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Finance, Talent Allocation and Growth

Abstract

The growing finance wage premium is related to a modest net reallocation of skilled workers from non-finance sectors into finance in a broad sample of 24 countries over 35 years. The reallocation is higher when the finance wage premium grows faster than the contribution of the financial sector to the economy, which we proxy with the relative value added of finance. More innovative sectors and sectors exhibiting lower labor-transition costs face a higher reallocation of skilled workers. Yet, the growing finance wage premium is unrelated to sectoral or aggregate growth, to countries' innovative capacity, to student enrollment in STEM degrees, and to the riskiness, efficiency, and competitiveness of banking sectors. Overall, the reallocation of skilled labor implied by a growing finance wage premium appears too modest to materially affect economic growth.

JEL-Codes: D720, G200, J230, J310, N200.

Keywords: finance wage premium, skilled labor, misallocation, growth, innovation, banking sector.

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I Introduction

Over the last four decades, the size of the financial sector has grown considerably all over the world. Rising compensation of finance workers has followed (e.g., Kaplan and Rauh (2010), Philippon and Reshef (2012), and Boustanifar, Grant, and Reshef (2017)). Academics and policy makers worry that excessive finance compensation might distort the efficient allocation of talent in the economy, because talented individuals maximize their private return by moving into lucrative finance jobs instead of engaging in occupations that generate higher social returns, such as entrepreneurship and scientific research.[1] According to Brink Lindsey and Steven Teles, the growing U.S. financial sector creates "growth-sapping diversion of some of the nation's best minds into unproductive or counterproductive pursuits" (*The Captured Economy, 2017*).

We assess this prediction empirically after assembling a large sample covering 13 sectors in 24 countries over 35 years, which includes several proxies for economic growth, innovation, and scientific research productivity at both the sectoral and aggregate levels. Consistent with earlier within-country evidence, we detect a reallocation of skilled workers from non-finance sectors into finance when the finance wage premium is high. Yet the magnitude of this reallocation is modest. Crucially, reallocation appears too low to hinder sectoral or aggregate economic growth, research productivity, and innovation, which we measure using several proxies and over various horizons. Reallocation does not materially affect the riskiness, efficiency, or competitiveness of the banking sector either. Higher finance wages *per se* do not seem to hinder growth or worsen the quality of a country's banking sector.[2]

To understand the interplay between the compensation of finance workers, talent allocation, and economic growth, we note the optimal allocation of talent across sectors could be distorted

[1]For instance, Vivek Wadhwa told the U.S. Congress that "thirty to forty percent of Duke Masters of Engineering Management students were accepting jobs outside of the engineering profession. They chose to become investment bankers or management consultants rather than engineers" (*Testimony to the U.S. House of Representatives, May 16, 2006*).

[2]Lack of statistical power is an unlikely explanations for these non-results, because we detect a small yet statistically significant reallocation of talent to finance in the same data with similar empirical specifications.

if the private returns in a sector – employees' compensation – exceed its social returns – the contribution of this sector to the economy. As Baumol (1990) and Murphy, Shleifer, and Vishny (1991) argue, when private returns are high in rent-seeking sectors that produce low social returns, talent flows excessively into socially unproductive sectors. A higher finance wage premium might thus induce harmful allocative distortions if it is not commensurate with the social returns finance provides to the rest of the economy (e.g., Philippon (2010)). A wedge between private and social returns can arise if the financial sector captures substantial rents at the expense of other sectors. This condition is often taken for granted, but the mechanisms and magnitude of rents in finance remain elusive.[3]

At the same time, a large literature documents important social returns associated with the financial sector (see Levine (2005) for a survey). An efficient financial sector offers talented individuals more opportunities to create, develop, or join productive firms in non-finance sectors (e.g., Guiso, Sapienza, and Zingales (2004)).[4] If the finance wage premium is proportional to the benefits finance provides to the rest of the economy, a high finance wage premium might even promote a more efficient allocation of talent, because individuals could obtain more resources to exploit their talent outside finance.

Assessing whether the higher and increasing compensation of finance workers relates to a misallocation of talent thus requires linking talent allocation to the potential wedge between the private and social returns associated with financial activities.[5] To this aim, we use detailed sectoral-level data on employment, compensation, skills, value added, and productivity covering 24 developed and emerging countries between 1970 and 2005 from the WORLD-KLEMS

[3]The financial sector might extract rents through complex services and its capturing of the government (e.g., Stiglitz (2012) or Lindsey and Teles (2018)). Research provides evidence that financial complexity is increasing (Celerier and Vallee (2017)) and can be socially inefficient (Perignon and Vallee (2017)). We are not aware of direct evidence that the social costs of rent-seeking in finance exceed the social benefits of financial activities.

[4]Starting with Schumpeter (1911), research shows that the financial sector provides benefits to other sectors, which fosters economic growth (e.g., King and Levine (1993), Levine (1997), Beck et al. (2000), or Beck (2002)). Finance might help manage risks, limit agency problems, and allocate capital efficiently.

[5]This idea is similar in spirit to that put forth by Cochrane (2013), who argues that to evaluate the social contribution of the financial sector, one needs to focus on its function and not its size.

2008 initiative. These data allow us to measure the private returns in finance as the average compensation (henceforth "wage") of skilled workers in finance relative to the average compensation of skilled workers in the rest of the economy (*finance wage premium*).[6] Measuring the social returns of finance is notoriously challenging. We rely on the value added of the financial sector. By construction, the measured value added of finance aggregates the overall value of the services the financial sector provides to the rest of the economy, (e.g., payment processing, screening and monitoring borrowers, or underwriting financial securities), net of purchases from other sectors. We thus approximate the social returns of the financial sector as the value added per skilled worker in finance relative to the average value added per skilled worker in the rest of economy (*finance value-added premium*). To validate this interpretation, we show the finance value-added premium is positively correlated with proxies for the benefits of the financial sector, such as the efficiency of capital allocation within countries.

We define the wedge between the private and social returns of the financial sector in each country and year by taking the difference between the growth of the finance wage and value-added premia at various horizons. We label this difference as the *adjusted growth of finance wages*, henceforth AGFW. Intuitively, a positive AGFW in a given country-year implies the relative compensation of finance workers in that country has grown *more* than their relative contribution to that country's economy. Our central prediction is that if the high relative wages in finance trigger a reallocation of talent into finance, such reallocation should occur in periods of high AGFW, that is, when private returns in finance exceed social returns. Our tests exploit the substantial variation of AGFW across countries and over time. As in Philippon and Reshef (2012), we focus on the education attainment of the labor force to measure talent, and calculate the skill intensity of a given country-sector-year as the fraction of the labor force holding a university degree (or equivalent).

[6]Workers' compensation includes wages, salaries, and supplements, employers' contributions to social programs, tips, bonuses. Corporate executives are also part of the sample. We label the sum of all these components "wage" following Philippon and Reshef (2012) and Boustanifar, Grant, and Reshef (2017).

