

Online Appendix for “The Growth of Finance is Not Remarkable”

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Appendix A: Sample construction and industry matching

A.1 Data sources, coverage and sample construction

Our main data source is the National Income and Product Accounts (NIPA), available online from Bureau of Economic Analysis (BEA). We start the sample in 1929 because the NIPA tables report consistently compiled data for the three financial services sub-sectors from 1929-2018. Some related studies include earlier data on the financial sector from various sources, including the Historical Statistics of the United States (HSUS)¹, Martin (1939), and Kuznets (1941). However, our main focus is on the growth of finance relative to other skill-intensive service industries after WWII, and, moreover, these alternative sources do not have consistent data on all other skill-intensive service industries during the late 19th and very early 20th centuries.

For 1929-1948, we classify service sub-sectors based on the NIPA tables, which follow the 1942 Standard Industrial Classification (SIC). We do this for two reasons. First, we divide the services sector into high-skill and low-skill groups following Buera and Kaboski (2012), who link their skill measures with NIPA industry data starting in 1929. We describe how we construct the skill-intensity measures in section A.2. These sectors are consistently tracked up to 2000 as NIPA follows different versions of the SIC system. However, starting in 2001, NIPA changes to the North American Industry Classification System (NAICS), which in some instances does not perfectly align with the 18 SIC service industries. Section A.3 describes how we map industries to generate a (roughly) consistent time series through 2018.

¹ Carter, Susan B. 2006. Historical statistics of the United States: earliest times to the present.

A.2 Variable selection construction

Greenwood and Scharfstein (2013) and Philippon (2015) measure the relative size of the financial sector with nominal value added divided by nominal GDP for each year. We cannot track value added across the non-finance sub-components of services until 1963. Philippon (2015) uses total employee compensation from 1929-1947 because value added measures by industry are not available. Since the publication of Philippon (2015), Bakker, Crafts, and Woltjer (2019) have created value added by industry back to 1929. However, the level of detail does not allow us to go earlier than 1963 for the non-finance sub-components of services. We therefore measure the relative size of each services sub-sector by its total employee compensation divided by the economy total employee compensation. Of importance, starting in 1963, when we compare employee compensation figures to the value added measure, the patterns are very similar. We also measure each sub-sector's share of economy wide employment by full-time equivalent (FTE) number of employees divided by total number of FTE employment each year.

A.3 Steps to construct the skill intensity measure

1. Download Dataset from <https://www.aeaweb.org/articles?id=10.1257/aer.102.6.2540> (Dataset for Buera and Kaboski, 2012).
2. Use data from the 'Data for Figure 4' tab and 'Skill classification for Fig. 3' tab.
3. We sort broad NIPA industry categories in to low- and high-skill services based on data from the 'Skill classification for Fig. 3' tab and information from columns D to J. A zero in column I indicates the broad NIPA industry is low skill, and a one indicates that it is high skill.
4. We combine the industries in D6 to D53 in to broader categories for two reasons. First, given the purpose of the study, we need broader sub-categories within high and low skill services. Second, in order to track the industry categories from 1929 to 2018 we need to aggregate to groups that are trackable over time.
5. We end up with 18 industries divided in to 11 skill intensive and 7 low skill.

a. High skill services sectors (corresponding sectors from column D in 'Skill classification for Fig. 3' tab):

- i. Transportation by air (Transportation by air, D12),
- ii. Telecommunications (Telephone and Telegraph (D16) and Radio and television (D17)),
- iii. Finance and insurance (Banking (D22), Credit agencies other than banks (D23), Security and commodity brokers (D24), Insurance carriers (D25) and Insurance agents, brokers, and service (D26)),
- iv. Real estate (D27),
- v. Professional business services (Business services (D34) and miscellaneous professional services (D44)),
- vi. Motion pictures (D37),
- vii. Amusement and recreation services (D38),
- viii. Health Services (Health services (D39) and social services (D42)),
- ix. Legal services (D40),
- x. Educational services (D41),
- xi. Membership organizations (D43).

b. Low skill services sectors (corresponding sectors from column D in 'Skill classification for Fig. 3' tab):

- i. Transportation excluding Air (Railroad transportation (D8), Local and interurban passenger transit (D9), Trucking and warehousing (D10), Water transportation (D11), Pipelines, except natural gas (D13) and Transportation services (D14)),
- ii. Wholesale trade (D19),
- iii. Retail trade and automobile services (Retail trade (D20) and Auto repair, services, and parking (35)),

- iv. Hotels and other lodging places (D32),
 - v. Personal services (D33),
 - vi. Miscellaneous repair services (D36),
 - vii. Private households (D45).
6. To compute skill intensity measures for 1940 and 2000 we use school31940 variable and hours94 (in some cases hours95) to compute weighted averages of broader industry skill intensity measures for 1940 and school3 and hours00 for the 2000 skill intensity measure from 'Data for Figure 4'.

