

# **THE STATE OF THE FINANCIAL SECTOR**

## **in Luxembourg – key figures**

**SYNTHESIS OF KPI EVOLUTION  
2011-2018**

## THE FINANCIAL SECTOR OVERALL

- The financial sector has grown throughout the period 2011-18:
  - FTE: from 39,000 to 46,000 (+2% p.a.) equivalent to 12% of the overall economy
  - Added Value: EUR 12bn to EUR 16bn (+5% p.a.) equivalent to 31% of the overall economy
  - Tax contribution: EUR 3bn to EUR 4bn (+7% p.a.)
- Main drivers of growth in the period 2011-2018 for FTE and Added Value are Corporate Banking, ManCo & Investment Firms and Audit and Legal Services, for tax contribution the "taxe d'abonnement"
- Private Banking, Retail Banking, Funds activities within banks and insurance have remained flat or shown limited growth

## DEVELOPMENT OF SUBSECTORS

- Banking represents roughly half of the Luxembourg financial sector. Employment level remained stable, added value grew by 5% p.a. and tax contribution by 6% p.a. and the number of banks has decreased from 144 to 135 throughout the reference period due to consolidation internationally and within Luxembourg
  - Private banking FTEs, added value and tax contribution remained stable as the industry is under pressure due to regulatory changes, more pressure on margins
  - Retail banking FTEs, added value and taxes contribution remained stable
  - Corporate banking drove up the value added with an increase from EUR 1.3bn in 2011 to EUR 3.4bn in 2018; legal, regulatory and ecosystem explaining the attractiveness of Luxembourg. Corporate banking taxes contribution rose by 15% p.a. while FTEs grew by 2% p.a.
- The insurance industry FTEs grew by a steady 2% p.a. while added value and taxes have been comparatively volatile due to changes in financial results and exceptional results of larger players

## SIZE OF THE FINANCIAL SECTOR IN THE ECONOMY

- The fund industry generated growth in FTEs (3% p.a.), added value (6% p.a.) and taxes contribution (8% p.a.)
  - "Taxe d'abonnement" growing faster than the added value and generating 1/4th of the direct taxes contribution of the financial sector in 2018
  - Management companies led the increase in added value
- Audit and Legal Services provided for the financial sector increased significantly throughout the period (FTE: +7% p.a. to 7,500; Added Value +10% to EUR 1bn; Taxes paid +7% p.a. to EUR 0.2bn)
- Stable share in the economy FTEs (13% in 2011 and 12% in 2018) and added value (30% in 2011 and 31% in 2018)
- The financial sector is more productive than the rest of the economy with an added value per FTE ~2.5 times higher
- Taking into account the direct, indirect and implied effect of the financial sector on the rest of the economy we observe that:
  - For each job in the financial sector in 2011 there were 1.1 other jobs in the economy. This ratio goes up to 1.4 in 2018
  - For each euro of added value in the financial sector in 2011 there were 0.5 euro of added value generated in the rest of the economy. This ratio remains stable over time

## CONTENT

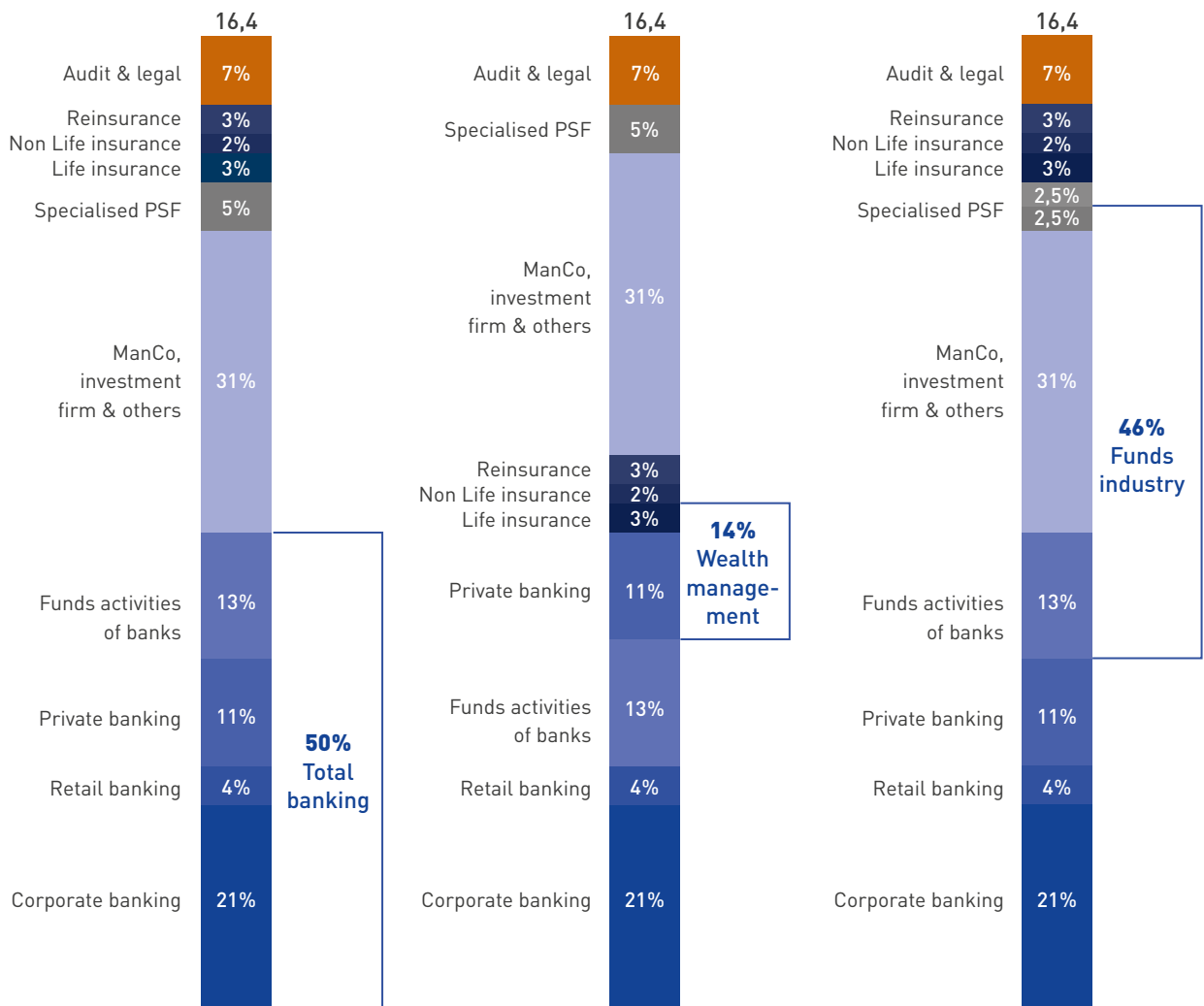
01	THE LUXEMBOURG FINANCIAL SECTOR	06
02	THE ROLE OF THE FINANCIAL SECTOR IN THE ECONOMY	23
03	BACK-UP: METHODOLOGY AND DEFINITIONS	28

# 01

## THE LUXEMBOURG FINANCIAL SECTOR

## THERE ARE DIFFERENT WAYS TO DEFINE THE SUBSECTORS OF THE FINANCIAL INDUSTRY

Added value in 2018<sup>1</sup>, EUR bn



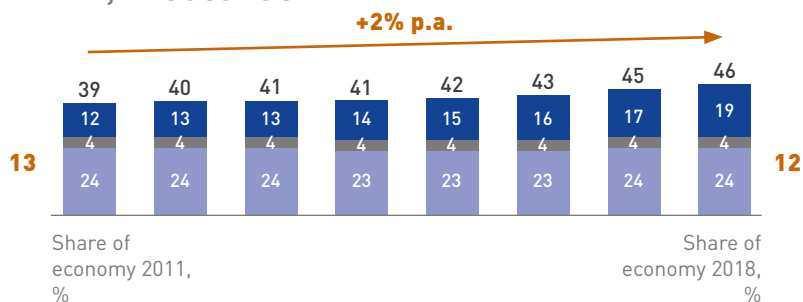
<sup>1</sup> Excluding BCL, EIB and Soparfis

## OVERALL FINANCIAL INDUSTRY

### Indicators evolution

■ Fund activities not performed by banks, legal and audit services to the financial sector ■ Total insurance ■ Total banking