First, we document that a higher finance wage premium is associated with a detectable reallocation of skilled workers from non-finance sectors into finance. We estimate a positive relationship between the AGFW and the share of skilled workers employed in the financial sector in a given country-year.[7] At the same time, we find a negative relationship between the share of skilled workers employed in non-finance sectors and the AGFW, indicating the talent intensity of non-finance sectors is lower when the AGFW is high. The negative association between the AGFW and the share of skilled labor in non-finance sectors holds at all horizons where we measure the AGFW. It also holds when we include country-sector and year fixed effects, indicating our results cannot be explained by unobserved shocks that are common to all countries (e.g., a worldwide recession) or time-invariant characteristics specific to each country-sector observation. We further show our results are not due to variation in the country-level supply of skilled labor, to countries' credit cycles that could correlate with variation in the finance wage premium, or to a set of proxies for the size and development of countries' financial sectors.[8]

When we consider the two components of the AGFW separately, we find the share of skilled workers in non-finance sectors is negatively associated with the recent growth of finance relative wages (i.e., the private returns), but positively associated with the growth of finance value added (i.e., the social returns). These results corroborate the use of the value added of finance as a proxy for the contribution of finance to other sectors. In terms of magnitude, the coefficient on the AGFW is more than twice as large as the coefficient on the (unadjusted) growth of finance relative wages. This discrepancy suggests scaling the finance wage premium by the contribution of the financial sector is important to avoid an omitted-variable bias when evaluating the real implications of increasing finance wages.[9]

[7]This result is consistent with the evidence in Bertrand, Goldin, and Katz (2010), Oyer (2008), and Shu (2013), as well as in Philippon and Reshef (2012) and Gupta and Hacamo (2017).

[8]The AGFW does *not* vary systematically with episodes of financial deregulation, because the increase in the finance wage premium post-deregulation (e.g., Philippon and Reshef (2012) and Boustanifar et al. (2017)) is accompanied by a parallel increase in the finance value-added premium.

[9]The opposite signs of the growth of finance relative wages and the growth of finance value added further

Our baseline negative association between skilled workers in non-finance sectors and the AGFW might be driven by unobserved time-varying country-specific variables, which are correlated with the AGFW and with the allocation of skills across sectors. To tackle this concern and clarify the economic mechanisms behind our results, we conduct an analysis in the spirit of Rajan and Zingales (1998). We explore how the sensitivity of skilled labor to the AGFW varies across non-finance sectors *within* countries, holding time-varying country characteristics constant with the interaction of country and year fixed effects. We show the sensitivity of skilled labor to the AGFW is more negative in sectors in which the costs of transitioning to the financial sector are lower, and in more innovative sectors.

Although statistically significant, the estimated sensitivity of the share of skilled workers in non-finance sectors to the AGFW is economically small. In our preferred specification, a one-standard-deviation increase in the AGFW in the previous five years (0.25) is associated with a 0.5-percentage-point decrease in the share of skilled workers in non-finance sectors. This magnitude represents a relative decline of 3% compared to the average share of skilled workers in our sample (which is 16%). When we focus on the top quintile of the distribution of AGFW, the association with the share of skilled workers in non-finance sectors is -1.5 percentage points, which is about 9% of the average share of high-skilled workers in non-finance sectors. The relatively small magnitude of the estimated reallocation may have several explanations, ranging from substantial frictions to the inter-sectoral mobility of skilled workers (e.g., Pissarides (2010)) to non-pecuniary incentives driving occupational choices (e.g., Hurst and Pugsley (2011)).

We then assess whether the statistically significant talent reallocation from non-finance sectors to finance at times of high AGFW predicts economic growth. Across a host of direct and indirect sectoral and aggregate measures of growth, we find no evidence that periods of high AGFW are systematically related to lower future growth. When using sectoral output, value added, total factor productivity, the overall market-to-book ratio, and sales growth, we

validate our use of value added as a proxy for the contribution of the financial sector to the rest of the economy.

find no relationship between the AGFW and the subsequent growth of non-finance sectors.

Similarly, we find no significant link between the AGFW and aggregate outcomes. Higher AGFW does not predict lower GDP growth measured at various horizons. Because the reallocation of talent related to the AGFW may take time to translate into real economic outcomes, we also consider long-run determinants of economic growth. A higher AGFW is not significantly associated with the allocation of students across fields of study, including STEM degrees (i.e., sciences, technology, engineering, and math) and business degrees. Neither do we find an association between the AGFW and countries' innovative capacity, measured using yearly patent applications, trademark applications, or scientific articles published in each country-year.

If a higher finance wage premium reflects rent-seeking activities, it might hinder long-run growth via a deterioration of the banking sector. Using proxies for the riskiness, efficiency, and competitiveness of countries' banking sectors, we find no evidence that the AGFW is associated with a deterioration of banking sectors. If anything, a higher AGFW is associated with more competition in banking.

Our findings add to the recent literature studying the growth of the financial sector, and in particular, the higher relative wages earned by finance workers. Most of the existing studies in this area, both theoretical and empirical, focus on the determinants of the rising finance wage premium. Existing evidence is mixed (e.g., Bertrand et al. (2010), Celerier and Vallee (2016)), or Böhm, Metzger, and Strömberg (2016)).[10] In this paper, we study the *consequences* of the rising finance wage premium for talent allocation across sectors and economic growth. Although we are not the first to study this question, we provide direct evidence of the implications of the increasing finance wage premium for both talent allocation and economic growth.[11] The

[10]See for instance Glode and Lowery (2016), Axelson and Bond (2015), Biais and Landier (2017), or Bolton, Santos, and Scheinkman (2016).

[11]Existing research provides indirect and mixed evidence. Kneer (2013) shows financial liberalization hurts the growth of skill-intensive manufacturing sectors. Cecchetti and Kharroubi (2015) report that credit growth is more detrimental to the productivity growth of R&D-intensive manufacturing sectors. Boustanifar, Grant, and Reshef (2017) find high wages in finance attract skilled workers from other countries. Gupta and Hacamo

key advantages of our cross-country and cross-industry approach are the ability to exploit large cross-sectional variation in finance wages, which is hard to detect within countries, and to empirically link talent allocation to outcomes at the sectoral and country levels.

We also contribute to the ongoing debate about the social value of the financial sector. Methodologically, our use of the AGFW aims to answer the calls in Cochrane (2013), Levine (2014), and Zingales (2015) to consider the benefits of a growing financial sector alongside its costs. Our goal is *not* to evaluate the net social value or the optimal size of the financial sector. Instead, we assess one debated channel through which the growth of the financial sector might reduce economic growth. Our results suggest the reallocation of talent due to growing finance wages is barely related to subsequent economic growth.

II The Adjusted Growth of Finance Wages (AGFW)

To study whether the finance wage premium – higher wages in the financial sector relative to other sectors – leads to a misallocation of talent across sectors, we propose to contrast the growth of the relative wages of skilled workers in finance to the contribution of skilled finance workers to other sectors. This section describes the construction of the variables and presents their main characteristics.