A.4 Mapping NIPA industries 1929-2018

A.4.1 NIPA datasets

We use ten datasets from National Data – National Income and Product Accounts from BEA's website:

Compensation of Employees by Industry

- 1. 1929-1948 (Table 6.2A). SIC 1942 classification.
- 2. 1948-1987 (Table 6.2B). SIC 1972 classification.
- 3. 1987-2000 (Table 6.2C). SIC 1987 classification.
- 4. 1998-2018 (Table 6.2D). NAICS 2012 classification.

Full-Time Equivalent Employees by Industry

- 5. 1929-1948 (Table 6.5A). SIC 1942 classification.
- 6. 1948-1987 (Table 6.5B). SIC 1972 classification.
- 7. 1987-2000 (Table 6.5C). SIC 1987 classification.
- 8. 1998-2018 (Table 6.5D). NAICS 2012 classification.

Value Added by Industry

- 9. 1947-1997 (Unnumbered table)
- 10. 1998-2018 (Unnumbered table)

A.4.2 The 18 services sectors mapped 1929-2018

Transportation excl air:

1929-1948: Railroad transportation; Local and interurban passenger transit; Trucking and warehousing; Water transportation; Pipelines, except natural gas; Transportation services

1948-1987: Railroad transportation; Local and interurban passenger transit; Trucking and warehousing; Water transportation; Pipelines, except natural gas; Transportation services

1987-2000: Railroad transportation; Local and interurban passenger transit; Trucking and warehousing; Water transportation; Pipelines, except natural gas; Transportation services

1998-2018: Rail transportation; Water transportation; Truck transportation; Transit and ground passenger transportation; Pipeline transportation; Other transportation and support activities (Consists of scenic and sightseeing transportation; transportation support activities; and couriers and messengers.)

Transportation by air:

1929-1948: Transportation by air

1948-1987: Transportation by air (Beginning with 1987, reflects the reclassification of air couriers from trucking and warehousing to transportation by air)

1987-2000: Transportation by air (Beginning with 1987, reflects the reclassification of air couriers from trucking and warehousing to transportation by air)

1998-2018: Transportation by air; Warehousing and storage

Telecommunications:

1929-1948: Telephone and telegraph; Radio and television broadcasting

1948-1987: Telephone and telegraph; Radio and television broadcasting

1987-2000: Telephone and telegraph; Radio and television broadcasting

1998-2018: Broadcasting and telecommunications

Wholesale trade:

1929-1948: Wholesale trade

1948-1987: Wholesale trade

1987-2000: Wholesale trade

1998-2018: Wholesale trade; General Merchandise store

Retail trade and automobile services:

1929-1948: Retail trade and automobile services

1948-1987: Retail trade; Auto repair, services, and parking

1987-2000: Retail trade; Auto repair, services, and parking

1998-2018: Motor vehicle and parts dealers; Food and beverage stores; Other retail²; Food services and drinking places.

Finance and insurance:

1929-1948: Banking; Security and commodity brokers and services; Credit agencies (other than banks); holding and other investment companies; Insurance carriers; Insurance agents brokers and service; (Credit intermediation: Banking; Credit agencies (other than banks); holding and other investment companies; Insurance: Insurance carriers; Insurance agents brokers and service; Securities: Security and commodity brokers and services).

² Consists of furniture and home furnishings stores; electronics and appliance stores; building material and garden equipment and supplies dealers; health and personal care stores; gasoline stations; clothing and clothing accessories stores; sporting goods, hobby, book, and music stores; miscellaneous store retailers; and nonstore retailers.

1948-1987: Banking; Security and commodity brokers and services; Credit agencies (other than banks); holding and other investment offices; Insurance carriers; Insurance agents brokers and service; (Credit intermediation: Banking; Credit agencies (other than banks); holding and other investment offices; Insurance: Insurance carriers; Insurance agents brokers and service; Securities: Security and commodity brokers and services).