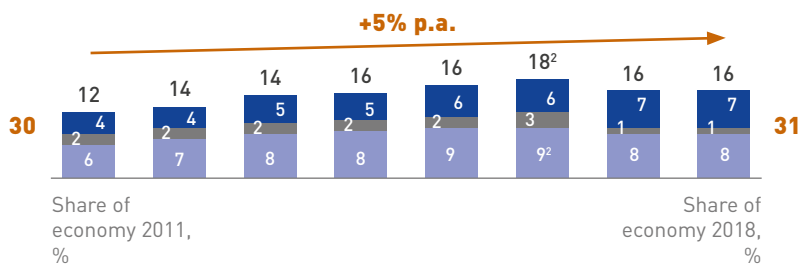
#### FTE, Thousands



#### Comments

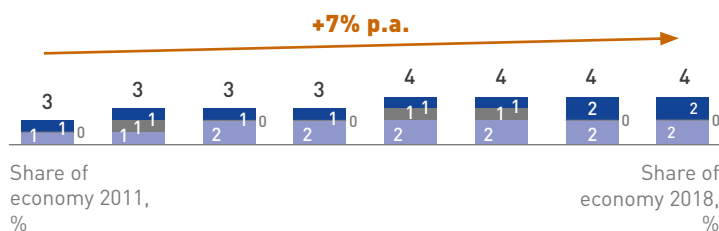
- 46 thousands FTE representing 51 thousands employees in 2018. Excluding brokers of insurance companies / private banks
- Stable FTEs in banking with a slight increase in private banking and slight decrease in corporate banking
- Slight FTE increase in insurances
- Slight FTE increase in fund industry driven by management companies
- FTE growth in audit and legal services

#### Added Value, EUR bn



- 2011-2018 average added value growth of 5% p.a. mostly driven by corporate banking and the fund industry
- Increasing cost pressure in banks has negatively impacted net results in recent years
- Impacted by volatility in profitability in insurances

#### Taxes<sup>3</sup>, EUR bn



- Significant share coming from taxe d'abonnement (EUR 1bn or 28% in 2018)

<sup>2</sup> Exceptional income of EUR 741mn due to sale of participation in Xia Bank Company Ltd. by Deutsche Bank Luxembourg

<sup>3</sup> Including taxe d'abonnement

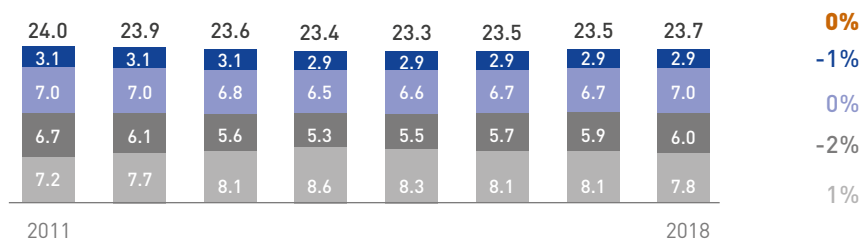


## TOTAL BANKING<sup>4</sup>

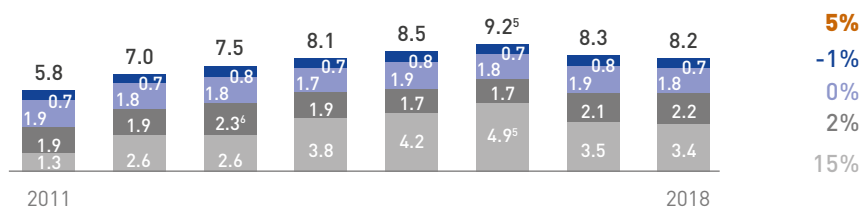
### Indicators evolution

■ Retail banking 
 ■ Private banking 
 ■ Funds activities of banks 
 ■ Corporate banking

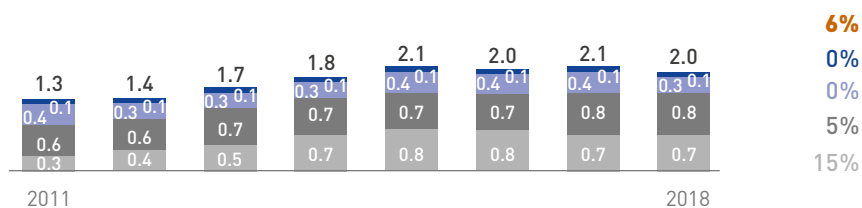
#### FTE, Thousands



#### Added Value, EUR bn



#### Taxes<sup>7</sup>, EUR bn



<sup>4</sup>Excludes EIB and BCL

<sup>5</sup>Exceptional income of EUR 741 mn due to sale of participation in Xia Bank Company Ltd. by Deutsche Bank Luxembourg

<sup>6</sup>Exceptional results of JP Morgan

<sup>7</sup>Including tax d'abonnement

## DECREASE IN THE NUMBER OF BANKS IN RECENT YEARS

### Evolution of the number of banks

2014-2018, From license perspective<sup>8</sup>

Number of banks 2014 YE	<b>144</b>	<ul style="list-style-type: none"> <li>• Serve home market and international private banking clients</li> <li>• Boost visibility of lending activities to EU institutional investors</li> <li>• Join financial centre (e.g., expertise)</li> <li>• Access to European market</li> </ul>
New entries	<b>16</b>	
Market exit	<b>14</b>	<ul style="list-style-type: none"> <li>• Lack of critical size</li> <li>• Presence in Luxembourg not strategic priority</li> </ul>
Consolidation in Luxembourg	<b>2</b>	<ul style="list-style-type: none"> <li>• Consolidation caused by overbanked industry</li> <li>• Economies of scale by capturing divestitures:               <ul style="list-style-type: none"> <li>– Ripple effect of M&amp;As or divestment decision following financial distress in domestic market</li> <li>– Lack of scale</li> <li>– Pressure on offshore activities</li> </ul> </li> </ul>
Consolidation out of Luxembourg	<b>1</b>	
Intra-group consolidation in Luxembourg	<b>4</b>	<ul style="list-style-type: none"> <li>• Group consolidating different entities to improve capital and liquidity positions</li> <li>• Supervision playing a key role in jurisdiction choice as banks with assets &gt;20% of GDP are supervised by ECB rather than national competent authority. Luxembourg GDP being relatively small may have an impact on bank's decision to consolidate in or out of Luxembourg</li> </ul>
Intra-group consolidation out of Luxembourg	<b>4</b>	
Number of banks 2018 YE	<b>135</b>	

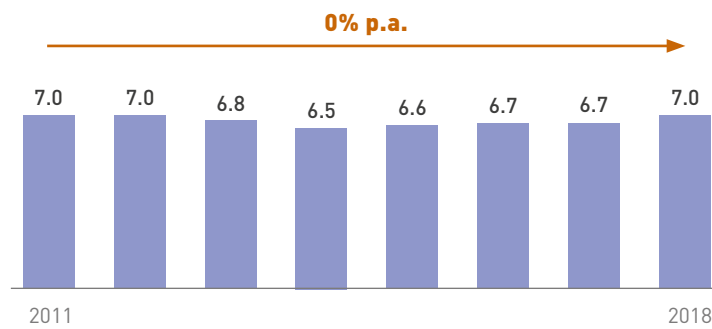
Source: CSSF, press search

<sup>8</sup> Multiple local legal entities of one group are all counted as different entities

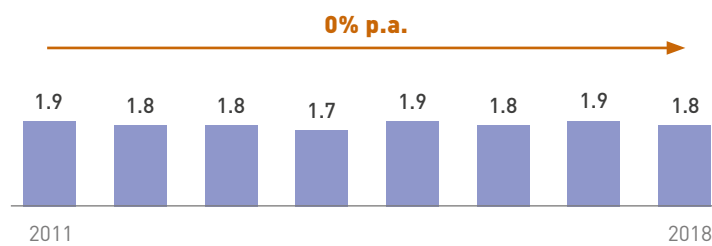
## PRIVATE BANKING

### Indicators evolution

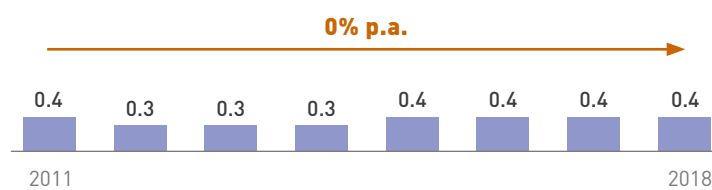
#### FTE, Thousands



#### Added Value, EUR bn

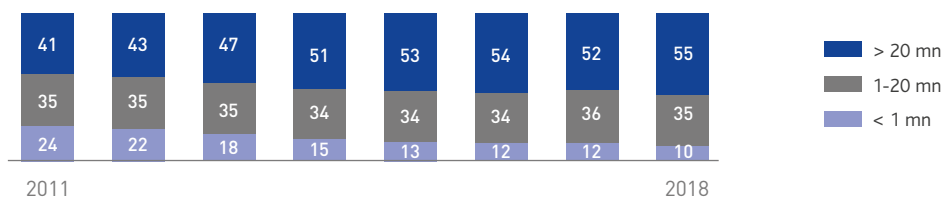


#### Taxes, EUR bn

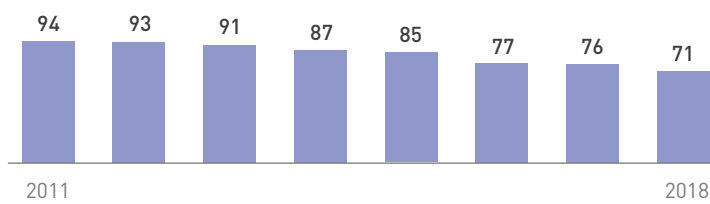


Source: CSSF, McKinsey PB survey, ABBL, press search

## AuM per wealth band, %



## Revenue margin, bps

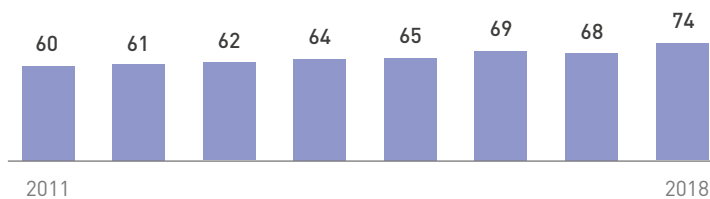


## Comments

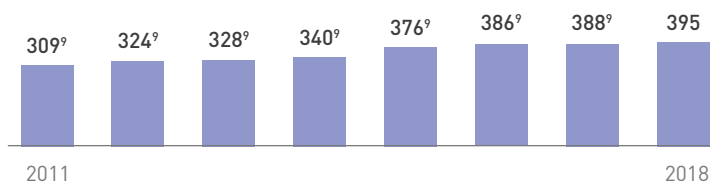
Regulatory changes:

- 2014-2018: Automatic exchange of information / MIFID II regulation increasing needs for Risk/Compliance staff
- Shift in share of AuM to UHNWI vs. lower wealth bands due to changing value proposition

## C/I ratio, %



## AuM in Luxembourg, EUR bn



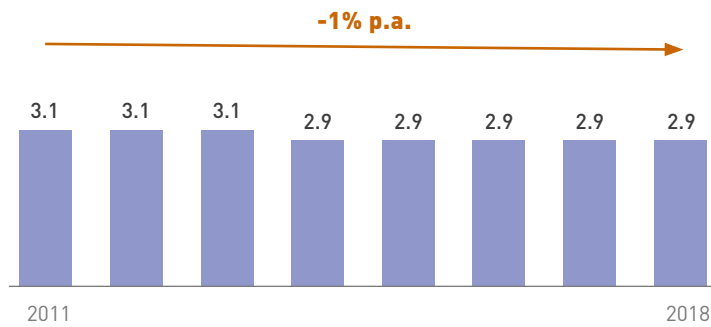
Source: CSSF, McKinsey PB survey, ABBL, press search

<sup>9</sup> Corrected from original ABBL number published as a player worth EUR 25bn in 2017 was excluded from the 2011-2017 surveys – EUR 25bn added in 2017, added retroactively supposing AuM growth following market growth

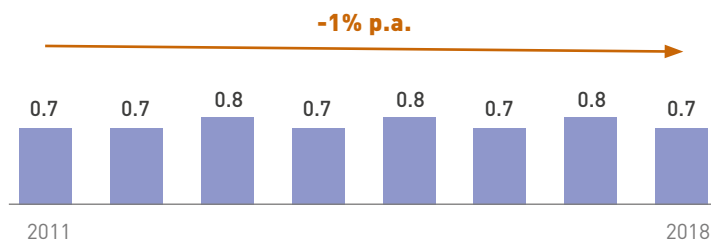
## RETAIL BANKING

### Indicators evolution

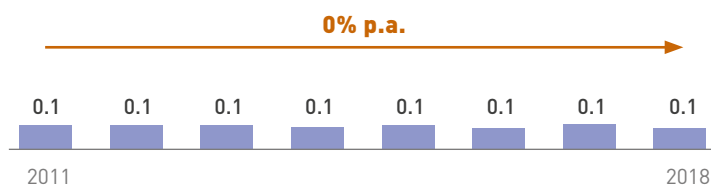
#### FTE, Thousands



#### Added Value, EUR bn

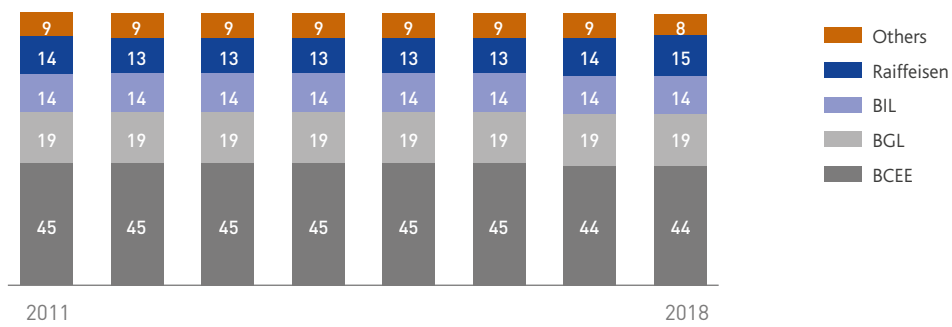


#### Taxes, EUR bn

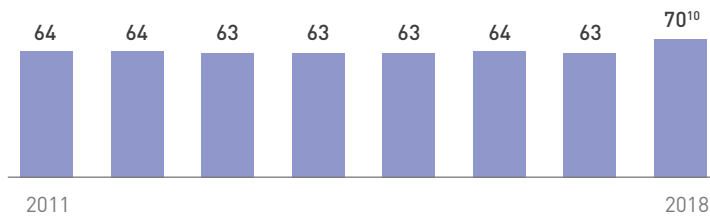


Source: Players' annual reports, CSSF, press search

## Market share, %



## C/I ratio, %



## Rationale

- Pressure on employment and value added driven by customers moving to mobile / e-banking, loss of cross-border clients following automatic exchange of information

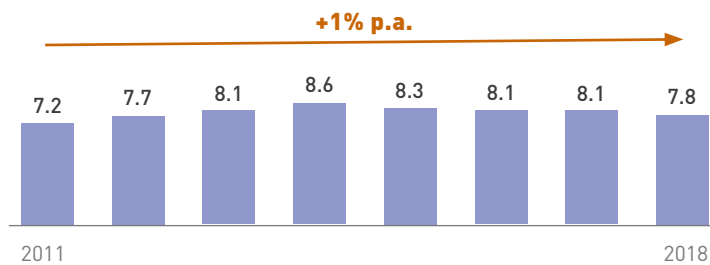
Source: Players' annual reports, CSSF, press search

<sup>10</sup> Important increase of C/I ratio of BCEE and BGL Retail

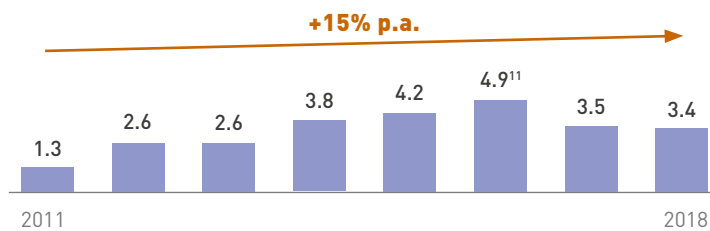
## CORPORATE BANKING

### Indicators evolution

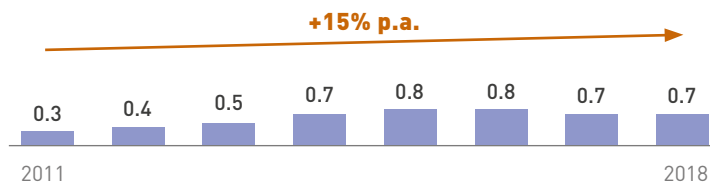
#### FTE, Thousands



#### Added Value, EUR bn



#### Taxes, EUR bn



Source: CSSF, press search, CEO interviews

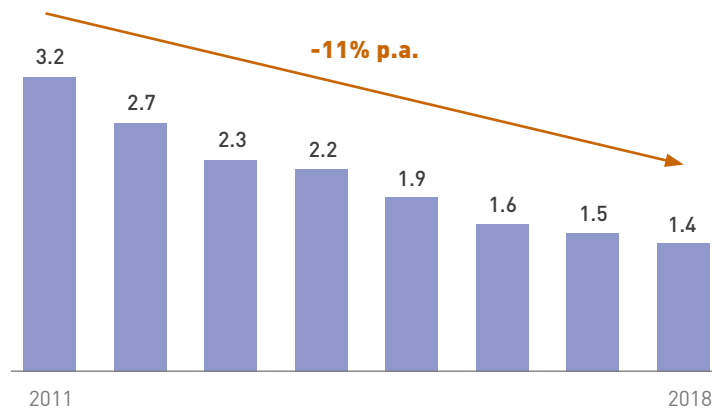
<sup>11</sup> Exceptional income of EUR 741 mn due to sale of participation in Xia Bank Company Ltd. By Deutsche bank Luxembourg

## Luxembourg specific activities generating high value

- Market activities, trade finance, cash management, deal structuring (structured / syndicated loans), services to PE-RE funds as well as international booking center have been activities generating high added value
- Attractiveness of Luxembourg lies in different factors such as the legal framework, depth of expertise throughout the eco-system allowing for deal structuring, the depth of the funds market, the responsiveness of the regulator and historical reasons

