meantime, 16 of these companies have applied for a registration according to the TVTG, eight of them have successfully registered. In total, 13 entities have successfully registered for 28 services. Additionally, 18 applications (for a total of 30 services) are currently under consideration. The so far registered entities include both classical financial intermediaries (e.g. banks, fiduciaries etc.) as well as "new" players (e.g. cryptocurrency exchanges) in the financial market. With the planned European legislation (Directive (EU) 2019/1937 on Markets in Crypto-assets, MiCA), some service providers currently covered by the TVTG will be comprehensively regulated across the Single Market. The implications for the regulation in Liechtenstein are not yet clear, but will be analyzed in detail going forward.

MACROPRUDENTIAL POLICY IN LIECHTENSTEIN

Policy and regulatory framework

The responsibility for macroprudential policy and supervision in Liechtenstein is divided among the FMA, the Financial Stability Council (FSC) and the government. The FSC is the central body for macroprudential policy and is, since it has been established in 2019, holding quarterly meetings to discuss a broad range of topics related to financial stability (see Box 8 for an overview of its decisions taken in the past year). The FSC is composed of representatives from the Ministry of General Government Affairs and Finance (MPF) and the FMA. The FMA is the competent authority for macroprudential supervision and safeguards the stability of the financial market in Liechtenstein according to Article 4 FMA Act. Based on the FMA's financial stability analyses and studies, the FSC proposes the application of macroprudential measures by issuing recommendations and warnings to the government, the FMA or any other domestic authority. In this context, the FMA serves as Secretariat to the FSC and is responsible for providing background analyses and research for the decisions of the FSC. Thereby, the FMA meets its legal mandate to preserve financial stability and, thus, assumes functions in the area of financial stability that are typically assigned to the central bank in other countries. Decisions regarding the application of macroprudential instruments are then taken by the FSC, whereas either the government or the FMA decide on the implementation for a wide range of macroprudential instruments within the framework of the existing legislation.

In addition, the MPF and the FMA are also represented in the ESRB and actively participate in its work and committees. While both the MPF and the FMA are represented in the European Systemic Risk Board's (ESRB's) decision-making body, the ESRB General Board, FMA staff is in charge of contributing to the technical work of the remaining ESRB committees. This is in line with the FMA's mandate to ensure financial stability and its role as the competent authority for macroprudential supervision in Liechtenstein. In this context, macroprudential authorities have continued their intense work regarding the implementation of the substantial list of ESRB recommendations in Liechtenstein during the last year (see Box 6).

The new legal framework for macroprudential policy, as introduced by the CRD V[30], is expected to be implemented by May 2022.[31] Given the legal revisions of the macroprudential policy framework in the context of the CRD V (see Box 7), the national macroprudential authority in Liechtenstein is revising its capital buffer framework according to the new common standards applicable in the EU. These revisions affect the calibration of all capital-based measures, in particular, however, the systemic risk buffer (SyRB) in light of its increased flexibility under CRD V. Section 6.2 provides an overview of the changes and the impact of the revisions with respect to the recalibration of the capital buffers in Liechtenstein.

30 *Capital Requirements Directive, Directive 2019/878/EU.*

31 *See Box 7 for an overview of the key revisions regarding the macroprudential policy framework.*

BOX 6

Implementation of ESRB recommendations in Liechtenstein

The European Systemic Risk Board (ESRB), in case of having identified substantial risks to the European financial system, issues warnings and recommendations to both its member countries and to national and European supervisory authorities. The ESRB is responsible for the macroprudential oversight within the EEA financial system and contributes to the prevention and mitigation of systemic risks. In pursuit of its macroprudential mandate, the ESRB monitors and evaluates systemic risks and issues warnings and recommendations, where appropriate.

Liechtenstein became a (non-voting) member of the ESRB in 2017 and has actively participated in the various work streams of the ESRB since then. While the ESRB was established in response to the global financial crisis already in 2010, it took until 2017 – with the adoption of the respective EEA decision – that Liechtenstein officially became an ESRB Member State. Since then, the FMA is actively participating in the work of the ESRB and, in addition, has started implementing the substantial list of ESRB recommendations which were issued before Liechtenstein became a member.

The first two ESRB recommendations which were implemented in Liechtenstein in 2019 focused on legally establishing the Financial Stability Council[18] (FSC) on the one hand, and on developing a "macroprudential strategy"[19] on the other hand. The Financial Stability Council (FSC, Ausschuss für Finanzmarktstabilität) is the central body for macroprudential supervision in Liechtenstein and was legally established by creating a comprehensive institutional framework for macroprudential policy and supervision. To operationalize its key objective of fostering financial stability, macroprudential supervision in Liechtenstein follows the recommendations of the ESRB. In addition, in the event of an ESRB warning or recommendation which is relevant for Liechtenstein, it is the statutory responsibility of the FSC to discuss how to deal with these warnings and recommendations and to decide on appropriate macroprudential measures if deemed necessary.

Since its establishment, the FSC has followed an ambitious agenda in implementing ESRB recommendations relevant to Liechtenstein. Since 2019, the FSC has managed to catch up for most of the earlier recommendations, which were issued before Liechtenstein became an ESRB member. These recommendations include the quarterly calibration of the CCyB rate for Liechtenstein[20] as well as the recognition and setting of CCyB rates for exposures to material third countries of the Liechtenstein banking sector.[21] Moreover, the FMA – in collaboration with the FSC – has put a lot of effort into closing real estate data gaps[22] in the past two years to improve the monitoring framework of the domestic residential real estate (RRE) sector including cur-

18 *Recommendation of the European Systemic Risk Board of 22 December 2011 on the macro-prudential mandate of national authorities (ESRB/2011/3).*

19 *Recommendation of the European Systemic Risk Board of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1).*

20 *Recommendation of the European Systemic Risk Board of 18 June 2014 on guidance for setting countercyclical buffer rates (ESRB/2014/1).*

21 *Recommendation on recognising and setting countercyclical buffer rates for exposures to third countries (ESRB/2015/1).*

22 *Recommendation of 31 October 2016 on closing real estate data gaps (Recommendation ESRB/2016/14 as amended).*

BOX 6

rent lending standards for loans given the risks in the domestic real estate sector in light of the high indebtedness of private households in Liechtenstein. As the domestic RRE market is characterized by a number of country-specificities (see also Box 4), the FSC has decided to take particular account of the principle of proportionality when implementing the ESRB recommendation. Until now, only three recommendations have not yet been fully implemented given their very early timeline and the focus of the FSC on more urgent and relevant recommendations to Liechtenstein. These recommendations deal with lending in foreign currency[23], US dollar denominated funding of credit institutions[24] as well as funding of credit institutions.[25] Currently, the FMA is analyzing the financial stability relevance of these recommendations for Liechtenstein and will propose their implementation to the FSC in the near future if deemed necessary.