1987-2000: Depository institutions; Nondepository institutions; Security and commodity brokers; holding and other investment offices; Insurance carriers; Insurance agents brokers and service; (Credit intermediation: Depository institutions; Nondepository institutions; holding and other investment offices; Insurance: Insurance carriers; Insurance agents brokers and service; Securities: Security and commodity brokers).

1998-2018: Federal Reserve banks, credit intermediation, and related activities; Securities, commodity contracts, and investments; Insurance carriers and related activities; Funds, trusts, and other financial vehicles (Credit intermediation: Federal Reserve banks, credit intermediation, and related activities; Insurance: Insurance carriers and related activities; Securities: Securities, commodity contracts, and investments).

Real estate:

1929-1948: Real estate

1948-1987: Real estate

1987-2000: Real estate

1998-2018: Real estate and rental and leasing

Hotel and other lodging places:

1929-1948: Hotel and other lodging places

1948-1987: Hotel and other lodging places

1987-2000: Hotel and other lodging places

1998-2018: Accommodation

Personal services:

1929-1948: Personal services

1948-1987: Personal services

1987-2000: Personal services

1998-2018: Not available

Professional business services:

1929-1948: Business services; Miscellaneous professional services

1948-1987: Business services; Miscellaneous professional services

1987-2000: Business services; Other services (Consists of museums, botanical and zoological gardens; engineering and management services; and services, not elsewhere classified.)

1998-2018: Publishing industries (includes software); Information and data processing services; Computer systems design and related services; Miscellaneous professional, scientific, and technical services³; Management of companies and enterprises.⁴

Miscellaneous repair services:

1929-1948: Miscellaneous repair services

1948-1987: Miscellaneous repair services

³ Consists of accounting, tax preparation, bookkeeping, and payroll services; architectural, engineering, and related services; specialized design services; management, scientific, and technical consulting services; scientific research and development services; advertising and related services; and other professional, scientific, and technical services

⁴ Consists of offices of bank and other holding companies and of corporate, subsidiary, and regional managing offices. Parts of credit intermediation is in this component from 1998.

1987-2000: Miscellaneous repair services

1998-2018:

Motion pictures:

1929-1948: Motion pictures

1948-1987: Motion pictures

1987-2000: Motion pictures

1998-2018: Motion picture and sound recording industries

Amusement and recreation services:

1929-1948: Amusement and recreation services

1948-1987: Amusement and recreation services

1987-2000: Amusement and recreation services

1998-2018: Arts, entertainment, and recreation

Health services:

1929-1948: Health services

1948-1987: Health services

1987-2000: Health services

1998-2018: Ambulatory health care services; Hospitals; Nursing and residential care facilities

Legal services:

1929-1948: Legal services

1948-1987: Legal services

1987-2000: Legal services

1998-2018: Legal services

Educational services:

1929-1948: Educational services, n.e.c.

1948-1987: Educational services, n.e.c.

1987-2000: Educational services, n.e.c.

1998-2018: Educational services, n.e.c.

Membership organizations:

1929-1948: Membership organizations

1948-1987: Membership organizations

1987-2000: Membership organizations

1998-2018: Not available

Private households:

1929-1948: Private households

1948-1987: Private households

1987-2000: Private households

1998-2018: Not available

A.4.3 Summary NIPA mapping 1929-2018

Industries are consistently mapped from 1929-2000. There is a major change to industry classifications in from 2001 and onwards. The following industries can be consistently mapped even after 2000:

- Transportation excl. air
- Transportation by air
- Telecommunications
- Hotels and other lodging places
- Amusement and recreation services
- Legal services
- Educational services

The following industries are mapped reasonably well, but with a slight change in the time series:

- Finance and insurance (Parts of credit intermediation is in *Management of companies and enterprises* from 1998, which is a sub component of professional business services).
- Real estate (leasing has become a part of real estate in the 1998-2018 series).
- Professional business services (see explanation for Finance and insurance).
- Motion pictures (no indication in the BEA data why there is a lower total compensation in the 1998-2018 compared to 1987-2000 for the same years).
- Health services (no indication in the BEA data why there is a higher total compensation in the 1998-2018 compared to 1987-2000 for the same years).