## Classic banking services to corporate under pressure

Interest rate on outstanding corporate loans, %



Source: CSSF, press search, CEO interviews



## THE DIFFERENT CORPORATE BANKING ACTIVITIES IN LUXEMBOURG

Activities		Clients		
		Luxembourg corporate	Large (international) corporates	Private equity / real estate
		Companies active in the domestic market	Corporation expanding their European business	PE/RE funds domiciled in Luxembourg
<b>Trade finance</b>	International trade transactions (credit, factoring...)	✓	✓	
<b>Treasury services</b>	Cash management and liquidity solutions	✓	✓	✓
<b>Capital market</b>	Listing, trading, clearing, settlement		✓	
<b>Proprietary resources allocation</b>	Booking of intragroup operations		✓	
<b>Fiduciary issues / notes</b>	Management of entities		✓	✓
<b>Structured loans</b>	Loans with cash flow collateralized in pooling vehicles		✓	✓
<b>Syndicated loans</b>	Loans between a company and multiple banks		✓	
<b>Bilateral loans</b>	Loans between a bank and a company	✓	✓	

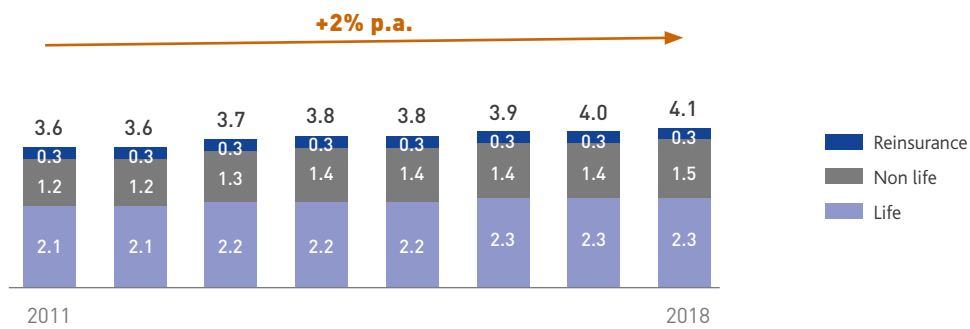
✓ Main client of each activity

Source: LFF, CEO interviews, team analysis

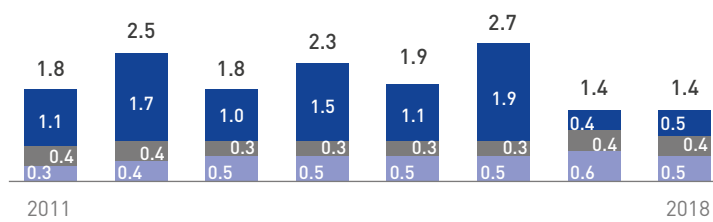
## INSURANCE INDUSTRY

### Indicators evolution

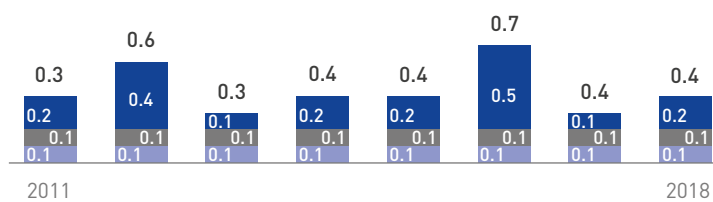
#### FTE<sup>12</sup>, Thousands



#### Added Value, EUR bn



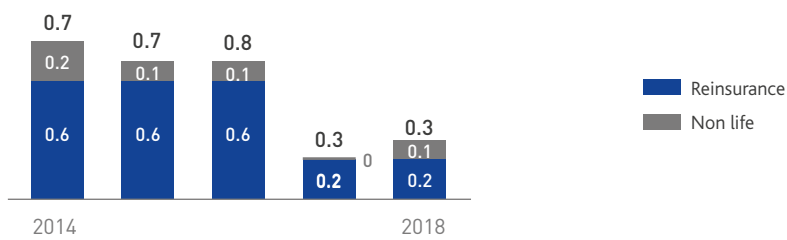
#### Taxes, EUR bn



Source: CAA, press search

<sup>12</sup> Based on employees on payroll of insurance companies, excluding independent brokers

## Financial results<sup>13</sup>, EUR bn



### Comments

- Volatile financial results and claims in reinsurance drive the volatility in profit:
  - Very concentrated market hence impacted by exceptional results of main players
  - Exceptional goodwill amortizations explain variation of profit and added value
- Premiums in life insurance have been volatile while steadily increasing in non-life and reinsurance
- Strong influence of financial results volatility for all players

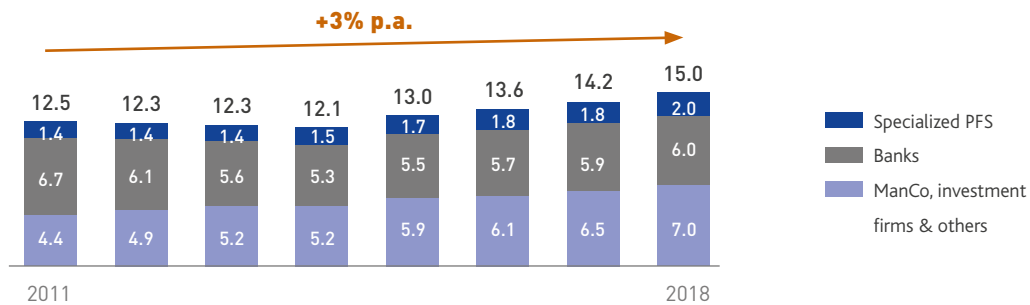
Source: CAA, press search

<sup>13</sup> Life insurance excluded as financial results are excluded from P&L as externalised in unit-link

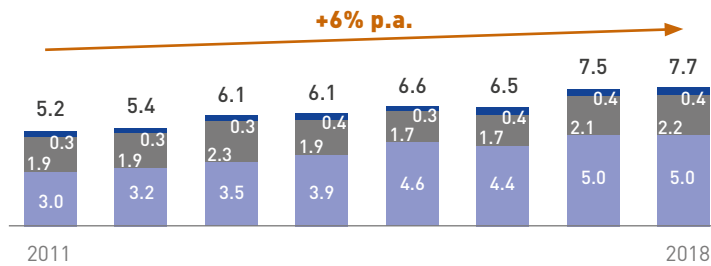
## FUND INDUSTRY

### Indicators evolution

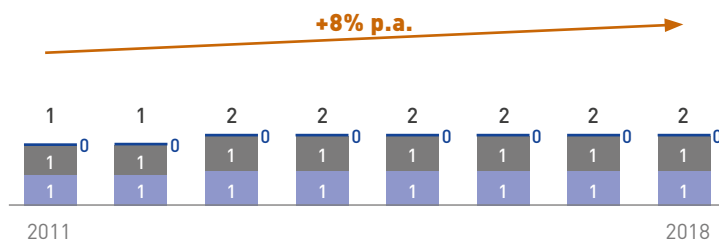
#### FTE, Thousands



#### Added Value, EUR bn



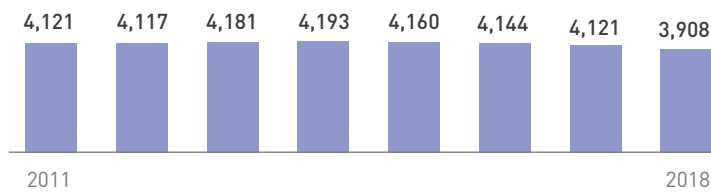
#### Taxes, EUR bn



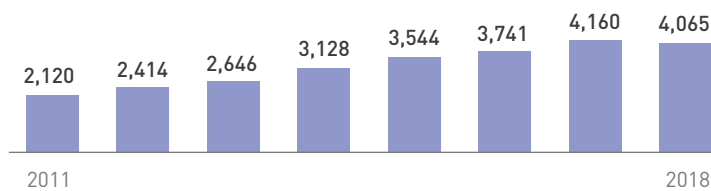
Source: Fundsquare, ALFI, players' annual reports, CSSF, press search