In light of the COVID-19 pandemic, the ESRB has swiftly issued a number of recommendations to tackle the related risks on financial stability within the EEA. One of the four recommendations issued focuses on monitoring the financial stability implications of debt moratoria, public guarantee schemes and other measures of a fiscal nature to protect the real economy in response to the COVID-19 pandemic.[26] In this context, national macroprudential authorities were recommended to monitor and regularly report the design features and uptake of measures taken to the ESRB in addition to assessing implications for financial stability in their domestic economy. Another recommendation of the ESRB encouraged banks and insurance corporations in the EU to limit voluntary pay-outs[27] (e.g. dividends, bonuses or share buybacks) to remove potential stigma attached to financial institutions. The recommendation aimed to preserve financial institutions' capital resources during these critical times of the pandemic, to enhance the resilience of the financial sector and to strengthen its capacity to lend to the real economy. The third recommendation addressed to national competent authorities deals with the liquidity risks arising from margin calls[28] due to sharp drops in asset prices and increased volatility, leading to significant margin calls across derivative markets. The fourth recommendation issued by the ESRB was addressed to the ESMA and national competent authorities given the significant redemptions from some investment funds and the deterioration of financial market liquidity as a consequence to sharp asset price falls.[29] The FSC has dealt with all recommendations addressed to Liechtenstein in due time and is closely collaborating with the ESRB Secretariat in implementing the relevant recommendations.

23 *Recommendation of the European Systemic Risk Board of 21 September 2011 on lending in foreign currencies (ESRB/2011/1).*

24 *Recommendation of the European Systemic Risk Board of 22 December 2011 on US dollar denominated funding of credit institutions (ESRB/2011/2).*

25 *Recommendation of the European Systemic Risk Board of 20 December 2012 on funding of credit institutions (ESRB/2012/2) and related annex.*

26 *Recommendation of the European Systemic Risk Board of 27 May 2020 on monitoring the financial stability implications of debt moratoria, and public guarantee schemes and other measures of a fiscal nature taken to protect the real economy in response to the COVID-19 pandemic (ESRB/2020/8).*

27 *Recommendation of the European Systemic Risk Board of 27 May 2020 on restriction of distributions during the COVID-19 pandemic (ESRB/2020/7) – as amended (ESRB/2020/15).*

28 *Recommendation of the European Systemic Risk Board of 25 May 2020 on liquidity risks arising from margin calls (ESRB/2020/6).*

29 *Recommendation of the European Systemic Risk Board of 6 May 2020 on liquidity risk in investment funds (ESRB/2020/4).*

BOX 7

Revision of the macroprudential capital buffer framework in light of the CRD V

The Capital Requirements Directive (CRD) and Regulation (CRR) – the core elements of the standardized legal framework for banking regulation in the European Economic Area (EEA) – have recently been revised. In the CRD IV and CRR, which entered into force in Liechtenstein in 2015, macroprudential tools were introduced to strengthen the resilience of the banking sector against future financial crises. Five years after the European post-crisis regulatory reforms entered into force, the legislator decided to revise the corresponding legal acts to address certain weaknesses in banking regulation in the Single Market under the new CRD V/CRD II. In addition, the revisions aim at ensuring a harmonized interpretation of the provisions, while also reducing excessive regulatory burden for banks or investment firms. Thereby, the existing EEA regulatory framework is also aligned to international developments.

Building on the experience gained so far in using the macroprudential toolkit, the legal changes also include revisions to the macroprudential capital buffer framework. Some important changes need to be considered when recalibrating macroprudential capital buffers. In particular, the capital buffers in Liechtenstein need to be adjusted to prevent buffer requirements from increasing only because of the intended legal changes. The main changes of the EU's revised CRD V macroprudential framework relate to the Systemic Risk Buffer (SyRB, Article 133 CRD V) and the Other Systemically Important Institutions Buffer (O-SII buffer, Article 131 CRD V). In particular, the new provisions turned Pillar 2 into a purely microprudential tool by clarifying its institution-specific nature and further streamlining its application. This change was offset by increasing the flexibility of macroprudential capital buffers, including a more targeted use of the SyRB.

With the introduction of the CRD V, the flexibility of the systemic risk buffer is increased by extending the scope of its application. The SyRB can now be applied in a sectoral manner, while the reference to long-term non-cyclical risks was removed from the SyRB's application to compensate for the fact that Pillar 2 capital requirements can no longer be used for macroprudential purposes. The aim of the sectoral SyRB is to allow authorities to target specific systemic risks that are inherent in banks' exposures at a sectoral level. For this reason, the CRD V defines four specific high-level sectoral exposures to which a SyRB can be applied (EBA, 2020)[32], e.g. it differentiates between natural and legal persons as well as between residential and commercial immovable property or subsets thereof. In addition, the legislator clarified the interdependencies between the SyRB, the O-SII and CCyB, respectively. According to the CRD V, the SyRB may address all systemic risks which are not covered by the O-SII (Article 131 CRD V) and the CCyB (Article 130 CRD V). Therefore, the SyRB and the O-SII buffer will apply cumulatively as overlaps of risks between the buffers must be considered in the calibration procedure. In

32 *EBA (2020). Final guidelines on the appropriate subsets of sectoral exposures to which competent or designated authorities may apply a systemic risk buffer in accordance with Article 133(5)(f) of Directive 2013/36/EU. EBA/GL/2020/13, 30 September 2020.*

contrast, under CRD IV, only the higher of the SyRB and the O-SII buffer applied due to the possibility of "double counting" of systemic risks. The new common framework aims to increase the harmonization of the SyRB, to facilitate a common approach throughout the EEA and to support reciprocation of the SyRB measure across Member States.