A Data and Definitions

Our main data source is the WORLD-KLEMS 2008 initiative, which provides harmonized data on value added, employment, wages, education levels of workers, and productivity, obtained from national statistical institutes. We focus on disaggregated data for 13 broad sectors based on the 1-digit European NACE revision 1 industry classification for 24 developed and emerging

(2017) show U.S. engineers are more likely to work in finance when the local financial sector grows more.

countries in North America, Europe, Asia, and Oceania. This level of sectoral disaggregation is the finest partition for which we can observe the education-level split of the workforce across countries and sectors. The maximum time span is from 1970 to 2005.[12] Key to our analysis, WORLD-KLEMS contains detailed information on the educational achievement of the labor force. For each country-sector-year observation, the labor force is split into three categories: high skilled (holding a university degree or equivalent), medium skilled, and low skilled (no formal qualifications). Data on employment, hours worked, and wages are available for each group at the sectoral level. WORLD-KLEMS 2008 has been used by Philippon and Reshef (2013), Boustanifar, Grant, and Reshef (2017), Larrain (2015) and Pellegrino and Zingales (2017). A detailed description of the country-level sources and the steps used to produce harmonized cross-country data is in Timmer, von Moergastel, Stuivenwold, and Ypma (2007).

We define the financial sector in a broad sense – it includes banks, insurances, pension funds, and other activities related to financial intermediation (KLEMS code "J" for Financial Intermediation).[13] Following Philippon and Reshef (2013) and Boustanifar, Grant, and Reshef (2017), we define the relative wages of high-skilled workers in the financial sector compared to all the other sectors as the average wage of skilled workers in finance divided by the average wage of skilled workers in the country for each country c and year t, which we label $\overline{wage}^{skill}_{c,fin,t}$. Average wages equal total labor compensation divided by the total full-time equivalent (FTE) employment. In KLEMS, labor compensation includes wages, salaries and supplements, employers' contributions to social programs, tips, bonuses, and executive compensation. It excludes, however, income from the exercise of stock options and the compensation of the labor services of business owners. Note this limitation is not negligible. For instance, it hinders us from mea-

[12]Data for Japan are available from 1973 to 2005. Data for Eastern European countries are only available from 1995 to 2005. For the case of Germany, the data refer to the Federal Republic of Germany from 1970 to 1994, and to the reunified country since 1995.

[13]This sector aggregates three industry groups: "Financial intermediation, except insurance and pension funding," "Insurance and pension funding, except compulsory social security," and "Activities related to financial intermediation".

suring precisely the overall compensation of senior partners of private equity funds or hedge funds.

High relative wages in finance may not automatically attract skilled workers from non-finance sectors. For instance, higher wages might reflect the higher productivity of finance workers, which improves the quality and quantity of financial services to non-finance sectors. To measure the contribution of finance to the rest of the economy, we rely on the value added of the financial sector, which aggregates the value of all the services provided to other sectors and consumers, net of the purchases from other sectors. An increase in the value added of finance occurs following an increase in the demand for financial services from other sectors and/or an increase in the unit price of financial services.[14]

Measuring the value of each individual service is complicated. Yet, national statistics typically provide disaggregated data on the value-added contribution of each sector to GDP. This variable is what we use in our analysis. Mirroring the construction of the finance wage premium, we define for each country c and year t, the finance value-added premium as the value added per skilled worker in the financial sector divided by the average value added per skilled worker in the economy, $\overline{va}^{skill}_{c,fin,t}$.

To validate the use of the growth of finance value added to capture the social returns of finance, we show in Table A.1 of the Online Appendix that the efficiency of capital allocation at the country-year level is higher after periods of growth of the finance value added premium.[15]

Using these two variables, we define the adjusted growth of finance wages (AGFW) for each

[14] Although we use the value added of finance as a measure of the value of the services provided to the economy, part of the value added of finance might reflect rents as opposed to valuable services. We discuss the potential implications of such measurement errors in section III.

[15] Moreover, one of the results we discuss below – namely, that higher growth of finance predicts higher subsequent shares of high-skilled workers in non-finance industries – can also be interpreted as a validation of the use of the finance value-added premium as a proxy for the social returns of finance.

country c and year t as:

$$AGFW^{n}_{c,t} = \triangle(\overline{wage}^{skill}_{c,fin})_{t-n,t} - \triangle(\overline{va}^{skill}_{c,fin})_{t-n,t}, \quad (1)$$

where $\triangle$ denotes growth rates (in percentage terms), and n denotes the horizons over which growth rates are computed. In the analysis, we consider two horizons: three and five years (n=3,5). Hence, $AGFW^{5}_{c,t}$ corresponds to the adjusted growth of finance wages for country c and year t measured over the past five years (from $t-5$ to t). By construction, the AGFW is expressed in percentage and can be positive or negative, depending on whether the growth of relative wages in finance has been larger or smaller than the growth of the value added per worker in finance.

B Patterns and Characteristics of the AGFW

Tables I reports the summary statistics of the AGFW. For each horizon, we report the statistics for the full sample, as well as separately for each decade from 1970 to 2005. Across all countries and years, the AGFW is positive, with averages of 2.9% and 4.3% at the five- and three-year horizons, respectively. The relative wages of financial sectors all over the world have grown faster than the contribution of finance to other sectors over the period 1970-2005. Yet the variation in the AGFW is substantial. Standard deviations range between 18.1% (at the one-year horizon) and 23.8% (at the five-year horizon).

[Insert Table I and Figure 2 about Here]

In the time-series dimension, the AGFW has decreased by roughly 10 times from the 1970-1985 period to the 1996-2005 period, even if its standard deviation has barely changed. Figure 2 plots the annual average of the AGFW measured at the five-year horizon, as well as its two components. The AGFW peaks in 1989 and falls below zero in the early 1990s. Figure 2 shows

this swing is determined by the asynchronous variation of the two components of the AGFW. For instance, the early 1990s are characterized by a drop in the growth of the finance wage premium and a simultaneous increase in the growth of the finance value-added premium.

Table II reports statistics for the AGFW measured in each country. Although our empirical analyses exploit within-country variation in the AGFW, its cross-country variation is remarkable. Over the whole period, the average AGFW at the five-year horizon is negative in Finland, Greece, Hungary, Italy, Luxembourg, and Slovakia. It is close to zero in Spain and South Korea, and large in Poland (30.4%), Portugal (22.3%), and Denmark (22.5%). Countries such as the United States (3.7%), France (6.8%), Germany (4.4%), and the United Kingdom (4.4%) display average values of the AGFW that are close to the sample average (4.3%). The AGFW varies substantially also within countries, with standard deviations at the five-year horizon ranging between 7.7% in Greece and 35.8% in Australia. This pattern indicates countries in our sample experience periods during which the gap between the growth of the finance wage and value-added premium widens, and periods during which the gap narrows or turns negative. This within-country variation is the main source of variation we exploit in the analysis.