## Consolidation of funds and AuA growth

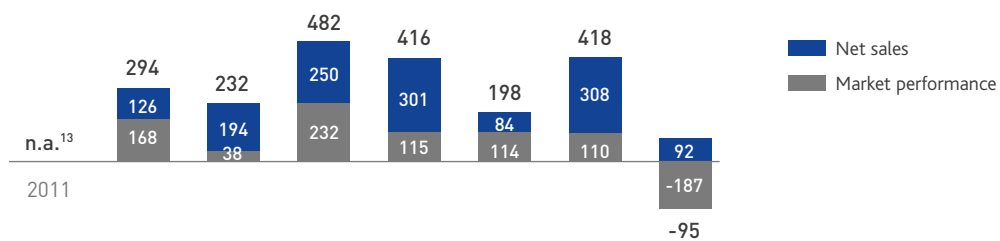
Number of funds, Units



AuA in funds, EUR bn

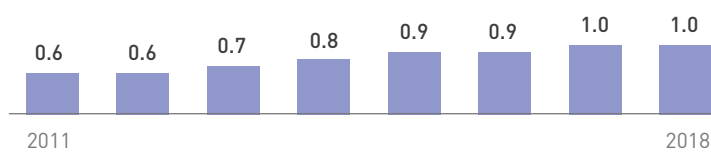


AuA growth during the year, EUR bn



## Taxes driven by taxe d'abonnement

Taxe d'abonnement, EUR bn

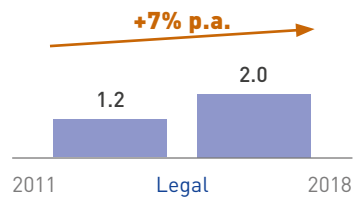
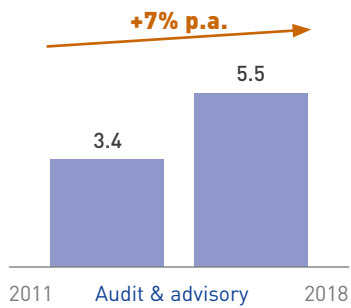


Source: Fundsquare, ALFI, players' annual reports, CSSF, press search

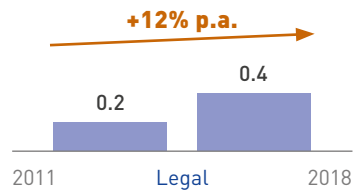
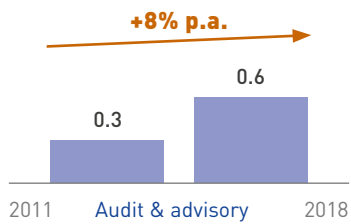
<sup>13</sup>AuM growth during the year 2011 not included in model

## AUDIT AND LEGAL SERVICES FOR THE FINANCIAL SECTOR

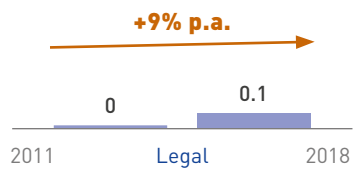
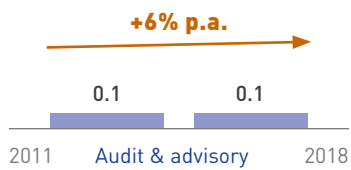
### FTE, Thousands



### Added Value, EUR bn



### Taxes, EUR bn



# 02

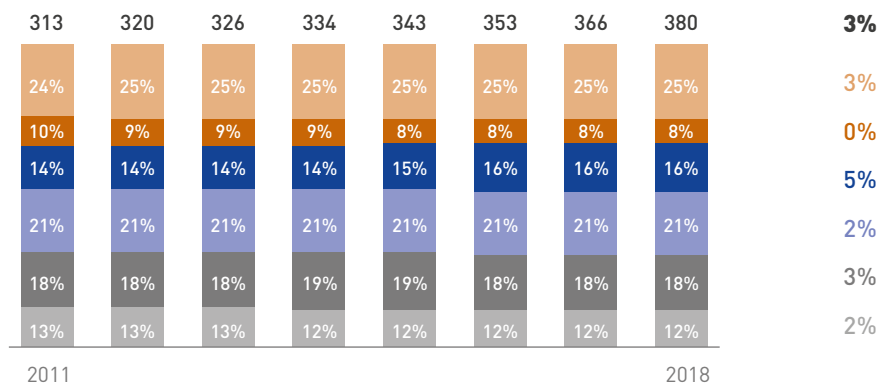
## THE ROLE OF THE FINANCIAL SECTOR IN THE ECONOMY

## THE FINANCIAL SECTOR REPRESENTS 31% OF THE ADDED VALUE AND 12% OF THE EMPLOYMENT IN LUXEMBOURG

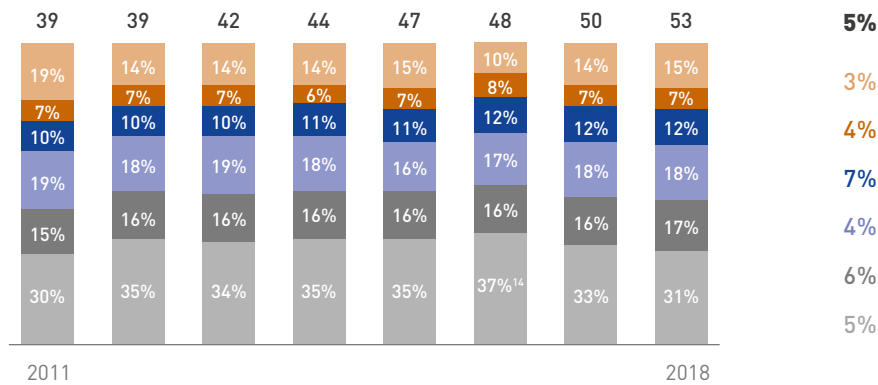
■ Others   
 ■ Industry   
 ■ Administrative, support, professional, scientific and technical activities  
■ Commerce, transport, hospitality and restauration   
 ■ Public services and administration   
 ■ Financial sector

### FTE, Thousands

CAGR 2011-2018



### Added Value, EUR bn



Source: Model, statec

<sup>14</sup>Added value growth driven by exceptional income of EUR 741 mn due to sale of participation in Xia Bank Company Ltd. by Deutsche Bank Luxembourg

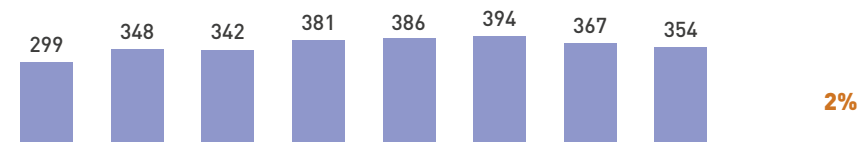


## THE FINANCIAL SECTOR ADDED VALUE PER FTE IS ~2.5 TIMES HIGHER THAN FOR THE REST OF THE ECONOMY

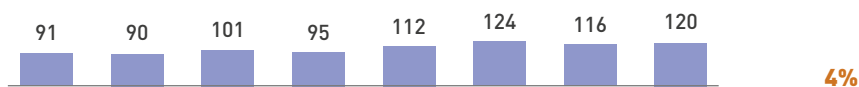
Added value per FTE, EUR thds

CAGR 2011-2018

### Financial sector



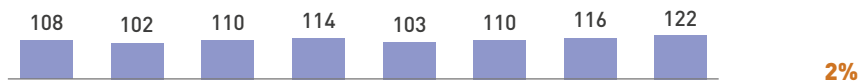
### Industry



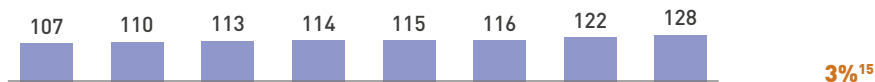
### Administrative, support, professional, scientific and technical activities



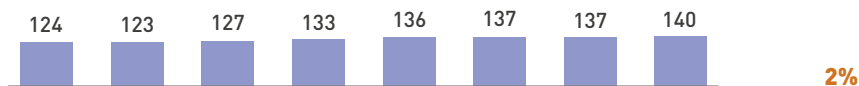
### Commerce, transport, hospitality & restauration