The following industries have been mapped making assumptions:

- Wholesale trade (there is a big decline in the size of wholesale trade from the 1987-2000 to 1998-2018 series. This decline is almost as big as the sub-component General merchandise stores which is classified as retail trade in the 1998-2018 series. If General merchandise stores is aggregated as Wholesale trade after 2000 we get a reasonably close size of wholesale trade between the 1987-2000 and 1998-2018 series).
- Retail and trade and automobile services (see above the re-classification of General merchandise stores to Wholesale trade. *Food services and drinking places* is classified in Retail trade in SIC (instead of under the newly formed industry Accommodation and Food services)

and by classifying it in Retail trade there is a relatively similar value between the 1987-2000 and 1998-2018 series.

The following industries remain unmapped in the 1998-2018 period:

- Personal services
- Miscellaneous repair services
- Membership organizations
- Private households

In the 1998-2018 three “new” industry groupings have not been mapped above: Social assistance; Administrative and support services; Other services, except government. Social assistance is classified as skill-intensive and Administrative and support services; Other services, except government are classified as low-skill services. Total services is larger using the NAICS classification in the 1998-2018 series.

A.5 References

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Appendix B: Additional figures and heterogeneity in finance

B.1 : Additional figures

Figure B1. Financial services share of GDP 1947-2018

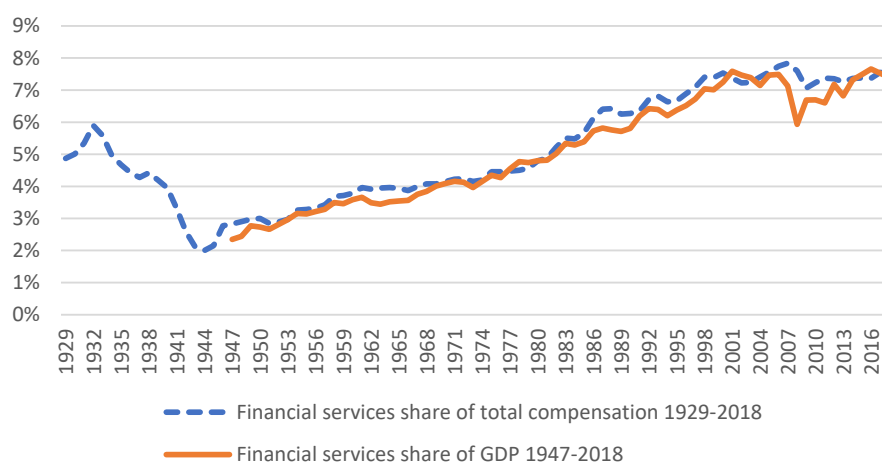
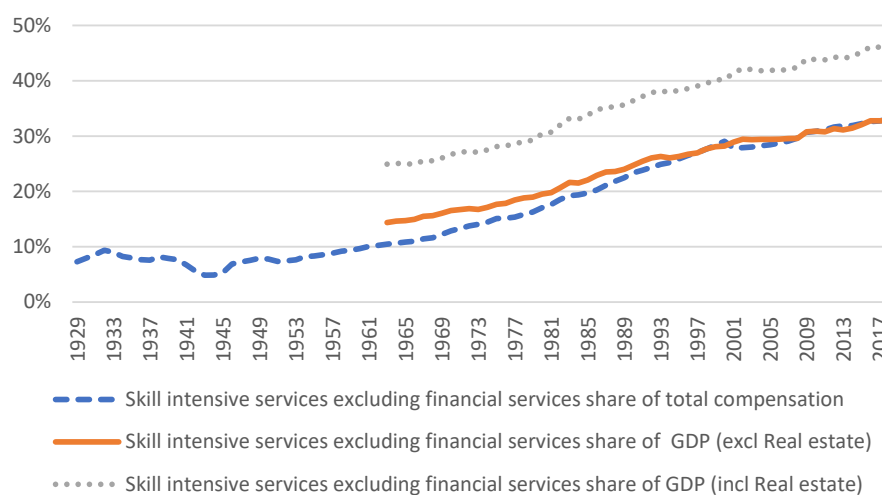


Figure B2. High-skill services share (excl financial services) 1963-2018



Notes: Data is from National Income and Product Accounts (1929–2018). Compensation share refers to the share of each sub-sector in total economy wide compensation (dashed line) and GDP share refers to the share of each sub-sector in to total economy wide value added (solid line). The financial services sector includes the securities, insurance, and credit intermediation subsectors.