The CRD V only foresees minor changes with regard to the CCyB and the O-SII buffer. The O-SII buffer calibration is fairly harmonized and O-SIIs are identified based on a standardized two-step approach based on a corresponding EBA guideline.[33] One of the main changes regarding the O-SII buffer under CRD V relates to the increase of the maximum buffer rate from 2% to 3% of risk-weighted assets, also resulting in increased flexibility in calibrating this instrument at the national level. The CCyB remains essentially unchanged with its calibration still building on a rule-based approach, whereby the consideration of additional cyclical indicators is explicitly encouraged ("guided discretion").

The CRD V and CRR II have not yet been incorporated into the EEA agreement, but the provisions will enter into force in Liechtenstein in early 2022. The new legal framework has been introduced in the EU as of December 2019. However, in EEA-EFTA states the provisions are not yet applicable, as the legal acts have to be formally incorporated in the EEA agreement. In light of the high relevance for Liechtenstein's financial market, however, it is expected that the new framework will be implemented into Liechtenstein's national legislation by May 2022.

33 *EBA (2014), Guidelines on the criteria to determine the conditions of application of Article 131(3) of Directive 2013/36/EU (CRD) in relation to the assessment of other systemically important institutions (O-SIIs). EBA/GL/2014/10, 16 December 2014.*

Recent developments in macroprudential policy in Liechtenstein

Over the last few years, Liechtenstein macroprudential authorities have introduced an effective and transparent policy-mix consisting of capital as well as lender- and borrower-based measures. The comprehensive combination of various macroprudential measures aims at increasing the risk-bearing capacity of Liechtenstein's banking sector and reducing the build-up of systemic risks. Current macroprudential measures include capital buffer requirements to improve the resilience of institutions and to reduce the likelihood of the materialization of structural risks. In addition, the policy-mix contains several borrower-based measures to prevent the further build-up of systemic risks in the real estate sector. Moreover, activated lender-based measures require banks to hold higher risk weights for riskier residential real estate exposures to further strengthen the risk-bearing capacity of banks against these risks.

Capital buffer requirements in the banking sector have remained unchanged despite of the COVID-19 related shock to the economy. At the start of the COVID-19 pandemic, the FMA has reacted quickly by giving financial intermediaries additional leeway by applying more flexibility in the application of the prudential framework. For instance, some supervisory reporting deadlines which were assessed not to be crucial as well as non-urgent on-site inspections and management meetings were postponed. Contrary to other countries, and in light of high capital and liquidity indicators, Liechtenstein authorities decided not to release capital buffers based on the assessment that a credit crunch in the domestic economy is extremely unlikely even in such an extreme scenario like the one hitting the world economy at the start of 2020. The continuously high capital buffer requirements also fostered the confidence of investors and market participants in the Liechtenstein banking sector. As Liechtenstein regarded the benefits of releasing buffers relatively small compared to the risks associated with a less

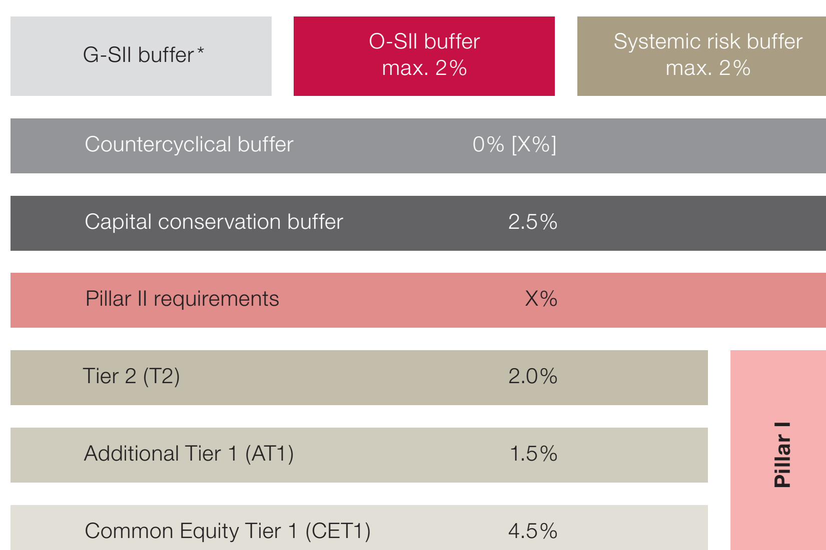


Figure 31
Current capital and buffer requirements for Liechtenstein's banks (percent of risk-weighted assets)
Source: FMA. If both the systemic risk buffer (SyRB) and the capital buffer for other systemically importation institutions (O-SII) are imposed on the same institute, the higher of the two applies.
**The G-SII buffer is not applicable in Liechtenstein.*

resilient banking sector, in particular in a stress period like the COVID-19 pandemic, capital buffers have remained unchanged since their recalibration when they were last adjusted in 2019 (for an overview of current capital buffer requirements in Liechtenstein's banking sector, see Figure 31). In the current crisis, the capital buffers worked as intended, ensuring that banks had sufficient capital at their disposal, supporting the high resilience of the Liechtenstein banking sector while also securing adequate lending to the real economy. In fact, as explained in detail in chapter 4, CET1 ratios in the banking sector continuously increased throughout the year 2020, with the aggregated CET1 ratio standing at 22.3% in mid-2021. A spillover of the real economic downturn to the financial sector was successfully avoided in Liechtenstein, allowing the financial sector to play an important supportive role in the economic recovery.