### Public services & administration



### Entire economy



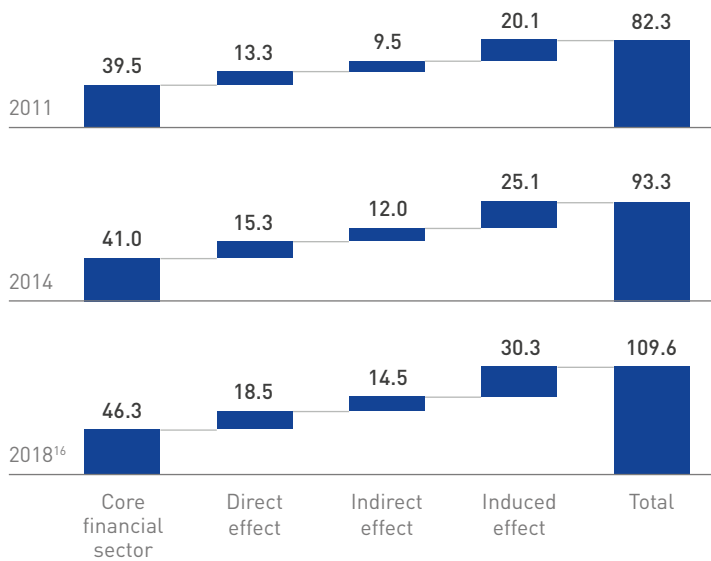
Source: Model, statec

<sup>15</sup> Driven by salary increase for state workers

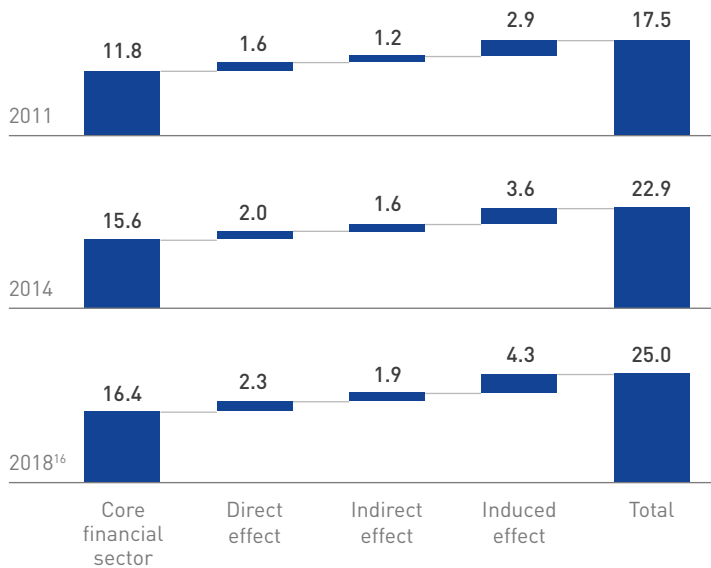
## IN ADDITION TO ITS ABSOLUTE IMPORTANCE, THE FINANCIAL SECTOR HAS AN IMPORTANT TRICKLE DOWN EFFECT ON THE REST OF THE ECONOMY

### Evolution of trickle down effect

FTE, Thousands



Value added, EUR bn

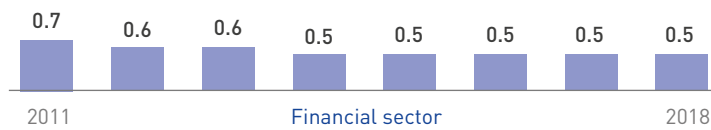
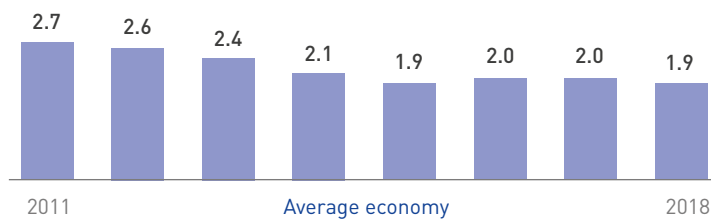


Source: Model, OECD, CSSF

<sup>16</sup> 2018 multipliers are 2014 multipliers corrected for labour intensity evolution between 2014 and 2018

## Important trickle down effect in employment

Labor intensity (FTE/Output in EUR thds)

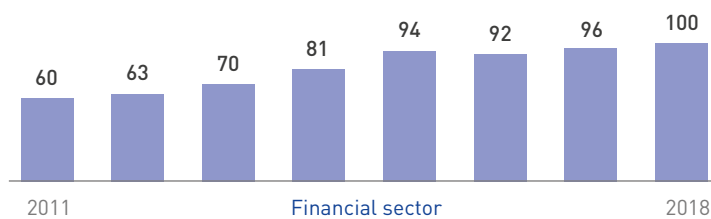


### Comments

- Trickle down effect more important in employment than value added due to higher labor intensity of other sectors

## High indirect contribution due to constantly growing production

Production of the financial sector<sup>17</sup>, EUR bn



### Comments

- Important increase in production allows financial sector to generate more and more jobs despite evolving in a less and less labor intensive economy

<sup>17</sup> CSSF

# 03

## BACK-UP: METHODOLOGY AND DEFINITIONS

## DISCLAIMER

The analyses contained in this document and underlying files are based on publicly available information complemented by industry association and individual player data as well as assumptions based upon factors and events subject to uncertainty.

This information is believed to be directionally reliable without being in all respects accurate or complete. The analyses and conclusions contained do not purport to contain or incorporate all the information that may be required to evaluate the Luxembourg financial sector.

Given the high level of openness of the Luxembourg economy and the comparably high concentration on selected economic sectors, the share of the financial sector in the overall economy may be subject to a relatively high volatility in future comparisons.

## DEFINITIONS

### Staff

Total number of salaried FTE, on average assumed to be equivalent to 90% of the headcount

### Value added

Sum of net profits, staff costs and total taxes paid. Roughly represents total production minus intermediary consumption; this metric also equals GDP contribution minus indirect taxes on products and goods (VAT, Excise)

### Staff costs

Sum of total salaries and total social contributions paid by the employer

### Taxes paid

Sum of corporate taxes and taxes on salaries. For funds services the "taxe d'abonnement" is also included

### Corporate taxes

Total direct taxes paid at corporate level to public authorities in Luxembourg (IF, IRC, ICC)

### Taxes on salaries

Taxes paid on salaries by people employed by the institutions concerned (impôts sur le revenu)

### Private Banking

Banking activities carried out for households with Assets under Management (AuM) in a given bank above EUR 100,000

### Retail Banking

Banking activities carried out for households with AuM in a given bank below EUR 100,000

### Funds industry

Activities related to the funds servicing value chain (fund administration, transfer agency, depositary bank, etc.)

### Corporate

Activities carried out by banks excluding private banking, retail banking and funds services – includes trade finance, corporate lending, treasury management, cash management and head office functions

**Insurance**

All activities carried out by insurance companies

**Specialized PFS**

Activities carried out by companies supervised by CSSF under the category of specialized PFS (professional depositaries of financial instruments, operators of a regulated market, debt recovery, professionals performing lending operations, family Offices, mutual savings fund administrators, etc.)

**Management companies & investment firms**

Activities carried out by companies supervised by CSSF under the categories management companies and investment firms

**Audit and advisory & law firms**

Activities of audit/advisory and law firms representing the services provided to the financial sector

**Direct effect**

Effect of the financial industry on first level suppliers

**Indirect effect**

Effect of the financial industry on suppliers of suppliers across the entire supply chain

**Induced effect**

Effect contributed by income spent of the employees in the financial industry and the supply chain

## UNDERLYING CALCULATION ARE COMPUTED SPECIFICALLY BASED ON THE DATA AVAILABLE

	Employment	Added Value (Profit + Staff cost + Corp. taxes)	Taxes
Total Banking	<ul style="list-style-type: none"> <li>Number of employees in credit institutions corrected for the ratio FTE / employee</li> </ul>	<ul style="list-style-type: none"> <li>Added value from credit institutions</li> </ul>	<ul style="list-style-type: none"> <li>Income taxes: FTE* Avg salary*Tax rate</li> <li>Corporate taxes paid by banks (CSSF)</li> <li>"Taxe d'abonnement" paid by banks</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Luxembourg tax administration</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Annual report of retail banking players</li> <li>Luxembourg tax administration</li> <li>Fundsquare</li> </ul>
Private Banking	<ul style="list-style-type: none"> <li>Number of FTEs in private banks as reported by ABBL</li> </ul>	<ul style="list-style-type: none"> <li>Profit: Revenues * (1-C/I)</li> <li>Staff cost: Avg staff cost * Employment</li> </ul>	<ul style="list-style-type: none"> <li>Corporate taxes: Share of taxes in profit for banking*profit in private banking</li> <li>Income taxes: FTE* Avg salary*Tax rate</li> </ul>
	<ul style="list-style-type: none"> <li>ABBL</li> </ul>	<ul style="list-style-type: none"> <li>McKinsey PB survey</li> <li>ABBL PB survey</li> <li>Luxembourg tax administration</li> <li>Robert Walter salary survey</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Luxembourg tax administration</li> </ul>
Retail Banking	<ul style="list-style-type: none"> <li>Number of RB employees from ABBL survey corrected for difference in reporting with statutory accounts</li> </ul>	<ul style="list-style-type: none"> <li>Profit: Revenues * (1-C/I)</li> <li>Staff cost: Employment * players avg staff cost</li> <li>Corporate Taxes</li> </ul>	<ul style="list-style-type: none"> <li>Corporate taxes: Share of tax at industry level (CSSF) * Profit</li> <li>Income taxes: FTE* Avg salary*Tax rate</li> </ul>
	<ul style="list-style-type: none"> <li>ABBL retail banking survey</li> <li>Retail banking players annual reports</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Annual report from retail banking players</li> <li>Lux tax administration</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Lux tax administration</li> </ul>