To further illustrate the within-country heterogeneity of the AGFW, Figure 3 plots its average for a subset of countries that provide interesting comparisons. The top panel contrasts the United States and the United Kingdom. The AGFW evolves quite differently in these two countries, despite the fact that they are commonly considered similar in terms of the characteristics of their financial sector (e.g., see Demirguc-Kunt and Levine (1999)). For instance, the AGFW is negative in the late 1980s and 1990s in the United States, but is positive in the United Kingdom. The time-series variation of the AGFW is substantially higher in the United Kingdom than in the United States.

[Insert Figure 3 about Here]

The medium panel of Figure 3 compares Germany with Italy. Italy is often proposed as an example of a country in which rent-seeking activities are substantial compared to Germany, but the growth of the finance wage premium does not capture this difference, because the AGFW is mostly negative in Italy and mostly positive in Germany throughout the sample period.

The bottom panel of Figure 3 plots the evolution of the AGFW measure in South Korea and Japan. In Japan, the AGFW was large and positive in the late 1970s and 1980s, but has declined persistently since then. The pattern is quite distinct for South Korea., which experienced a large spike in the early 1980s, a period during which South Korea liberalized its financial sector and opened its capital markets.

Based on the time-series variation of the AGFW in South Korea, one might wonder whether the AGFW is closely tied to financial deregulation episodes, but we find it is not on average. In particular, following Philippon and Reshef (2013), we construct an index of financial deregulation at the country-year level that aggregates seven dimensions of financial reforms using data from Abiad et al. (2017).[16] In the Online Appendix, we show that the AGFW does not vary systematically with financial deregulation events, because *both* increase on average after deregulations. Financial deregulations lead to higher relative wages for skilled finance workers (e.g., Boustanifar, Grant, and Reshef (2017)), but on average are also associated with higher value added per skilled worker, consistent with the literature documenting the benefits of financial deregulation for non-finance sectors (e.g., Henry (2000) or Bekeart and Harvey (2005)).

III AFGW and Talent Allocation

We move on to exploit the substantial variation of the AGFW within countries to assess its association with the allocation of talent across sectors. If high relative wages in the financial

[16]These seven dimensions are reduction in credit controls, removal of interest-rate controls, removal of entry barriers, privatization, capital-account liberalization, securities-market development, and introduction of prudential regulation and supervision.

sector trigger a reallocation of talent into finance and away from non-finance sectors, we should observe (i) a positive association between the share of skilled workers employed in the financial sector and the AGFW as well as (ii) a negative association between the share of skilled workers employed in non-finance sectors and the AGFW.

A Measuring Talent

Talent encompasses various cognitive and non-cognitive skills that are hard to observe on a large scale (see Celerier and Vallee (2016) for a detailed discussion of measurement issues). Following Philippon and Reshef (2012), we focus on one measurable variable that is arguably related to talent, namely, educational attainment. We thus use the proportion of the labor force in each sector holding a university degree or the equivalent as a proxy for sectoral talent intensity. Specifically, we compute the fraction of total employment composed of workers in the high-skilled category in each country c, sector k, and year t ($skilled_{c,k,t}$) as the number of FTE skilled employees divided by the total number of FTE employees. The varying quality of university degrees across countries is one of the reasons our analysis uses only the variation in the allocation of talent intensity across sectors *within* countries.

[Insert Table III about Here]

Panel A of Table III provides summary statistics for $skilled_{c,k,t}$. Across all years, the average share of skilled workers is 16.6%, with a substantial standard deviation (15.7%). Consistent with the secular increase in educational attainment worldwide documented by the labor literature, the fraction of skilled workers across countries and sectors increased from 14.5% in the 1975-1985 period to 18.8% in the 1996-2005 period.

Our definition of skilled workers is meaningful only if skilled workers enjoy a wage premium over other workers in the same industries, both across countries and over time. Consistently,

Panel B of Table III indicates skilled workers earn about 74% more than other workers in our sample. This wage gap increased slightly to 76.1% in the 1996-2005 period.

We follow Philippon and Reshef (2012) to compute the finance wage premium as the share of compensation of workers in finance over the average compensation of workers in other industries at the country-year level. Panel C of Table III provides summary statistics for the finance wage premium that replicate the results of Philippon and Reshef (2012). We confirm a substantial finance wage premium, which on average increased over time from 57% in the 1975-1985 period to 61% in the 1996-2005 period. This average increase across all countries masks the spectacular increase in the finance wage premium in countries such as the United States over the last two decades.

B The AGFW and Talent Reallocation

To assess whether the AGFW relates to an increase in the skill-intensity of finance, we estimate the following specification:

$$skilled_{c,fin,t} = \gamma_0 + \gamma_1 AGFW^n_{c,t} + \eta_c + \eta_t + \epsilon_{c,fin,t}, \tag{2}$$

where $skilled_{c,fin,t}$ represents the proportion of high-skilled workers employed in the financial sector of country c in year t, and $AGFW^n_{c,t}$ is the adjusted growth of finance wages measured at two different horizons (n=3,5). The unit of observation is a country-year. We include country fixed effects (η_c) to control for time-invariant characteristics affecting the demand for skills in finance in each country, and year fixed effects (η_t) to absorb time-varying shocks that affect the demand for skills similarly across all countries. The coefficient γ_1 in specification (2) thus measures how the fraction of skilled workers employed in finance in a given country varies when that country experiences a higher AGFW. We allow $\epsilon_{c,fin,t}$ to be correlated within countries

by clustering the standard errors at the country level, following the few-cluster correction of Donald and Lang (2007).

[Insert Table IV about Here]

Table IV reports the results for estimating specification (2) at the five-year horizon (Panel A) and at the three-year horizon (Panel B). The first column of Table IV confirms that the talent intensity of financial sectors worldwide is positively related to the AGFW ($\hat{\gamma_1} > 0$), and we reject the null hypothesis that the two variables are not associated at all standard levels of significance. This result is in line with that of Philippon and Reshef (2012) and Celerier and Vallee (2016), who document positive relationships between finance relative wages and skill intensity in the United States and France, respectively.

To assess whether the AGFW is related to a *reallocation* of talent from non-finance sectors, we estimate the following baseline specification:

$$skilled_{c,k,t} = \beta_0 + \beta_1 AGFW^n_{c,t} + \eta_{c,k} + \eta_t + \epsilon_{c,k,t}, \tag{3}$$

where $skilled_{c,k,t}$ is the proportion of skilled workers employed in non-finance sector k of country c in year t, and $AGFW^n_{c,t}$ is the adjusted growth of finance wages measured at two different horizons (n=3,5). The unit of observation is now a country-sector-year. Compared to specification (2), we include country×sector fixed effects ($\eta_{c,k}$) to absorb time-invariant unobserved heterogeneity at the sectoral level in each country. The coefficient β_1 in specification (3) measures the sensitivity of skilled labor in non-finance sectors to the AGFW, and is estimated using the time-series variation in the AGFW within countries.

