

# Higher Frequency Indicators for Liechtenstein

Andrew Baer

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**Higher Frequency Indicators for Liechtenstein**  
**Prepared by Andrew Baer (STA)**

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**ABSTRACT:** This paper describes steps to compile a high-frequency indicator of growth to be used for timely monitoring of real sector activity in Liechtenstein. Since the indicator is compiled with methods consistent with those used for national accounts, its development may also serve as an interim step towards production of quarterly GDP estimates. High-frequency indicators of growth measure domestic production rather than expenditure, making them well suited for monitoring Liechtenstein's export-oriented economy.

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Author's E-Mail Address:	abaer@imf.org

## SELECTED ISSUES PAPERS

# Higher Frequency Economic Indicators for Liechtenstein

Prepared by Andrew Baer<sup>1</sup>

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# PRINCIPALITY OF LIECHTENSTEIN

March 5, 2025

## SELECTED ISSUES

Approved By

Prepared By Rodgers Chawani, Thomas Elkjaer, Tara Iyer (all EUR) and Andrew Baer (STA)<sup>1</sup>

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# HIGHER FREQUENCY INDICATORS FOR LIECHTENSTEIN<sup>1</sup>

*This paper describes steps to compile a high-frequency indicator of growth to be used for timely monitoring of real sector activity in Liechtenstein. Since the indicator is compiled with methods consistent with those used for national accounts, its development may also serve as an interim step towards production of quarterly GDP estimates. High-frequency indicators of growth measure domestic production rather than expenditure, making them well suited for monitoring Liechtenstein's export-oriented economy.*

## A. Introduction

1. **The Liechtenstein Office of Statistics (OS) publishes annual GDP by economic activity in current prices with a lag of 23 months.** More timely measures of economic activity in constant prices would provide greater visibility to changes in the business cycle and support responsive policymaking. This should ideally include quarterly national accounts (QNA).
2. **As preparing full, timely indicators of activity will take time and effort, the authorities should develop a high-frequency indicator of economic growth (HFIEG).** The process of developing data sources to generate tabulated levels of economic activity each quarter will take time. While this long-term effort is taking shape, the authorities should develop a HFIEG, including as an interim solution. This will be less burdensome because it requires only economic growth trends and not detailed tabulations of the real value of economic production. An HFIEG will give a greater picture of economic developments. The HFIEG can also be an important new input to GDP nowcasting exercises.
3. **This new indicator would complement the currently available quarterly composite business cycle indicator.** It will draw more heavily on quantitative transactions data to capture real economic activities.

## B. KonSens

4. **Recognizing the need for more timely information, the Liechtenstein Institute<sup>2</sup> developed KonSens, a concurrent quarterly composite business cycle indicator.** KonSens is based on systematic aggregation of 16 indicators, which can be grouped into the following categories:

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<sup>1</sup> Prepared by Andrew Baer (STA).

<sup>2</sup> The Liechtenstein Institute is a research institute in Liechtenstein.

- Quantitative measures of **economic activity** (goods exports, goods imports, employees, commuters, unemployed, vacancies, share prices of companies, electricity consumption, overnight stays, and new vehicle registrations).
- Qualitative measures of **business sentiment and perception** (results from the Liechtenstein economic survey, which asks business respondents to assess the general situation, plant utilization, incoming orders, and earnings on a scale of good, satisfactory, or poor).
- Qualitative measures of **consumer sentiment** in Switzerland and Austria.

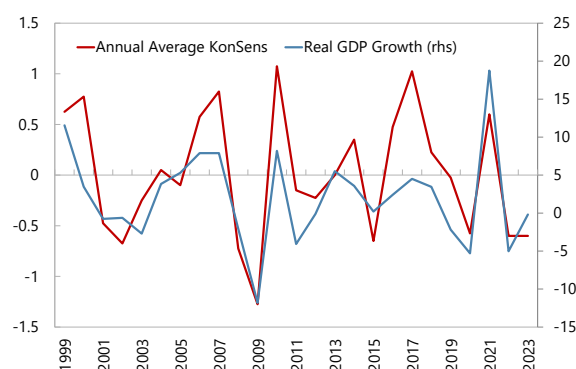
**5. Each indicator is standardized to ensure comparability, accounting for variations in scale and units.** Principal component analysis is employed to identify the underlying patterns and correlations among the indicators. This reduces the dimensionality of the data, allowing for the extraction of a composite score that reflects the overall economic condition.