	Employment	Added Value (Profit + Staff cost + Corp. taxes)	Taxes
Funds in banks	FTE (from representative players) Number of funds (from representative players) X Funds in Luxembourg (weighted for banks market share in fund industry)	<ul style="list-style-type: none"> <li>Profit: Revenues * (1-C/I)</li> <li>Staff cost: Employment * Average staff cost</li> <li>Corporate taxes</li> </ul>	<ul style="list-style-type: none"> <li>Corporate taxes: Share of taxes on total banking revenues extrapolated to the corporate banking revenues</li> <li>Income taxes: FTE* Avg salary*Tax rate</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> <li>Annual reports from fund services players<sup>1</sup></li> <li>Fundsquare</li> </ul>	<ul style="list-style-type: none"> <li>Statec</li> <li>CSSF</li> <li>Annual reports from selected fund services players</li> <li>Luxembourg tax administration</li> <li>Fundsquare</li> </ul>	<ul style="list-style-type: none"> <li>Statec</li> <li>CSSF</li> <li>Annual reports from fund services players<sup>1</sup></li> <li>Luxembourg tax administration</li> <li>Fundsquare</li> </ul>
Corporate banking & others	<ul style="list-style-type: none"> <li>Banking revenues excluded from other categories</li> </ul>	<ul style="list-style-type: none"> <li>Banking added value excluded from other categories</li> </ul>	<ul style="list-style-type: none"> <li>Banking taxes excluded from other categories</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> <li>Other banking sections</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Other banking sections</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Other banking sections</li> </ul>
Insurance	<ul style="list-style-type: none"> <li>Sum of life insurance, non-life insurance and reinsurance</li> </ul>	<ul style="list-style-type: none"> <li>Sum of life insurance, non-life insurance and reinsurance</li> </ul>	<ul style="list-style-type: none"> <li>Corporate taxes: Sum of life insurance, non-life insurance and reinsurance</li> <li>Income taxes: Avg Salary * FTE * Tax rate</li> </ul>
	<ul style="list-style-type: none"> <li>CAA</li> </ul>	<ul style="list-style-type: none"> <li>CAA</li> </ul>	<ul style="list-style-type: none"> <li>CAA</li> <li>Annual reports from selected insurance players</li> </ul>
Management Compagnies	<ul style="list-style-type: none"> <li>Number of employees in management companies corrected for the ratio FTE / employee</li> </ul>	<ul style="list-style-type: none"> <li>Profit as reported</li> <li>Staff cost: Average Cost of employee * Employment</li> <li>Taxes including taxe d'abonnement for funds administrated by management companies</li> </ul>	<ul style="list-style-type: none"> <li>Income taxes: FTE * Avg Salary * Tax rate</li> <li>Corporate taxes: CSSF</li> <li>Taxe d'abonnement (Statec) for funds administrated by management companies</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Luxembourg tax administration</li> <li>Robert Walter salary survey</li> <li>Fundsquare</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Luxembourg tax administration</li> <li>Robert Walter salary survey</li> <li>Fundsquare</li> </ul>

Source: Model

	Employment	Added Value (Profit + Staff cost + Corp. taxes)	Taxes
Investment firms	<ul style="list-style-type: none"> <li>Number of employees in management companies corrected for the ratio FTE / employee</li> </ul>	<ul style="list-style-type: none"> <li>Data as reported by CSSF</li> <li>Taxes including tax d'abonnement (Statec) for funds administrated by investment firms</li> </ul>	<ul style="list-style-type: none"> <li>Income taxes: FTE* Avg Salary* Tax rate</li> <li>Corporate taxes: CSSF</li> <li>Taxe d'abonnement (Statec) for funds administrated by investment firms</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Fundsquare</li> <li>Statec</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Fundsquare</li> <li>Statec</li> </ul>
Specialized PFS	<ul style="list-style-type: none"> <li>Number of employees in specialized PFS corrected for the ratio FTE / employee</li> </ul>	<ul style="list-style-type: none"> <li>Data as reported by CSSF</li> <li>Taxes including tax d'abonnement (Statec) for funds administrated by specialized PFS</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Fundsquare</li> <li>Statec</li> </ul>
	<ul style="list-style-type: none"> <li>CSSF</li> </ul>	<ul style="list-style-type: none"> <li>CSSF</li> <li>Fundsquare</li> <li>Statec</li> </ul>	<ul style="list-style-type: none"> <li>Sum of FTE as reported by players weighted by the share of the financial sector in legal work</li> </ul>
Legal	<ul style="list-style-type: none"> <li>Sum of FTE as reported by players weighted by the share of the financial sector in legal work</li> </ul>	<ul style="list-style-type: none"> <li>Sum of added value as reported by players weighted by the share of the financial sector in legal work</li> </ul>	<ul style="list-style-type: none"> <li>Annual reports of legal industry players</li> </ul>
	<ul style="list-style-type: none"> <li>Annual reports of legal industry players</li> </ul>	<ul style="list-style-type: none"> <li>Annual reports of legal industry players</li> </ul>	<ul style="list-style-type: none"> <li>Annual reports of legal industry players</li> </ul>
Audit & advisory	<ul style="list-style-type: none"> <li>Sum of FTE as reported by players weighted by the share of the financial sector in legal work</li> </ul>	<ul style="list-style-type: none"> <li>Sum of added value as reported by players weighted by the share of the financial sector in legal work</li> </ul>	<ul style="list-style-type: none"> <li>Sum of FTE as reported by players weighted by the share of the financial sector in legal work</li> </ul>
	<ul style="list-style-type: none"> <li>Annual reports of audit &amp; advisory players</li> </ul>	<ul style="list-style-type: none"> <li>Annual reports of audit &amp; advisory players</li> </ul>	<ul style="list-style-type: none"> <li>Annual reports of audit &amp; advisory players</li> </ul>

Source: Model

## THE TRICKLE DOWN EFFECT OF THE FINANCIAL SECTOR IN LUXEMBOURG

### Leveraging input / output tables and different structural indicators ...

- Input-Output tables describe the sale and purchase relationships between producers and consumers within an economy
- Example for a 3 sectors economy
- Structural indicators: value added intensity, employment intensity, share of production exported, hare of import of production

	Sector 1	Sector 2	Sector 3	Final consumption by HH	Exports	Total output
Sector 1	$a_{11}$	$a_{12}$	$a_{13}$	$a_{14}$	$a_{15}$	$TO_1 = \sum_{i=1}^5 a_{1i}$
Sector 2	$a_{21}$	$a_{22}$	$a_{23}$	$a_{24}$	$a_{25}$	$TO_2 = \sum_{i=1}^5 a_{2i}$
Sector 3	$a_{31}$	$a_{32}$	$a_{33}$	$a_{34}$	$a_{35}$	$TO_3 = \sum_{i=1}^5 a_{3i}$
Imports	$a_{41}$	$a_{42}$	$a_{43}$	$a_{44}$	$a_{45}$	$TO_4 = \sum_{i=1}^5 a_{4i}$
Labour compensation	$a_{52}$	$a_{52}$	$a_{53}$	$a_{54}$	$a_{55}$	$TO_5 = \sum_{i=1}^5 a_{5i}$
Taxes paid	$a_{61}$	$a_{62}$	$a_{63}$	$a_{64}$	$a_{65}$	$TO_6 = \sum_{i=1}^5 a_{6i}$
Total intermediate consumption	$= \sum_{j=1}^6 a_{j1}$	$= \sum_{j=1}^6 a_{j2}$	$= \sum_{j=1}^6 a_{j3}$	$= \sum_{j=1}^6 a_{j4}$	$= \sum_{j=1}^6 a_{j5}$	Na
Value added	Production sector 1 – Intermediate consumption sector 1	Production sector 2 – Intermediate consumption sector 2	Production sector 3 – Intermediate consumption sector 3	Na	Na	Na

Used for Luxembourgish input / output analysis

Source: OECD IO, WIOT

## ... we are able to size the trickle down effect of the financial sector to the rest of the economy

### DIRECT EFFECT

- **Effect on first level suppliers**
- Methodology: Share of domestic intermediate consumption in each sector over total output applied to labor and value added intensity

### INDIRECT EFFECT

- **Effect on suppliers of suppliers across the entire supply chain**
- Methodology:
  - Example in a 2 sector economy:
  - Sector 1 produces 12 units of output. 5 consumed by sector 1 itself, 7 consumed by sector 2
  - Sector 2 produces 11 units of output. 8 consumed by sector 2 itself, 3 consumed by sector 1
  - Without sector 2, sector 1 would only produce 5 units. The multiplier for sector 1 is 2.4 (12/5)
- ➔ Similar logic applied through a matrix analysis in order to take into account interactions across all sectors

### INDUCED EFFECT

- **Effect contributed by income spent of the employees in the industry and the supply chain**
- Methodology: similar as for indirect effect but including labour compensation and final consumption

### TAKEN INTO ACCOUNT VERSUS ASSUMPTIONS



- Labor intensity of all industries in the economy
- Value added intensity of all industries in the economy
- Share of output exported / imported for all industries in the economy
- Sale and purchases relationship for all industry-industry pairs in the economy



- Responsive supply chain – industries vary their production to meet changes in demand
- Fixed price supply chain
- Fixed production patterns