In light of the legal revisions of the macroprudential policy framework (see Box 7), the national macroprudential authorities in Liechtenstein have recalibrated the capital buffers in the banking sector in 2021. These revisions affect the calibration of all capital-based measures, in particular, however, the systemic risk buffer (SyRB) in light of its increased flexibility under CRD V. Box 8 gives an overview of the intense work program of the Financial Stability Council (FSC) in the course of last year.

Discussions and decisions of the Financial Stability Council (FSC)

BOX 8

The key task of the FSC is to address systemic and procyclical risks to financial stability in Liechtenstein. In line with its mandate, the FSC has discussed issues relevant to financial stability and issued recommendations to the government and the FMA related to the use of macroprudential instruments. During the past year, the FSC particularly focused on the recalibration of the capital buffer framework in the banking sector to account for the legal changes resulting from the implementation of CRD V (see Box 7). Furthermore, the FSC discussed the risks related to the high indebtedness of private households and the appropriateness of the implemented macroprudential measures to mitigate them. To preserve financial stability and to protect the financial system from the effects of the COVID-19 pandemic, the FSC also closely monitored the developments in financial markets and continued implementing the related ESRB recommendations. In addition, the FSC regularly discussed structural and cyclical systemic risks in Liechtenstein's financial sector.

Periodical tasks of the FSC include discussions on current systemic risks and setting various macroprudential capital buffers in the Liechtenstein banking sector. In this context, the FSC has discussed the appropriate levels of the countercyclical capital buffer (CCyB), the capital buffer for other systemically important institutions (O-SII), and the systemic risk buffer (SyRB) by considering the legal changes implied by the introduction of CRD V, which is expected to become effective in May 2022.

BOX 8

The CCyB rate is set on a quarterly basis and has remained at 0% of risk-weighted assets (RWA) since its introduction. The main indicator guiding buffer decisions is the so-called credit-to-GDP gap, which reflects the deviation of the private sector debt ratio relative to GDP from its long-term trend. As the credit gap in Liechtenstein has remained negative over the past years despite the COVID-19 pandemic, the buffer has remained at 0%. Additional indicators support this decision as they also do not indicate excessive credit growth in Liechtenstein. Thus, the FSC has recommended to the government to keep the CCyB unchanged (recommendation FSC/2021/1).

In 2021, the FSC has also reviewed the O-SII buffer and the SyRB in light of the CRD V adjustments. As described in Box 7, the implementation of the CRD V brings about legal changes to the macroprudential framework also impacting the calibration of the SyRB and the O-SII buffer. In light of these changes, the FSC has recommended, based on the calibration proposed by the FMA, to leave the O-SII buffer level unchanged at 2% of risk-weighted assets for the three identified O-SIIs (recommendation FSC/2021/2). The FSC recommended to introduce the O-SII buffer requirement, in addition to the consolidated level, also on the individual level. Moreover, the FSC has also reviewed the SyRB and recommended in October to use the increased flexibility of this instrument under the CRD V. More precisely, the SyRB of 1% will be applied in a sectoral manner to all Liechtenstein banks for loans secured by mortgages in Liechtenstein to increase their risk-bearing capacity against the risks resulting from the real estate sector (recommendation FSC/2021/3).

The FSC has also dealt with various topical issues arising during the past year. Non-periodical items on the agenda of the FSC in the past year included a special focus on the risks related to the high household indebtedness, the policy-actions taken to mitigate macroprudential risks from the COVID-19 crisis, risks associated with Liechtenstein's interconnectedness with the Swiss financial market infrastructure and the implementation of various ESRB recommendations. Following a recommendation in the 2019 Financial Stability Report, the FMA has conducted an in-depth analysis of the indebtedness of private households in Liechtenstein in 2020. Its results and implications for the Liechtenstein financial sector were regularly discussed in the meetings of the FSC in the past year. In line with the ESRB methodology to assess real estate vulnerabilities and the appropriateness of macroprudential policies in the residential real estate sector[34], the risk assessment is based on three main categories: collateral stretch (i.e. price indicators), funding stretch (i.e. credit indicators) and household stretch (i.e. vulnerabilities of household balance sheets). In this context, the FMA has also published a report on recent developments in the domestic residential real estate sector shedding light on the risks related to the high household indebtedness in Liechtenstein (see box 4).[35] The report also discusses various possibilities

34 *ESRB (2019). Methodologies for the assessment of real estate vulnerabilities and macroprudential policies: residential real estate, https://www.esrb.europa.eu/pub/pdf/reports/esrb.report190923_methodologies_assessment_vulnerabilities_macroprudential_policies~7826295681.en.pdf.*

35 *FMA (2021). Immobilien- und Hypothekarmarkt Liechtenstein: Aktuelle Entwicklungen und Risiken aus Sicht der Finanzstabilität.*

BOX 8

how to address both the identified risks and current data gaps that hamper the associated risk monitoring by the FMA. The results of the report have been presented in October 2021 in the context of a public event to increase the public risk awareness. To improve the monitoring framework in the real estate sector by enhancing data availability, the FMA has taken the necessary steps to obtain the relevant information from Liechtenstein banks as of 2022, in line with the FSC decision to implement ESRB recommendation ESRB/2016/14. Furthermore, in the context of ESRB recommendation ESRB/2015/1 dealing with the identification of material third countries, the FSC has recognized the jurisdictions of Hong Kong, Singapore, Switzerland and the United States as materially relevant for the Liechtenstein banking sector. With regard to reciprocating macroprudential measures in Member States (ESRB recommendation ESRB/2015/2), the FSC acknowledged that macroprudential measures taken in other Member States should, in general, be reciprocated but that none of them will be currently reciprocated in Liechtenstein, as the relevant exposures in the Liechtenstein banking sector are either below the respective de minimis thresholds or the respective measures are not applicable to Liechtenstein. Finally, the FSC discussed the financial stability implications of the interconnectedness between the financial market infrastructure of Liechtenstein and Switzerland and also performed the periodical review of the various objectives outlined in the macroprudential strategy.