**6. The KonSens index operates on a continuous scale where values indicate the state of the economy in relation to its long-term average, newly calculated each quarter.** Positive values indicate growth above the long-term average since 1998, while negative values indicate growth below this long-term average. Note that a negative value may indicate slow real growth as opposed to negative growth.

**7. A limitation of the KonSens is that direct quantitative comparisons cannot be made between index values at different points in time.** For example, if the index value declines from 2 in Q1 to 1 in Q2, we can say that economic growth slowed, but we cannot say that it slowed by 50 percent. Another important limitation is that we cannot decompose KonSens to determine economic conditions by activity, such as manufacturing or financial services.

**Figure 1. Konsens and Real GDP**

**Annual Average KonSen and Real GDP Growth Rate (Percent)**



Source: Liechtenstein Institute. A KonSens value above 0 is interpreted as seasonally adjusted quarterly growth above average for the period beginning in the second quarter of 1998. Axes are set so that a KonSens value of 0 is aligned with the average annual growth in real GDP – 1999–2023 (2.06 percent).

8. **Figure 1 compares the annual average of KonSens quarterly figures with changes in GDP in constant prices, which are available on a substantial lag.** This demonstrates the strong value of the KonSens as a predictor of changes in the business cycle since its inception.

### C. High-Frequency Indicator of Economic Growth (HFIEG)

9. **An HFIEG would be a valuable complement to the KonSens because it will more closely mirror the target measure of national production.** The IMF has recently developed a program to support member countries with the process of identifying and aggregating sources to develop HFIEGs based on national accounting principles. One such example is Mongolia, where a monthly indicator of economic growth is now compiled by the National Statistical Office. Other countries that compile HFIEGs include Canada, Mexico, Argentina, Chile, and Uganda. While many countries target a monthly indicator (or MIEG), a quarterly indicator would be beneficial as a first step.

10. **This indicator has the following characteristics** (Stanger 2020b):

- **Bottom-up approach.** The indicator of total economic activity is calculated as an aggregation of estimates of changes in economic production for each of the most important activity sectors (i.e. manufacturing, trade, financial services, professional services, and public administration).
- **Based on a national accounting framework, with activity value-added weights consistent with the annual national accounts.** This facilitates benchmarking and improves the coherence between the indicator and the target to be forecasted GDP. Changes in production volumes for each activity sector are aggregated to a total economy-wide indicator of growth, using the updated value-added figures available with each new release of the official annual national accounts.
- **Relies heavily on transaction data that are directly tied to specific economic output produced in Liechtenstein, generated from a statistically representative panel of domestic producers.** These include both observed quantities of production and sales values, sourced from administrative tax filings such as value-added tax (VAT) records and/or targeted surveys of large companies. Business sentiment indicators are not used.
- **Estimated on a constant-dollar basis, excluding price effects.** Where values of production are used in the calculation, they are deflated with the most relevant available price index measures. These are likely to include detailed producer price indices (PPIs) from Switzerland. For example, the estimated nominal value of machinery manufacturing in Liechtenstein would be deflated using the Swiss PPI for machinery manufacturing.
- **Provides growth rates showing direct quantitative comparisons** of the value of economic activity over time.

## D. Key Steps to Establishing an HFIEG

**11. The first step of compiling an HFIEG is analyzing the structure of the economy to determine the most important productive activities.** This can be done by listing production activities by value-added in descending order by size. Table 1 shows a list of the largest activities in Liechtenstein based on the preliminary 2022 national accounts compiled by the OS.