Column (2) of Table IV reports the estimated $\hat{\beta}_1$. The fraction of skilled workers in a given non-finance sector is negatively related to the AGFW, with point estimates of -0.035 and -0.022 for the five- and three-year horizons. These estimates are also statistically different from zero.

Consistent with the idea that high relative wages in the financial sector attract talent from other sectors, our estimates indicate the share of skilled workers in non-finance sectors in year t is on average *lower* when relative wages in finance have grown faster than finance value added in the preceding years.

Note the negative association between skilled labor in non-finance sectors and the AGFW is obtained in a restrictive specification, in which the fixed-effects structure absorbs any time-invariant variation across country-sectors as well as any time-varying factor common to all country-sectors, which is why the adjusted R^2 range between 0.92 and 0.97. The results do not change if we use the variation across countries and over time (column (3)), or if we only restrict the variation of the variables within countries and within years (column (4)).

[Insert Figure 4 about Here]

We move on to assess the heterogeneity of the negative association between the AGFW and skilled workers in non-finance sectors by time period and by countries' GDP per capita. In Panel A, we estimate the baseline specification (3) separately across adjacent five-year periods and plot the period-specific coefficients $\hat{\beta}_1$. The negative sensitivity of skilled labor to the AGFW is especially strong from the mid-1980s onward. In Panel B, we split the sample into four groups, based on countries' GDP per capita. We find the negative association between the share of skilled workers in non-finance sectors and the AGFW is similar in countries featuring high or low levels of development. In untabulated results, we also consider a third dimension of heterogeneity, namely, the extent to which a country imports and exports capital through international capital flows. We split our sample between countries that are above and below the median in the extent of international capital flows (both inbound and outbound) based on the country-year data underlying the *International Monetary Fund Financial Liberalization Index*. The size of the estimated sensitivity of skilled labor to the AGFW does not vary substantially across partitions. We obtain a point estimate of -0.012 and a t-statistic of -0.69 in country-

years below the median, and a point estimate of -0.016 with a t-statistic of 2.09 in country-years above the median.

C Is Finance Special?

We move on to ask whether the negative association between the AGFW and the skill intensity in other sectors is a unique feature of the financial sector, or also operate when relative wages in other sectors are high. To do so, we compute our measure of adjusted growth for each non-finance sector over each horizon (i.e., equation (1)), and estimate (sector-specific) regressions similar to our baseline specification (3) in which we replace the AGFW by the "adjusted growth" of each sector. Table VI reports the estimated coefficients (i.e., the sector-specific β_1). Except for the real estate sector, we do not detect any reallocation of skills when the relative wages of skilled workers of non-finance sectors grow faster than the value added per skilled worker in these sectors. The sign of the estimated coefficient varies, but the point estimates are never statistically significant.[17] Overall, these findings indicate that the reallocation of talent associated with increasing relative wages is a phenomenon that is primarily present when skilled workers employed in the financial sector earn a significant wage premium compared to their contribution to other sectors.

D Robustness and Additional Evidence

We perform additional tests to assess the robustness of our baseline results. First, we estimate our baseline specification by weighted least squares (WLS), using countries' GDP as weights, instead of OLS. Column (1) of Table V indicates our baseline findings are not solely driven by small countries. In fact, the estimated coefficient is three times as large once we give more

[17] We obtain virtually similar results if we exclude the financial sector from the set of sectors and only focus on non-finance sectors.

weight to larger countries. In column (2), we replace the share of skilled workers in an industry in year t by the share in year $t+1$ as the dependent variable to avoid any overlap between the outcome variable and the horizon over which we compute the AGFW. The results are virtually identical. In column (3), we change the dependent variable and use the share of FTE skilled workers in sector k and year t over the total amount of FTE available in the country-year. In column (4), we change the definition of the AGFW. We use the difference between the growth of the share of the finance wage bill over countries' total wage bill and the growth of the share of value added of the financial sector over countries' GDP. None of these modifications have any material effects on the results.

[Insert Table V about Here]

To further assess the robustness of our results, we include the growth of value added and of employment in country c and sector k computed over the same horizon as the AGFW ($\triangle(va^n_{c,k,t})$ and $\triangle(emp^n_{c,k,t})$) to control for time-varying sectoral economic conditions. We use this approach because a potential concern is that the observed negative sensitivity of skilled labor to the AGFW is driven by economic shocks occurring during the years over which we measure the AGFW. For instance, non-finance sectors may have declined in periods during which finance salaries rose the most. In this case, our results would not reflect a reallocation of skilled workers that are actively attracted by higher finance salaries, but might reflect a weaker demand for skilled workers in declining sectors. Column (5) of Table V shows our results do not change while we control directly for sectoral economic conditions within countries.

In column (6), we include a host of measures of financial development and credit cycles as additional controls in the baseline specification (3). These measures include the relative size of the financial sector (measured as the share of the gross output of the financial sector in the total output produced in a country-year using KLEMS), total bank private credit, total private credit, total market capitalization, total bank assets, and total bank deposits, all scaled by GDP,

as well as GDP per capita, and a binary variable that equals 1 if a country experienced any banking crisis in the previous five years. The data are from the World Bank Global Financial Development dataset, as described by Cihak, Demirguc-Kunt, Feyen, and Levine (2012). We continue to observe a negative sensitivity of skilled labor to the AGFW even after including these additional controls, suggesting the AGFW is not simply capturing an effect of financial development on the distribution of skills within countries.

[Insert Table VI about Here]

E Economic Magnitudes and Discussion

Although statistically significant, the negative association between skilled workers in non-finance sectors and the AGFW is economically small. To assess the magnitude of the associations, note that all the variables in our specifications are standardized. Consider the baseline estimate in column (2) of Table IV, in which we absorb any systematic time-varying shock that affects all countries at the same time, as well as any time-invariant systematic characteristics of country-sectors. A one-standard-deviation increase in the AGFW in the previous five years (σ_{AGFW}=0.238) is associated with a 3.5%-standard-deviation decrease in the share of skilled workers in the average non-finance sector, which, based on the statistics in Table I, corresponds to a decrease of about 0.55 percentage points ($\approx \hat{\beta}_1 \times \sigma_{skilled}$). Similarly, an increase in the AGFW from the 25^{th} to the 75^{th} percentile of its distribution (0.276) is associated with a 0.64-percentage-point drop in the share of skilled workers. Such effects represents relative declines of about 3% compared to the average share of skilled workers in the sample, which is 16.6%.

[Insert Figure 5 about Here]

To provide a different perspective on the magnitude of the talent reallocation our estimates imply, we re-estimate the baseline specification (3) but replace the AGFW with five variables

delineating the quintiles of the AGFW's distribution. Figure 5 plots the coefficient estimates within quintiles. All the estimates are negative, and the size is largest for the top quintile, in which the AGFW is above 0.32, with a point estimate of -0.098 (t-statistic: -2.73). This effect implies a corresponding drop in the share of skilled workers in non-finance sectors of 1.54 percentage points, or about 9% of the sample average. Note that the majority of countries in our sample, including, for instance, the United States, never attain values of the AGFW in the top quintile of the distribution from 1970 to 2005.