Furthermore, the FMA has continued its work on the implementation of COVID-19 related ESRB recommendations in 2021, as recommended by the FSC in 2020 (see also Box 6). The FMA implemented recommendations ESRB/2020/6 focusing on liquidity risks arising from margin calls and ESRB/2020/8 relating to reporting and monitoring data on the financial stability implications of the COVID-19 support measures. Additionally, the FSC discussed recommendation ESRB/2020/7, and its amendments (ESRB/2020/15), which provides for a restriction of dividend distributions, share buybacks, and payments of variable salary components for banks, insurance undertakings, reinsurers, and central counterparties until the end of September 2021 in order to strengthen the capital basis of financial intermediaries in the context of the COVID-19 pandemic. In principle, the FSC supported the objectives of the recommendation that the spillover of the crisis to the financial sector should be prevented, so that the financial sector can fulfil its important role in the recovery of the real economy. However, considering the special characteristics of the financial sector in Liechtenstein, especially the above-average capitalization of the Liechtenstein banking and insurance sector, a general prohibition of dividend distributions, share buybacks, and the payment of variable salary components was not considered proportional for the purpose of the recommendation. Therefore, an implementation of the proposed measures was not recommended in Liechtenstein.

The O-SII buffer will remain unchanged at 2% of RWA for the three O-SIIs, but will be applicable both at the consolidated as well as on a solo basis for three banking groups. The O-SII buffer aims at addressing the "too-big-to-fail" issue arising from the assumption of implicit government guarantees, which potentially result in excessive risk taking. The calibration of the buffer requirement is based on the guidelines of the European Banking Authority (EBA)[36], with O-SIIs being identified annually on the basis of ten pre-defined indicators. Based on these indicators, a point score is calculated for all institutions at the highest level of consolidation as well as the individual level. The indicators reflect the systemic relevance of the institution and include the size, the importance for the economy of the relevant Member State and the substitutability/infrastructure of the financial institution, the complexity, which also includes the additional complexity arising from cross-border activities as well as the institution's links with the financial system. The FMA has identified three O-SIIs as systemically relevant to the Liechtenstein banking sector based on the EBA guidelines. The banking sector is highly concentrated around these three systemically important banking groups, as their aggregated total score account for 9,157 points (out of a possible 10,000 basis points). Since all three identified O-SIIs have a total score far above the threshold of 350 basis points set for the identification of an O-SII by the EBA, the FSC recommended that the FMA retains the O-SII buffer of 2% of the total risk amount. The O-SII buffer aims to reduce the probability of large, systemically important institutions to malfunction or fail as well as to limit any related damage for the financial system by requiring them to hold sufficient capital buffer against their risks.

Credit gap (r.a.)
Household debt (l.a.)
Trend household debt (l.a.)

Figure 32
Household indebtedness and resulting credit gap in Liechtenstein (percent of GDP, percent)
Sources: Office of Statistics, FMA.

36 *Guidelines on criteria for determining the conditions of application of Article 131(3) of Directive 2013/36/EU (CRD) as regards the assessment of other systemically important institutions (O-SII) (EBA/GL/2014/10).*

With respect to the countercyclical capital buffer (CCyB), the FSC has decided to retain the buffer at a rate of 0% of risk-weighted assets, as there are currently no signs of excessive credit growth in Liechtenstein. The CCyB, which aims at building up additional capital reserves in times of excessive credit growth, has been kept unchanged at a rate of 0% of risk-weighted assets since its introduction in early 2015. The main indicator guiding the buffer decisions is the so-called credit-to-GDP gap, which reflects the deviation of the private sector debt ratio relative to GDP from its long-term trend. The main estimate of the credit gap[37] remained negative over the year 2020 (Figure 32), supporting the decision to keep the buffer unchanged at 0%. As suggested by the ESRB and the Basel Committee on Banking Supervision (BCBS), the CCyB calibration also considers additional indicators besides this rule-based approach to examine whether the conclusions from the credit-to-GDP guide are consistent with other indicators in the economy. The rule-based approach is only partly conclusive for the economy in Liechtenstein and its special features and, thus, alternative variables play an important role for the CCyB decision. However, as these indicators do not indicate excessive credit growth in Liechtenstein, the FSC decided to leave the buffer unchanged at 0%. Nonetheless, in light of the high household indebtedness and the related risks in the RRE sector, the FMA will continue to closely monitor the cyclical developments in the financial sector and propose to adapt the rate of the CCyB if deemed necessary.

The Systemic Risk Buffer (SyRB) will be recalibrated in light of the regulatory changes implied by the CRD V package. Under the CRD V, on the one hand, the SyRB can be used more flexibly, as the buffer can now be applied to four separate sectors and specific subsets thereof, and flexibility has also been increased by no longer referring to long-term non-cyclical systemic risks. On the other hand, the scope has been narrowed to some extent, now excluding its application to risks that stem from systemically important institutions to avoid overlaps with the G-SII/O-SII buffers. In return, the G-SII/O-SII buffer and the SyRB become additive, i.e. G-SII/O-SII buffers and the SyRB are applicable simultaneously rather than only the higher of the two buffers. The recalibration of the SyRB, which will enter into force after the implementation of the CRD V in Liechtenstein in May 2022, takes account of these regulatory changes. In particular, overlaps to the O-SII buffer are explicitly considered in the calibration, and the increased flexibility of the measure will also be utilized under the revised framework. In general, the SyRB serves to prevent or mitigate macro-prudential risks or systemic risks with potential serious adverse effects on the financial system and the real economy that have not already been covered by the O-SII and the CCyB. In Liechtenstein, the main structural systemic risk is the high level of household debt, mainly due to the high volume of mortgage loans in banks' balance sheets. Although mortgage loan growth has slowed down in recent years, according to tax statistics, the household debt to GDP ratio is still one of the highest in Europe.[38] After considering overlaps with the O-SII buffer and the CCyB as well as various risk mitigating factors, the calibration results in a sectoral SyRB of 1% of risk-weighted assets for loans secured by mortgages on real estate in Liechtenstein for all domestic banks. The calibration, which is based on

37 *The credit-to-GDP gap is calculated on the basis of household debt and bank mortgage loans given the lack of data availability of total private sector debt in Liechtenstein.*