**Table 1. Liechtenstein: Gross Value Added by NACE Activity - 2022**

NACE Activity Classification	2022 Gross Value Added (nominal, Million CHF)	Share	Cumulative Share
28 Manufacture of machinery and equipment n.e.c.	1359.0	20.01%	20.01%
69 Legal and accounting services	638.9	9.41%	29.42%
45-47 Wholesale and retail trade; motor vehicle repair	628.8	9.26%	38.68%
64-66 Financial service activities, insurance, and related services	533.3	7.85%	46.54%
68 Real estate services	461.8	6.80%	53.34%
84 Public administration and defence; compulsory social security	407.0	5.99%	59.33%
31-33 Manufacture of all other products n.e.c; machinery and equipment repair	301.7	4.44%	63.78%
41-43 Construction	273.8	4.03%	67.81%
29-30 Manufacture of motor vehicles and other transport equipment	225.1	3.32%	71.13%
62-63 Computer programming, data processing, hosting, and related services	207.0	3.05%	74.17%
70 Activities of head offices and management consultancy	201.1	2.96%	77.14%
10-12 Manufacture of food, beverage, and tobacco products	186.1	2.74%	79.88%
24-25 Manufacture of basic metals and fabricated metal products	170.3	2.51%	82.38%
26 Manufacture of computer, electronic and optical products	159.4	2.35%	84.73%
77-82 Rental and leasing; business support activities n.e.c.	145.7	2.15%	86.88%
86 Human health activities	117.8	1.73%	88.61%
71 Architectural and engineering activities; technical testing and analysis	108.7	1.60%	90.21%

Source: Liechtenstein Office of Statistics.

**12. Next, source data are identified for either values or quantities of output produced by activity.** This typically starts with assessing the availability of value-added tax (VAT) data. The Fiscal Authority currently provides the OS with a broad indicator of changes in VAT receipts for large enterprises every six months. This data sharing could be expanded further—the OS should explore with the Fiscal Authority the possibilities of receiving these data on a higher frequency, ideally with expanded coverage of enterprises, and mapping the results to the Nomenclature of Economic Activities (NACE) classification that is currently used by the OS.

**13. Monthly merchandise trade exports information can be used to supplement the VAT records.** Large Liechtenstein enterprises are mandated to report goods exports data on a quarterly basis to the Swiss National Bank (SNB) as part of the Swiss current account survey. These company reports would provide a strong indicator of changes in production if obtained on a regular basis from the SNB. Expanding the quarterly Liechtenstein economic survey to include quantitative data on sales, production, inventories, expenses, and services exports would also improve measurement of this sector.

**14. For other activities, direct estimation of production volumes instead of deflation of production values may be more realistic as a first step.** Table 2 lists potential data sources by



activity. These include non-tax administrative records, such as employment and wage data, FMA financial reports, and data from the public health authority.

**Table 2. Liechtenstein: Potential Sources for Estimating Real Output**

NACE Activity Classification	Potential Sources to Estimate Change in Value of Production	Potential Source to Estimate Change in Prices
Manufacturing	Merchandise exports reported to the SNB, company surveys	Swiss PPIs for manufacturing
Construction	Building permits, government investment, supply of construction inputs, private investment reports of large projects, records of public tenders.	Direct volume estimation (no deflation)
Wholesale and retail trade	Value-added tax data	Swiss CPIs
Financial service activities, insurance, and related services	Assets under management, premiums and claims for insurance, stocks of deposits and loans and interest flows for banking, FMA statistics	Direct volume estimation (no deflation)
Real estate services	Employment, register of realtors, number of transactions	Direct volume estimation (no deflation)
Non-financial services activities	Employment, hours worked	Direct volume estimation (no deflation)
Public administration	Employment, hours worked	Direct volume estimation (no deflation)
Human health activities	Use of services by type of care, usage of hospital beds.	Direct volume estimation (no deflation)

**15. In compiling a new HFIEG, emphasis is placed on continual refinement and improvement over time.** While the process of developing data sources may take time, interim estimates based on preliminary sources or modeled estimates may be used until the preferred data sources are developed. The indicator may rely on interpolation/estimation to fill data gaps when sources are unavailable.

**16. Once data sources are identified and organized, activity-specific volume indices are calculated and aggregated to form the economy-wide HFIEG.** A Laspeyres formulation, relying on value-added activity weights from the most recently compiled annual national accounts, is recommended to allow for timely compilation. Seasonal and calendar adjustment methods used to compile the KonSens should be adapted for the HFIEG.

**17. The HFIEG should be disseminated by OS on a regular, pre-announced schedule.** While it will not be feasible to disseminate detailed volume indices for the entire NACE classification, summary sub-indices such as those for manufacturing, financial services, and other activities would be useful. Developing timely, constant-price growth estimates for specific economic activities will also support faster preliminary estimates of annual real GDP. In this way, development of the HFIEG provides synergies with the key priority of improving the timeliness of annual constant-price GDP in Liechtenstein.

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