Although they point to an economically small reallocation of talent, our estimates might be conservative due to the difficulty in accurately measuring the "true" contribution of the financial sector to the economy. An increase in the value added of finance might originate from higher demand for financial services or higher prices, and higher prices could reflect better quality of financial services but also higher surplus financiers extract from those who access their services. Because such rents are unlikely to benefit non-finance sectors, our reliance on value added might overestimate the contribution of finance (i.e., value added = true contribution + rents), and therefore underestimate the level of the AGFW.

To investigate this possibility and better interpret the magnitude of our estimates, we re-estimate our baseline specification (3) but focus on the association between the fraction of skilled workers in non-finance sectors and each component of the AGFW separately, instead of the AGFW. We report the results in the last two columns of Table IV. Column (5) indicates that the share of skilled workers in non-finance sectors is negatively associated with the recent unadjusted growth of the finance wage premium $\triangle(\overline{wage}^{skill}_{c,fin})$. Yet the estimated association is weak because the statistical significance is only present when the growth of the finance wage premium is measured over the past five years (with a t-statistic of -1.90). By sharp contrast, column (6) reveals a positive and significant association between the fraction of skilled workers employed in non-finance sectors and the relative value added per skilled worker in finance $\triangle(\overline{va}^{skill}_{c,fin})$. This latter result confirms that an increase in our proxy for the contribution of

finance to other sectors indeed leads to more skilled labor in non-finance sectors, which is barely consistent with the value added of finance reflecting mainly rent extraction as opposed to the contribution of finance to the other sectors of the economy.

In terms of magnitude, note also that the baseline coefficients reported in column (2) of Table IV are more than twice as large as the coefficients of the unadjusted growth of the finance wage premium (column (5) of Table IV). This discrepancy emphasizes the importance of adjusting the finance wage premium with the contribution of the financial sector when estimating the real implications of growing finance compensation. Failing to do so could severely bias the estimates downwards, because the growth of the finance wage premium is often accompanied by a parallel growth in the contribution of the financial sector, which is positively linked to skilled labor across non-finance sectors. Contrasting results across columns (2), (5), and (6) thus indicate that growing relative wages in finance are associated with a reallocation of talent only when they outgrow the contribution of finance to other sectors.

F Variation across Sectors

Our baseline results indicate that, on average, the share of skilled workers employed in non-finance sectors is significantly lower in years in which the AGFW has been large. This result is consistent with the conjecture that high relative wages in the financial sector induce a re-allocation of skilled workers from non-finance sectors to finance. Yet our baseline test cannot rule out the possibility that the negative association between skilled workers in non-finance sectors and the AGFW is spurious. In particular, the negative sensitivity of talent intensity to the AGFW in non-finance sectors might be driven by unobserved time-varying country-specific shocks, which are correlated with the AGFW and with the allocation of skills across sectors.

To address this concern and clarify the economic mechanisms behind our results, we conduct an analysis in the spirit of Rajan and Zingales (1998) and explore how the sensitivity of skilled

labor to the AGFW varies across non-finance sectors *within* countries. To do so, we estimate the following specification:

$$skilled_{c,k,t} = \alpha_0 + \alpha_1 AGFW^n_{c,t} \times \Psi_k + \eta_{c,k} + \eta_{c,t} + \eta_{k,t} + \epsilon_{c,k,t}, \tag{4}$$

where $skilled_{c,k,t}$ is the proportion of high-skilled workers employed in (non-finance) sector k of country c in year t, $AGFW^n_{c,t}$ is the adjusted growth of finance wages measured at two horizons (t=1,3,5), and Ψ_k represents a sector characteristic (e.g., its R&D intensity). The unit of observation is a country-sector-year. The specification includes a set of country×sector ($\eta_{c,k}$), country×year ($\eta_{c,t}$), and sector×year ($\eta_{k,t}$) fixed effects. As a result, we do not include $AGFW^n_{c,t}$ and Ψ_k separately, because their variation is fully absorbed by the fixed effects. The parameter of interest α_1 is estimated using the within-country cross-sectional variation of the sector's characteristic Ψ_k. The central ingredient in specification (4) is the inclusion of country×year fixed effects ($\eta_{c,t}$), which absorb unobserved time-varying country-specific variation. Thus, α_1 measures the differential sensitivity of skilled labor to the AGFW in sectors in which the characteristic Ψ is high relative to the sensitivity in sectors in which Ψ is low, within the same country and year. This specification helps our interpretation to the extent that unobserved country-year-specific variables do not imply heterogeneous sectoral sensitivities that coincide with the heterogeneous sectoral sensitivities the AGFW induces.

[Insert Table VII about Here]

We consider three broad types of sectoral characteristics. First, we proxy for the frictions non-finance workers would face if they wanted to transition to the financial sector. The extent of reallocation should be stronger from sectors in which the costs to transition to finance are lower. Second, inspired by Murphy, Shleifer, and Vishny (1991), we consider proxies for sectoral innovation intensity. The *societal costs* of a finance-induced reallocation of talent would

be higher if the transitioning workers moved from jobs that produce innovation in research-oriented sectors to jobs in finance. Third, we focus on proxies for each sector's need of financial services. The *societal benefits* of a finance-induced reallocation of talent should be higher if more workers move into sectors that need finance to produce and grow, which would suggest that higher relative wages in finance allow finance-dependent sectors to attract more talent.

F.1 Transitioning Costs

To proxy for the cost of transitioning from non-finance sectors into finance, we first construct an index capturing the similarity of the inputs used by non-finance sectors and finance. Using data from KLEMS on the composition of sectoral inputs, we compute the share of each intermediate input (i.e., intermediate energy inputs, intermediate material inputs, and intermediate service inputs) so that the three shares sum up to 1. For each U.S. non-finance sector, we then compute the absolute difference between their shares and the corresponding shares for finance. The index of *Input Similarity* ranges between -1 and 0, and is closer to 0 for sectors whose input structure deviates the least from the input structure of the financial sector. This index aims to capture industries in which the baseline skills needed to transform the factors of production are more similar to the skills needed in finance, and hence industries whose employees have skills that might be useful to the financial sector. Second, we consider the intensity with which non-finance sectors transact with finance. Using the U.S. BEA Input-Output tables (the 1997 version), we compute for each sector the annual amount of product and services supplied to the financial sector. This variable captures the extent to which companies in each sector are suppliers to finance. We conjecture that transitioning into finance jobs is relatively easier from sectors that transact more with the financial sector. The rationale is that the extent of asymmetric information regarding the quality of a potential non-finance hire is lower if financial institutions interact with the non-finance workers on a regular basis, compared to assessing the quality of a worker with which they have never interacted. For instance, an employee of a large consulting

firm that interacts often with the M&A team of an investment bank will be vetted more closely by the bank than an employee in a company with whom the bank has never interacted, and hence the former might be more likely to obtain a job offer from the bank if his/her quality is high.