38 *See chapter 3 for more detailed information on the financial stability risks arising from the household sector and its indebtedness.*

past stress scenarios and crisis costs, is considered effective, proportional and appropriate given the level of systemic risks in the Liechtenstein banking system. For example, an abrupt increase in interest rates, an increase in the unemployment rate, or a decline in real estate prices could potentially lead to large defaults on loans and, as a result, large write-offs at domestic banks if borrowers are unable to service their debt and interest payments. In this situation, some Liechtenstein banks could suffer large capital losses. Higher capital requirements for particularly exposed banks can therefore improve the banks' risk-bearing capacity vis-à-vis this systemic cluster risk. Despite the risk-mitigating factors, this systemic cluster risk should not be underestimated for the banking sector, and should therefore be addressed accordingly. An overview of the revised capital buffer framework, applicable after the implementation of the CRD V in Liechtenstein (presumably by May 2022), is shown in Figure 33.

Requirement	Rate	
Sectoral SyRB (mortgage loans in LI)	1%	
O-SII buffer	max. 2%	
Countercyclical buffer	0% [X%]	
Capital conservation buffer	2.5%	
Pillar II requirements	X%	
Tier 2 (T2)	2.0%	Pillar I
Additional Tier 1 (AT1)	1.5%	Pillar I
Common Equity Tier 1 (CET1)	4.5%	Pillar I

Figure 33
Future capital and buffer requirements for Liechtenstein's banks after the implementation of the CRD V framework (percent of risk-weighted assets)
Source: FMA.

The FMA also assesses risks at the individual bank level in the context of the Supervisory Review and Evaluation Process (SREP) on an annual basis. Based on the SREP, the FMA may require certain banks to hold additional capital under the Pillar 2 requirement. The SREP combines a wide range of findings from the supervisory process at the institution level, resulting in a comprehensive supervisory overview for each bank in the domestic market. The outcome of this process represents the up-to-date supervisory view of the risks and viability of the respective institution and constitutes the basis for both supervisory measures and the dialogue with the institution. Based on the risks of the bank, the FMA may require banks to hold additional capital, liquidity and/or set qualitative requirements from a microprudential perspective with the objective to support the solvency and liquidity of individual institutions.

The FMA closely monitors systemic risks in the real estate sector in the context of its regular monitoring framework of financial stability risks. In many countries, negative developments in real estate markets have led to high losses in the banking sector and associated adverse effects on the real economy. Due to the strong feedback effects between the financial system and the real economy, negative developments may be further exacerbated, potentially jeopardizing the stability of the financial system and even of the economy as a whole.

To target the build-up of systemic risks in the residential real estate (RRE) sector, the FMA and the government have implemented a risk-mitigating policy including various borrower-based measures. The policy mix consists of a comprehensive combination of borrower- and lender-based measures to increase the effectiveness of the policy instruments. The policy mix implemented in Liechtenstein is microprudential in nature and is laid down in the Banking Ordinance in Annex 4.5, which is based on Art. 7a of the Banking Act focusing on banks' risk management. The current regulations stipulate slightly higher risk weights instead of the risk weights indicated in Art. 125(2) of the CRR. For residential properties with a loan-to-value ratio (LTV) between 66⅔ percent and 80 percent the risk weights are set at 50% (instead of 35% as indicated by the CRR). In addition, the borrower-based measures include a maximum LTV ratio of 80 percent and the mortgage loan must also be amortized to an LTV ratio of 66⅔ percent within 20 years. Exceptions to these borrower-based measures are possible in principle and must be declared as "exception-to-policy" (ETP), but are not associated with any further consequences (such as higher capital requirements or the like). Therefore, current borrower-based provisions have to be classified as legally non-binding. The provisions regarding affordability of mortgage loans are less clearly regulated, as it must only be ensured that loan payments can be serviced with the current income and that internal directives must be issued by banks on affordability. However, neither an imputed interest rate nor a maximum share of the household income, which may not be exceeded by the debt service, is defined in the Banking Ordinance.

Against this background, the FMA's analysis has put a focus on systemic risks in the RRE sector over the last year. To increase risk awareness of the real estate related vulnerabilities in Liechtenstein and to support the current policy discussion, the FMA has published a report in October 2021 focusing on the medium-term risks in the Liechtenstein RRE market. The FSC has intensely discussed recent developments and the associated vulnerabilities as well as the policy appropriateness on the basis of this analysis by the FMA. While the RRE related vulnerabilities are not assessed to be critical in the short-term, FSC members agree that the high household indebtedness in Liechtenstein constitutes a significant systemic risk for the financial sector in the medium- to long term.

Based on its analysis, the FMA has proposed a number of measures to mitigate the risks in the RRE sector over the medium term. The report identifies significant data gaps in Liechtenstein with regard to the real estate and mortgage sector, in particular for price and lending indicators. As data availability is also a problem in other European countries, the ESRB issued a respective recommendation in 2016 to close these data gaps. Against this backdrop, to enhance future risk monitoring in the real estate and mortgage sector, the FSC has recommended in 2020 to quickly catch up with the implementation of the corresponding ESRB recommendation on closing real estate data gaps (ESRB/2016/14

as amended). During the implementation process, the FMA has closely collaborated with the respective banks to find a reasonable solution for establishing a new, efficient reporting framework on banks' lending standards for residential real estate financing while also considering proportionality criteria in the context of the small market. In light of the high household indebtedness, the FMA will continue to closely monitor relevant RRE risks based on the newly established monitoring framework, where data is expected to be first received in 2022. Furthermore, strengthening the risk awareness both among banks and borrowers is key for any risk mitigating measures. Borrowers need to understand the underlying risks of high levels of debt financing, and banks fulfill a crucial role in advising their clients and in making sure that the risk-bearing capacity of borrowers is not exceeded with the respective mortgage loan arrangement. Given the vulnerabilities highlighted in the FMA report, the FSC has also agreed to discuss a strengthening of targeted macroprudential instruments, particularly regarding income-based measures. Thereby, the possibility to introduce a transparent legal basis for borrower-based macroprudential instruments will be discussed in the next few months.