Figure B3. Compensation shares within financial services 1929-2018

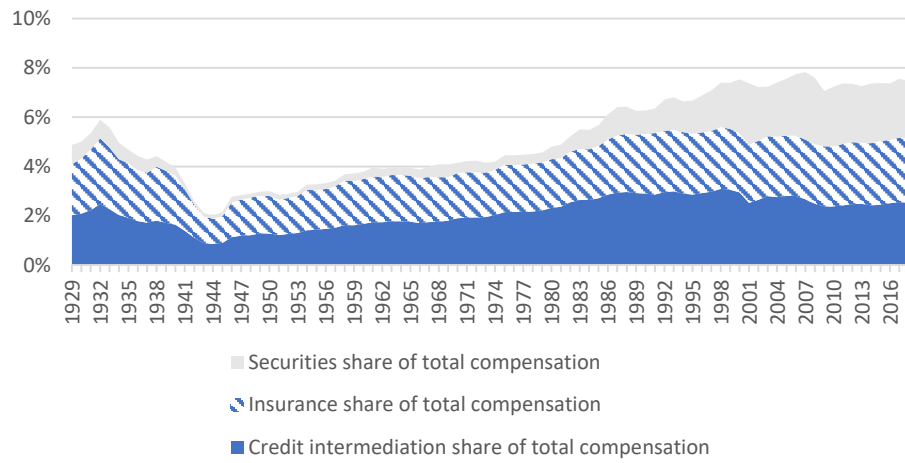


Figure B4. Employment share within financial services 1929-2018

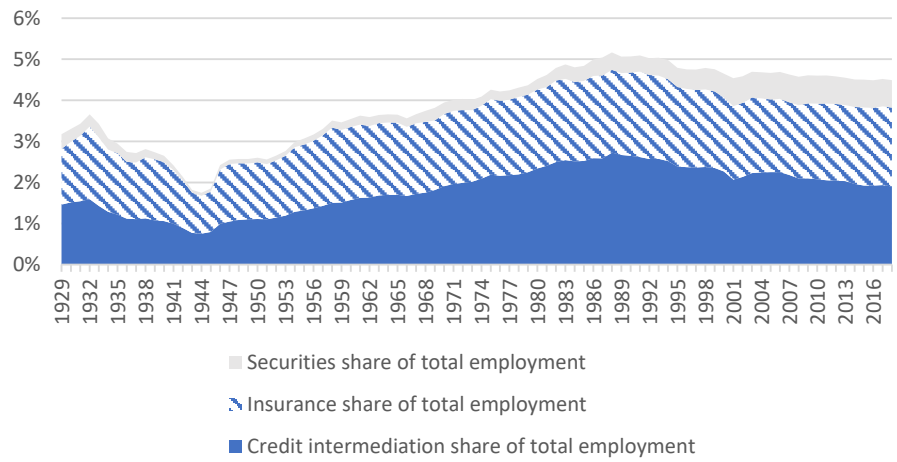
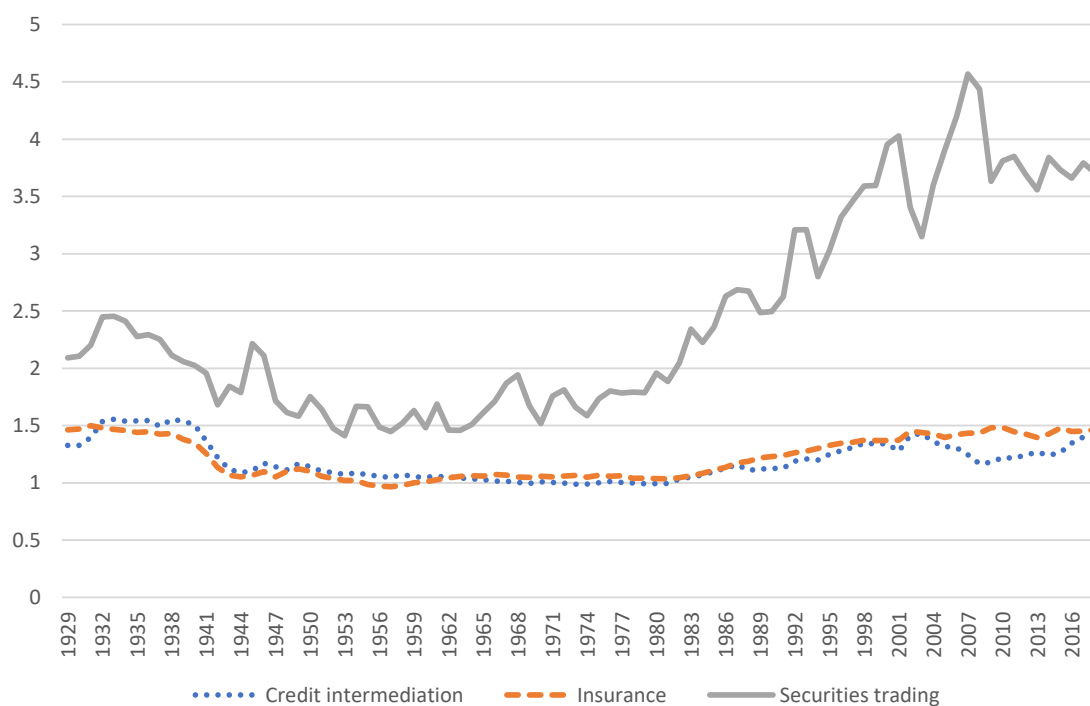