Columns (1) and (2) of Table VII show that indeed the negative sensitivity of skilled labor to the AGFW is more pronounced in sectors whose workers face lower transitioning costs to finance, irrespective of the horizon over which we compute the AGFW.

F.2 Innovation Intensity

To measure differences in innovation intensity across sectors, we use information on the R&D intensity and presence of scientists in the workforce across sectors in the United States. Using data from the National Science Foundation (NSF) Yearly Survey of R&D and Innovation Activities, we calculate the average share of total R&D expenses by companies that engage in R&D activities – financed by public or private sources – over the total amount of sales of these companies. We then define *R&D Intensity* as the average share within each U.S. sector from 1997 to 2005. Using the same source, we define *Scientist Intensity* as the average share of scientists and engineers over all workers employed by companies that engage in R&D activities in each sector.

Columns (3) and (4) of Table VII indicate that, within countries, the negative sensitivity of skilled labor to the AGFW is significantly larger in more innovative sectors than in less innovative sectors.

F.3 Need of Finance

Finally, we capture a sector's reliance on financial services using two proxies. First, we use the average financial leverage of mature firms in the sector, which is directly linked to firms' reliance

on financial services in the form of capital. We compute sectoral leverage ratios using data from Compustat, averaged across the period 1970-2005. Second, we use sectoral investment in information and communication and technology (ICT) to capture the sectoral need for finance. We use investment data from KLEMS and compute the share of ICT for each country-sector-year. We consider ICT investment because it is the only type of investment for which we have direct information in KLEMS, but this test could be potentially run considering any type of physical investment that requires financing. Results are reported in columns (5) and (6) of Table VII. Across specifications, the coefficients on the interaction between the AGFW and both proxies are positive, but statistical significance is low.

IV Impediment to Growth?

Our evidence so far supports the view that abnormal growth of relative wages in finance compared to the growth of the relative value added of finance is systematically associated with the reallocation of skilled workers from non-finance sectors to finance, even though the size of this reallocation seems modest. In this section, we examine whether this talent reallocation might be large enough to affect sectoral and aggregate economic growth.

A Sectoral Evidence

Ideally, we would be able to *directly* measure the impact of the AGFW-induced talent reallocation on sectoral growth. Yet because our measure of reallocation – the estimated coefficient β_1 in our baseline specification (3)) – is indirect, this strategy is not feasible. Instead, we assess whether the AGFW itself is systematically related to several measures of growth at the sectoral

level. We thus estimate the following specification:

$$growth_{c,k,t} = \omega_0 + \omega_1 AGFW^n_{c,t} + \eta_{c,k} + \eta_t + \epsilon_{c,k,t}, \tag{5}$$

where $growth_{c,k,t}$ is a measure of the growth of non-finance sector k in country c in year t, and $AGFW^n_{c,t}$ is the adjusted growth of finance wages measured at two different horizons (n=3,5).

Table VIII presents the results. We first consider the logarithm of output, the logarithm of value added, and total factor productivity (TFP) as computed in KLEMS as proxies for sectoral growth. The unit of observation is a country-sector-year. Similar to specification (2), we include year fixed effects (η_t) to absorb time-varying factors affecting the worldwide demand for skills over time. We further include country×sector fixed effects ($\eta_{c,k}$) to absorb time-invariant unobserved heterogeneity across each country and sector. The coefficient of interest, ω_1, measures the association between the AGFW and sectoral growth. As in specification (2), we cluster the standard errors at the country level.

[Insert Table VIII about Here]

For each measure, we employ both levels and annual growth, computed over three years (from t to $t+3$).

In columns (1) to (3), we detect no significant relationship between the AGFW and variation in non-finance sectors' output, value added, or productivity. The estimated t-statistics range between -0.32 and 0.94. A one-standard-deviation increase in the AGFW in the past five years is associated with an increase of 0.004 in the log output of the average non-finance sector, corresponding to an increase of 0.4% of a standard deviation in the average log output. A similar shock is associated with an increase of 0.006 in value added, and 0.012 in productivity, or 0.6% and 1.2% of a standard deviation, respectively. We complement the KLEMS-based growth measures using the average valuation (market-to-book ratio) and sales growth of all

listed firms in each country-sector-year from Worldscope in columns (4) and (5). Again, we fail to reject the null of no association between these outcomes and the AGFW.

In columns (6) to (8) of Table VIII, we display the results with the subsequent three-year growth rates of output, value added, and tfp as dependent variables. We fail to detect any statistically significant relationship between the AGFW and the future output, value added, or productivity growth of non-finance sectors. The t-statistics are low and the point estimates are modest. Despite a decrease in the share of skilled workers employed in non-finance sectors after periods of high AGFW, these sectors do not seem to exhibit lower economic growth going forward. Overall, the lack of a significant link with growth at the sectoral level suggests the reallocation of skills away from non-finance sectors associated with the AGFW might be too small to hinder the economic performance of these sectors.

B Aggregate Evidence

In Table IX, we examine whether the adjusted growth of finance wages is related to countries' aggregate economic outcomes. We use a specification similar to specification (5), but regress time-varying country-dependent variables on the AGFW (measured at two horizons) as well as country and year fixed effects. Column (1) indicates that within-country variation in the AGFW is unrelated to variation in countries' GDP. Column (2) further shows the AGFW is largely unrelated to three-year-ahead GDP growth. In both cases, the point estimates are positive, but the t-statistics (i.e., 0.40 and 0.07) unambiguously indicate statistically insignificant relationships. In column (3), we find that, if anything, a higher AGFW is associated with a higher share of R&D expenditure over countries' GDP, which seems consistent with the notion that a more effective financial sector allows startups and mature firms to invest more in research activities.

[Insert Table IX about Here]

Arguably, the reallocation of talent related to the AGFW may take a long time to translate into real aggregate economic outcomes such as GDP growth. To address this possibility, we first look at the determinants of human capital and ask whether high relative wages in finance are related to the allocation of students across fields of study within countries. To do so, we use data on the distribution of university degrees from the United Nations Educational, Scientific and Cultural Organization (UNESCO), which contain the annual fraction of graduates across nine fields of study by country.[18] We aggregate these fields to create a "STEM" (i.e., sciences, technology, engineering and math) and a "Services" field, in addition to "Business, Administration and Law." In columns (4) and (5), we find no evidence that the AGFW correlates with the allocation of graduates. In particular, column (4) reveals that the fraction of graduates in a STEM major is not significantly related to the adjusted growth of finance wages. Column (5) also indicates that higher relative wages in finance are not associated with significant changes in the fraction of students graduating with a business or law degree.