## THE DIRECT EFFECT – EFFECT ON FIRST LEVEL SUPPLIERS

	Sector 1	Sector 2	Sector 3	Final consumption by HH	Exports	Total output
Sector 1	$a_{11}$	$a_{12}$	$a_{13}$	$a_{14}$	$a_{15}$	$TO_1 = \sum_{i=1}^5 a_{1i}$
Sector 2	$a_{21}$	$a_{22}$	$a_{23}$	$a_{24}$	$a_{25}$	$TO_1 = \sum_{i=1}^5 a_{2i}$
Sector 3	$a_{31}$	$a_{32}$	$a_{33}$	$a_{34}$	$a_{35}$	$TO_1 = \sum_{i=1}^5 a_{3i}$
Direct effect	$= \sum_{j=1}^3 a_{j1} / TO_1$	$= \sum_{j=1}^3 a_{j2} / TO_2$	$= \sum_{j=1}^3 a_{j3} / TO_3$	$= \sum_{j=1}^3 a_{j3} / TO_{HH}$	Na	Na
Imports	$a_{41}$	$a_{42}$	$a_{43}$	$a_{44}$	$a_{45}$	$TO_1 = \sum_{i=1}^5 a_{4i}$
Labour compensation	$a_{52}$	$a_{52}$	$a_{53}$	$a_{54}$	$a_{55}$	$TO_1 = \sum_{i=1}^5 a_{5i}$
Taxes paid	$a_{61}$	$a_{62}$	$a_{63}$	$a_{64}$	$a_{65}$	$TO_1 = \sum_{i=1}^5 a_{6i}$
Total intermediate consumption	$= \sum_{j=1}^6 a_{j1}$	$= \sum_{j=1}^6 a_{j2}$	$= \sum_{j=1}^6 a_{j3}$	$= \sum_{j=1}^6 a_{j4}$	$= \sum_{j=1}^6 a_{j5}$	Na
Value added	Production sector 1 – Intermediate consumption sector 1	Production sector 2 – Intermediate consumption sector 2	Production sector 3 – Intermediate consumption sector 3	Na	Na	Na

- Effect on first level of suppliers
- The share of a given sector output that is made based on inputs produced in other sectors

Data used for direct effect

For each sector:  

$$\frac{\sum \text{intemediary domestic consumption}}{\text{Total output}}$$
 Example - sector 1:  

$$\frac{\sum \text{intemediary domestic consumption}}{\text{Total output}}$$

Source: OECD IO, WIOT

## THE INDIRECT EFFECT – EFFECT ON THE REST OF THE SUPPLY CHAIN


### Computation

#### Step 1 – creation of the sector by sector direct effect matrix

- Each value in DE is the share of the output of a given sector coming from each one of the other sectors

DE=


	Sector 1	Sector 2	Sector 3	Final consumption by HH	Total output
Sector 1	$\frac{a_{11}}{TO_1}$	$\frac{a_{12}}{TO_2}$	$\frac{a_{13}}{TO_3}$	$\frac{a_{14}}{TO_4}$	$TO_1$
Sector 2	$\frac{a_{21}}{TO_1}$	$\frac{a_{22}}{TO_2}$	$\frac{a_{23}}{TO_3}$	$\frac{a_{24}}{TO_4}$	$TO_2$
Sector 3	$\frac{a_{31}}{TO_1}$	$\frac{a_{32}}{TO_2}$	$\frac{a_{33}}{TO_3}$	$\frac{a_{34}}{TO_4}$	$TO_3$
Labour compensation	$\frac{a_{51}}{TO_1}$	$\frac{a_{52}}{TO_2}$	$\frac{a_{53}}{TO_3}$	$\frac{a_{54}}{TO_4}$	Na

 Data to be included to account for induced effect

## Step 2 – Subtract the DE matrix to the identity matrix

$$|I - DE| =$$

	Sector 1	Sector 2	Sector 3	Final consumption by HH
Sector 1	$1 - \frac{a_{11}}{TO_1}$	$-\frac{a_{12}}{TO_2}$	$-\frac{a_{13}}{TO_3}$	$-\frac{a_{14}}{TO_4}$
Sector 2	$-\frac{a_{21}}{TO_1}$	$1 - \frac{a_{22}}{TO_2}$	$-\frac{a_{23}}{TO_3}$	$-\frac{a_{24}}{TO_4}$
Sector 3	$-\frac{a_{31}}{TO_1}$	$-\frac{a_{32}}{TO_2}$	$1 - \frac{a_{33}}{TO_3}$	$-\frac{a_{34}}{TO_4}$
Labour compensation	$-\frac{a_{51}}{TO_1}$	$-\frac{a_{52}}{TO_2}$	$-\frac{a_{53}}{TO_3}$	$1 - \frac{a_{54}}{TO_4}$

 Data to be included to account for induced effect

### Step 3 – Subtract the DE matrix to the identity matrix

- Inverse of a matrix:  
 $|I-DE|*|I-DE|^{-1}=I$
- Example with numbers: 8  $\rightarrow$  1/8

$$|I - DE|^{-1} =$$

	Sector 1	Sector 2	Sector 3	Final consumption by HH
Sector 1	$N_{11}$	$N_{12}$	$N_{13}$	$N_{14}$
Sector 2	$N_{21}$	$N_{22}$	$N_{23}$	$N_{24}$
Sector 3	$N_{31}$	$N_{32}$	$N_{33}$	$N_{34}$
Labour compensation	$N_{41}$	$N_{42}$	$N_{43}$	$N_{44}$

#### Rationale

$$|I - DE|$$

X

$$|I - DE|^{-1}$$

=

$$I -$$

- Creation of each sector-sector output in a theoretical economy in which:
  1. Outputs are standardized to one
  2. All cross sector interactions are removed

- Each value represents by how much each sector-sector output of the theoretical economy  $|I-DE|$  needs to be multiplied to obtain the production of economy I
- Those values-Direct effect-1 (as economy is standardized) give the actual indirect multipliers

- Actual output of the economy standardized to one

Source: OECD IO, WIOT

### Step 4 – Extrapolate multipliers from $|I-DE|^{-1}$

For sector-sector pairs,  
compute:

$$IE_{ij} = N_{ij} - \frac{a_{ij}}{TO_j} - 1$$



## FROM OUTPUT MULTIPLIERS TO VALUE ADDED / EMPLOYMENT MULTIPLIERS

### Calculation rational –

### Example, VA direct effect multiplier for the financial sector, 2014

Similar logic applies for other multipliers / years

	1. For each sector, computation of proportionality ratios		2. Multiply each sector/ sector output by the ratios
	VA / Q	FS direct effect – Output	FS direct effect – VA
Agriculture, forestry, fishing	0.34	0	= 0.34 * 0.00
Mining, quarrying	0.44	0	0
Manufacture	0.26	0	0.0003
Electricity, gaz, air conditionning, water supply	0.31	0	0.0003
Construction	0.42	0	0.0005
Wholesale	0.35	0	0.0012
Transporation	0.39	0.01	0.0037
Accomodation	0.62	0	0.0010
Information / communication	0.23	0	0.0008
Financial services	0.15	0.32	0.0478
Real estates	0.73	0	0.0019
Other business services	0.40	0.03	0.0120
Public admin	0.75	0	0.0003
Education	0.88	0	0.0017
Health	0.74	0	0.0001
Arts, entertainment, recreation others	0.60	0	0.0006
Private HH with employed persons	1.00	0	0

Direct effect multiplier for VA

$$= \sum \square = 0.07$$

Source: OECD IO, WIOT

## Output

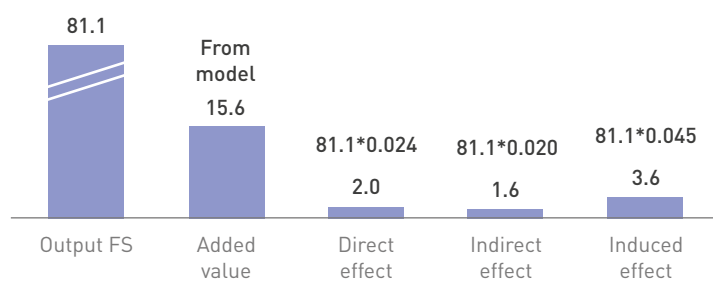
### For each sector you get

(example financial sector 2014):

1 additional unit of output in the financial sector generates below numbers of FTE / employment in Luxembourg

	Direct	Indirect	Induced
VA	0.02	0.02	0.04
Empl.	0.19	0.15	0.31
	Through direct suppliers of financial sector	Through suppliers of suppliers of financial sector	Through additional income spent of employees of industry and supply chain

### Value added example, EUR bn



## ABOUT LUXEMBOURG FOR FINANCE

Luxembourg for Finance (LFF) is the Agency for the Development of the Financial Centre. It is a public-private partnership between the Luxembourg Government and the Luxembourg Financial Industry Federation (PROFIL). Founded in 2008, its objective is to develop Luxembourg's financial services industry and identify new business opportunities.

LFF connects international investors to the range of financial services provided in Luxembourg, such as investment funds, wealth management, capital market operations or advisory services. In addition to being the first port of call for foreign journalists, LFF cooperates with the various professional associations and monitors global trends in finance, providing the necessary material on products and services available in Luxembourg. Furthermore, LFF manages multiple communication channels, organises seminars in international business locations, and takes part in selected world-class trade fairs and congresses.