Figure B5. Relative wages in the finance sub-sectors 1929-2018



Notes: Data is from National Income and Product Accounts (1929–2018). In Figure B3: Compensation share refers to the share of each financial services' sub-sector in total compensation, measured as the total income (both wages and salaries, and supplements to wages and salaries) earned by employees each year. In Figure B4: Employment share refers to the share of each financial services' sub-sector in total number of full time equivalent (FTE) employment each year. The financial services sector includes the securities, insurance, and credit intermediation subsectors. In Figure B5: The relative wage refers to total compensation per worker in each finance sub-sector relative total compensation per worker across all *other* (nonfarm) private industries.

B.2 Additional Information on Heterogeneity within Financial services

Figures B3-B5 show how compensation, employment and relative wages for the three finance industries evolve between 1929 and 2018. Figure B3 shows that all three components of finance decline as a share of total compensation between 1933 and 1944, and then grow steadily in the decades following WWII. However, starting in the mid-1980s, the expansions of both *Credit intermediation* and *Insurance* level off. In contrast, the compensation share in *Securities* grows dramatically from the mid-1980s to 2008. This evidence is similar to the findings in Greenwood and Scharfstein (2013). The *Securities* compensation share peaks in 2007, declines during the financial crisis, and then remains relatively stable thereafter. At the end of the sample period the three components of finance account for roughly similar shares of economy-wide compensation, a marked contrast from the early 1940s, when *Credit intermediation* and *Insurance* accounted for approximately 92% of compensation in financial services.

Figure B4 shows that the employment shares for the three finance industries also follow a U-shaped pattern between the early 1930s and the mid-1980s. However, in contrast to the compensation shares shown in Figure B3, the overall finance employment share peaks in 1987, and the *Securities* share of employment increases only modestly between the late 1980s and mid-2000s. Moreover, while *Securities* accounts for approximately 31% of compensation in financial services in 2018, it accounts for only 15% of finance employment.

Figure B5 shows how relative wages evolve in the finance sub-sectors between 1929 and 2018. Wages in *Securities* are much higher and more volatile than wages in the other finance subsectors. Between 1975 and 2000, there is a sharp increase in the relative wage in *Securities*, which explains why the *Securities* share of total compensation expands rapidly at the end of the 20th century despite only modest growth in *Securities* employment. The *Securities* relative wage peaks in 2007 at around 4.6

times the economy-wide average. Relative wages in *Securities* have been rather stable since the financial crisis, and are essentially unchanged over the past two decades.

Figures B3-B5 shed considerable light on the mechanics of the growth of finance during the 20th century. The growth of finance during the early post-war period was driven to a large extent by an increase in the economy share of employment across the three finance sub-sectors. After the mid-1980s, however, employment shares decline in *Credit intermediation* and *Insurance* and increase only modestly in *Securities*, especially when compared to growth in the *Securities* share of compensation. Thus, the growth of finance from the mid-1980s to the financial crisis is due primarily to wage growth in *Securities*.