The current macroprudential policy stance is considered to be largely appropriate to mitigate the identified systemic risks in Liechtenstein's banking sector. Liechtenstein's banking sector is well capitalized relative to its European peers, with strong liquidity and sound profitability indicators. Furthermore, it has shown high resilience during the COVID-19 pandemic with capital levels even increasing at the onset of the crisis. In addition, the high and increasing level of assets under management also underlines the attractiveness of the financial center in times of high uncertainty. The strong performance of the banking sector has been confirmed by Standard and Poor's once again in the current year, with the rating agency rating Liechtenstein's banking sector among the most stable in the world. Nonetheless, possible negative effects of the pandemic cannot yet be ruled out, in particular, when fiscal support measures are terminated. Thus, a continuous and close monitoring of financial stability indicators is necessary. In this context, close attention must be paid to borrowers' solvency and asset quality in the domestic banking sector. Further adaptions regarding the macroprudential policy mix may become necessary in the medium term. In particular, in the case of further increasing levels of indebtedness, it is the responsibility of macroprudential policy to limit the further build-up of vulnerabilities in the residential real estate sector, and thus contribute to safeguarding financial stability also in the medium to long term.

Sustainability in the financial sector becomes increasingly important in recent years, aiming to achieve benefits for clients, the environment and society. Climate change poses a particular challenge for the environment, the society and the economy. Thus, the government of Liechtenstein approved to attach great importance to sustainability and the transition to a low-carbon economy. In this context, for the first time, Liechtenstein carried out a voluntary climate compatibility test (the so-called Paris Agreement Capital Transition Assessment, PACTA) for its financial market. This internationally coordinated test intended to serve as an initial assessment of the financial market's alignment with the goals of the Paris Agreement and supports financial institutions' efforts to steer their investments into a climate-friendly direction. The results[39] suggest that investments of some participating institutions are not yet well aligned with a climate-compatible target path, but there is a growing awareness of this issue in the domestic financial sector. In addition, the FMA puts significant efforts into supporting the transformation towards a sustainable financial center by implementing corresponding regulations in Liechtenstein (see Box 9 for more information on climate risks and financial stability). Although the implementation of regulatory requirements is at an early state in Liechtenstein, internationally-oriented domestic institutions have already taken significant steps towards fostering sustainable investment decisions.

39 The results of the PACTA for Liechtenstein are available on the government website.

BOX 9

Climate risks to financial stability

Since climate change is a complex collective action problem, coordinating actions among many players including governments, the private sector, civil society and the international community are required. In this context, climate change also poses new challenges to regulators, supervisors and central banks (Bolton et al., 2020), since environmental changes due to climate change and associated changes in the real economy can carry significant risks for individual financial market participants as well as for the financial market as a whole (German Ministry of Finance, 2020).

While governments are in the driving seat to mitigate climate change and the associated risks, central banks also play an important role in supporting the policy measures to fight climate change. The financial sector's main role in climate change mitigation and the transition towards a low-carbon, climate resilient economy is to redirect capital flows towards more "green" projects, technologies and businesses. In this context, the term "sustainable finance" has recently gained traction both among policy makers and the broader public. Sustainable finance refers to the incorporation of environmental, social and governance (ESG) considerations into investment decisions in the financial sector (European Commission, 2020).

There are two main transmission channels through which climate change can affect the financial sector and its stability: physical risks and transition risks. Physical risks arise from more frequent and severe weather events such as storms or floods and from climate-related environmental changes such as rising sea levels and changes in precipitation (ESRB, 2020). Transition risks stem from the process of adjustment towards a low-carbon economy, since the uncertainties related to the timing and speed of this process can negatively affect financial markets (Giuzio et al., 2019). Physical as well as transition risks might persistently affect macroeconomic and financial variables, such as growth, productivity, food and energy prices, inflation expectations and insurance costs, which are crucial for the achievement of central banks' mandates in monetary policy and financial stability (NGFS, 2019). The materialization of physical and transition risks is reflected in various risk categories and typically implies numerous secondary and side effects: credit risk, market risk, liquidity risk, operational risk and insurance risk (Bolton et al., 2020). Also, physical and transition risks are not likely to be independent of one another (ESRB, 2020). They may also emerge simultaneously, which might lead to an amplification of their impact on the financial system. However, since the severity and the time horizon of climate change-related risks to the financial system tend to be uncertain, a precise quantification of these risks is particularly difficult (Financial Stability Board, 2020).

To address climate-related financial stability risks, various initiatives by both European and international organizations are underway. The European Systemic Risk Board (ESRB) considers climate-related risks to be emerging risks to financial stability which need to be monitored, assessed, and mitigated. A recent ESRB report (ESRB, 2020) provides a comprehensive basis for a better understanding of climate change-related financial stability risks in the European context. It investigates the magnitude of physical and transition risks and examines whether such risks are already priced in by financial markets or whether there is capacity to do so in the future. Based on currently available disclosures, the ESRB also evaluates the magnitude of exposures for banks and insurers to climate-related risk. Furthermore, the report describes forward-looking scenario anal-

yses focusing on transition risks for the EU banking and insurance sectors. The findings suggest that even in the event of a significant increase in carbon pricing or marked industrial shifts, the costs to the economy or the banking sector tend to be contained over a five-year timeframe, and lower than for the losses that are likely to result from climate change-related physical risks (ESRB, 2020).

Besides the ESRB, the International Monetary Fund (IMF), the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) as well as the ECB have initiated various workstreams focusing on the transition towards a low-carbon, climate resilient economy. Non-binding recommendations are made for central banks, supervisors, policymakers and financial institutions, an action plan for the incorporation of climate change considerations into policy frameworks is elaborated as well as the development of climate-related stress tests is supported. One of the most significant developments in sustainable finance is the EU Taxonomy which is a classification system that supports the EU's 2030 climate and energy targets as well as the objectives of the EU Green Deal (EU Technical Expert Group on Sustainable Finance, 2020).

In recent years, Liechtenstein's financial sector has shown a strong commitment to make significant progress in the area of sustainable finance. Against this backdrop, the FMA strives to support the transformation towards a sustainable financial center, guided by the political sustainable development goals (SDGs). As part of prudential supervision, the FMA ensures the control of the incorporation of sustainability risks and factors into the business strategies of financial market participants and, in particular, compliance with the legislative transparency requirements for the purpose of efficient investor protection. At the same time, the FMA will integrate sustainability risks into its own stress tests and supervisory analyses as well as into its own crisis prevention and crisis management planning in general, whereby a special emphasis lies on the avoidance of any sort of "greenwashing". In this context, the implementation of the EU taxonomy is currently in process in Liechtenstein.

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Recovery and resolution

Liechtenstein's Recovery and Resolution framework is based on the EU's Recovery and Resolution Directive (BRRD). The respective national legislation, the Recovery and Resolution Act, entered into force at the beginning of 2017. The Liechtenstein Resolution Authority participates in the work of the European Banking Authority (EBA) with regard to recovery and resolution matters.

In 2021, the Liechtenstein Resolution Authority has made substantial progress in the drafting of resolution plans and resolution strategies for all Liechtenstein banks. The initial set of plans is expected to be finalized by the end of 2021. The Resolution Authority's work has benefited from the successful implementation of the resolution reporting framework, which includes the EBA resolution reporting templates as well as national reporting requirements. The first reporting cycle via the FMA's reporting platform was successfully completed at the beginning of 2021. In the context of resolution planning, the Liechtenstein Resolution Authority has been involved in several resolution colleges regarding internationally active banking groups with its European peers. With regard to Liechtenstein based banking groups, the Resolution Authority fulfils the role of the Group Level Resolution Authority responsible for establishing and heading the colleges.

As in previous years, the Liechtenstein Resolution Authority has taken efforts to accommodate some of the specificities of the Liechtenstein banking sector in its resolution plans. To this aim, the Resolution Authority has inter alia liaised with its European peers, such as other Resolution Authorities of the European Economic Area (EEA) as well as the Single Resolution Board (SRB).

The build-up phase of the resolution financing mechanism has further progressed. As of today, the total amount of funds, including irrevocable payment commitments, amounts to around CHF 21 million. As in the EU, the fund's target sum is 1% of covered deposits. The build-up phase is supposed to end by the end of 2027.

The implementation of the revised BRRD framework (BRRD II) is currently underway. As an EEA member, Liechtenstein is obliged to transpose EEA-relevant EU legislation into its national legal order. Therefore, the revised BRRD framework (BRRD II) will also be implemented in Liechtenstein. The Liechtenstein Resolution Authority has been involved in the respective regulatory work. Since BRRD II will lead to changes with regard to the MREL-framework, binding MREL decisions based on BRRD II may only be taken after the entry into force of the respective national legislation. The entry into force of the revised recovery and resolution framework is expected by the end of 2022 or the beginning of 2023.

APPENDIX

List of abbreviations

AE Advanced economies
AIF Alternative investment fund
AHV/IV Public pension system
AMC Asset management company
AuM Assets under management
BCBS Basel Committee of Banking Supervision
BIS Bank for International Settlements
BPVG Occupational Pension Act
BRRD Banking recovery and resolution directive
CAPE Cyclically-adjusted price-to-earnings ratio
CBOE Chicago Board Options Exchange
CCyB Countercyclical capital buffer
CET1 Common equity Tier 1
CHF Swiss franc
CIR Cost-income ratio
CRD Capital Requirements Directive
CRR Capital Requirements Regulation
ECB European Central Bank
EBA European Banking Authority
EEA European Economic Area
EME Emerging economies
ESG Environmental, social and governance
ESRB European Systemic Risk Board
ETP Exception-to-policy
Fed Federal Reserve (US Central Bank)
FMA Financial Market Authority
FOMC Federal Open Market Committee
FSC Financial Stability Council
FTE Full-time equivalents
GaR Growth-at-risk
GDP Gross domestic product
GFC Global financial crisis
GNI Gross national income
GNP Gross national product
G-SII Global systemically important institution
IMF International Monetary Fund
LCR Liquidity coverage ratio
LTV Loan-to-value
ManCos Management companies
MiFID Markets in Financial Instruments Directive
MPF Ministry for General Government Affairs and Finance
MREL Minimum requirements of own funds and eligible liabilities
NFC Non-financial corporations
NII Net interest income
NPL Non-performing loans
NSFR Net stable funding ratio
OECD Organisation for Economic Co-operation and Development
O-SII Other systemically important institution
p.c. Per capita
PGR Law on Persons and Companies
PMIs Purchasing manager indices
PPP Purchasing power parity
q-o-q Quarter-on-quarter
RoE Return on equity
RRE Residential real estate
RWA Risk-weighted assets
SDGs Sustainable development goals
SECO State Secretariat for Economic Affairs (Switzerland)
SME Small & medium enterprises

SNB	Swiss National Bank
S&P 500	Standard & Poor’s 500
SREP	Supervisory review and evaluation process
SyRB	Systemic risk buffer
TBTF	To-big-to-fail
THK	Liechtenstein Institute of Professional Trustees and Fiduciaries
TrHG	Professional Trustees Act
TVTG	Tokens and Trusted Technologies Act
UCITS	Undertakings for collective investments in transferable securities
US	United States
VIX	Volatility index
3m-o-3m	3-months-on-3-months

Publisher and Editor
Financial Market Authority Liechtenstein
Landstrasse 109
PO Box 279
9490 Vaduz
Liechtenstein

Telephone +423 236 73 73
Fax +423 236 73 74

info@fma-li.li
www.fma-li.li

Editorial board
Mario Gassner, Martin Gächter

Main authors
Sophia Döme, Martin Gächter, Martin Meier

Contributions
Andreas Brunhart, Martin Geiger,
Elias Hasler, Laura Kerber, Thomas Stern

Editing
Beat Krieger, Lukas Müller

Concept and Design
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