Second, we focus on countries' innovative capacity. In column (6) of Table IX, we ask whether high relative wages in finance are related to the ratio of R&D expenditures to GDP. If anything, we detect a *positive* association, which suggests that at times of high relative wages in finance, on average, countries devote a higher share of their GDP to investment in R&D. Similarly, we explore whether variation in the AGFW within countries is associated with their production of innovation, which is likely to be an important determinant of long-term growth. Using aggregated data from the World Bank on the number of patent applications, trademark applications, scientific articles, and the share of exports made of high-tech products in each country and year, columns (7) to (9) of Table IX indicate the AGFW is unrelated to any of these outcomes, either economically or statistically.

[18]The fields are: "Education," "Arts and Humanities," "Social Sciences," "Business, Administration and Law," "Natural Sciences, Mathematics, and Statistics," "Information and Communication Technologies," "Engineering, Manufacturing, and Construction," "Agriculture, Forestry, Fisheries, and Veterinary," "Health and Welfare," and "Services."

The non-results in Table IX suggest the talent reallocation associated with increasing adjusted finance wages might be too small to predict negative aggregate economic outcomes. In Table A.2 of the Online Appendix, we propose an analysis similar to Table IX, using additional proxies for economic growth at the country-year level, including the share of students that enroll in service sectors, different types of R&D expenditures and patents, as well as the number of scientific articles per capita. Consistent with the results in Table IX, we fail to detect any systematic association between the AGFW and any of these outcomes.

[Insert Table X about Here]

A third channel through which growing finance wages might hamper economic growth in the long-run is via a deterioration of the functioning of the financial sector. To assess this possibility, we rely on data measuring the riskiness, efficiency, and competitiveness of the financial sector at the country-year level compiled in the *World Bank Global Financial Database* (version June 2016). To measure the riskiness of the financial sector, we consider the aggregate amount of provisions by banks over the overall value of non-performing loans in the economy, the aggregate amount of regulatory capital in the economy on the aggregate amount of bank-level assets, and the Bank Z-score, which proxies for the probability of default of the country's commercial banking system. The first three columns of Table X reveal no significant association between the AGFW and any of these proxies. In columns (4) to (6), we focus on the efficiency of the banking system, measured using the average lending-to-deposit spread, the share of overhead costs over bank-level assets, and the share of all bank costs to the aggregate income reported by banks in the country. Again, we find no association between the AGFW and these outcomes.

Finally, we consider the competitiveness of the banking sector, because a less competitive banking sector might increase the rents in finance and reduce the efficiency of the allocation of factors of production in the economy. We measure competitiveness using the asset concentration in the banking sector (the sum of the assets of the three largest commercial banks of the country

divided by the total assets of the banking system), the Lerner Index (the markup the banking sector charges to companies and households), and the 5-Bank concentration ratio (the sum of the assets of the five largest commercial banks in the country divided by the total assets of the banking system). Columns (7) to (9) indicate again no association between the AGFW and measures of the concentration of the banking system. If anything, using the five-year-horizon version of the AGFW, the growth of finance wages is related to a lower asset concentration (Panel A, column (7) of Table X), and hence to a *more* competitive banking sector.

V Conclusions

Using detailed sectoral data for 24 countries over 35 years, we find evidence that growing finance wages are associated with a modest reallocation of skilled workers from non-finance sectors to finance, and no evidence that they predict lower subsequent economic growth. An innovation of our approach is to adjust the growth of finance wages – which is commonly interpreted as reflecting rents in finance – by the contribution of finance to the economy. This adjustment is important, because the finance compensation and the contribution of finance are positively correlated in our sample. Our results contribute to the debate on the social value of finance, but our analysis focuses solely on talent allocation across sectors. Thus, our findings cannot directly speak to whether finance is ultimately beneficial or detrimental to other sectors.

Several questions deserve further investigation. Growing finance wages are often proposed as evidence of increasing rents in the financial sector. However, higher finance wages might at times reflect a higher contribution of finance to the rest of the economy. Further theoretical and empirical research should dig deeper in understanding the sources and magnitude of rents in finance. We also find the financial sector is unique in attracting talent from other sectors when compensation is generous. Future research should investigate what makes finance so special.

Our results also point to the importance of cross-country sectoral data and long time series to assess questions on economy-wide factor reallocation and growth. Focusing on policy experiments limited in space and time is crucial to pinpoint causal relationships, but assessing external validity and overall magnitudes using broader and more representative settings also provides relevant insights.

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Figure 2: Adjusted Growth of Finance Wages: Aggregate Evolution

This figure plots the annual average value of the adjusted growth of finance wages (AGFW) and its two components over the period 1970-2005 across all country-years in our sample. The sample includes 24 countries. The AGFW for a given country-year observation is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t).

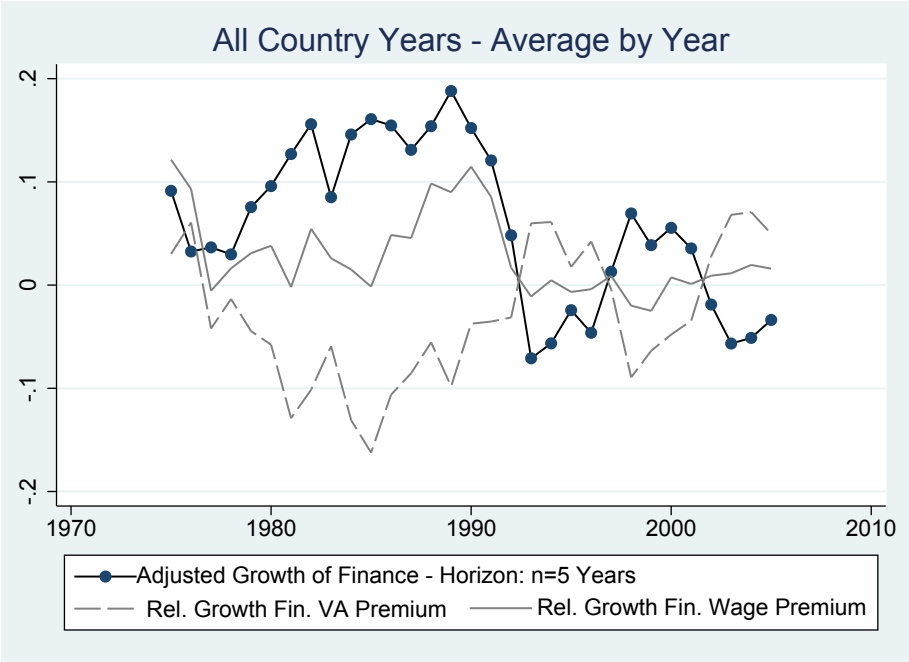


Figure 3: Adjusted Growth of Finance Wages across Countries

This figure plots the annual average value of the adjusted growth of finance wages (AGFW) over the period 1970-2005 for six countries: the United States, the United Kingdom, Germany, Italy, South Korea, and Japan. The AGFW for a given country-year observation is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value added premium is defined as the value added per skilled worker in finance relative to the average value-added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value-added premia are computed over five-year horizon (from year $t-5$ to year t).

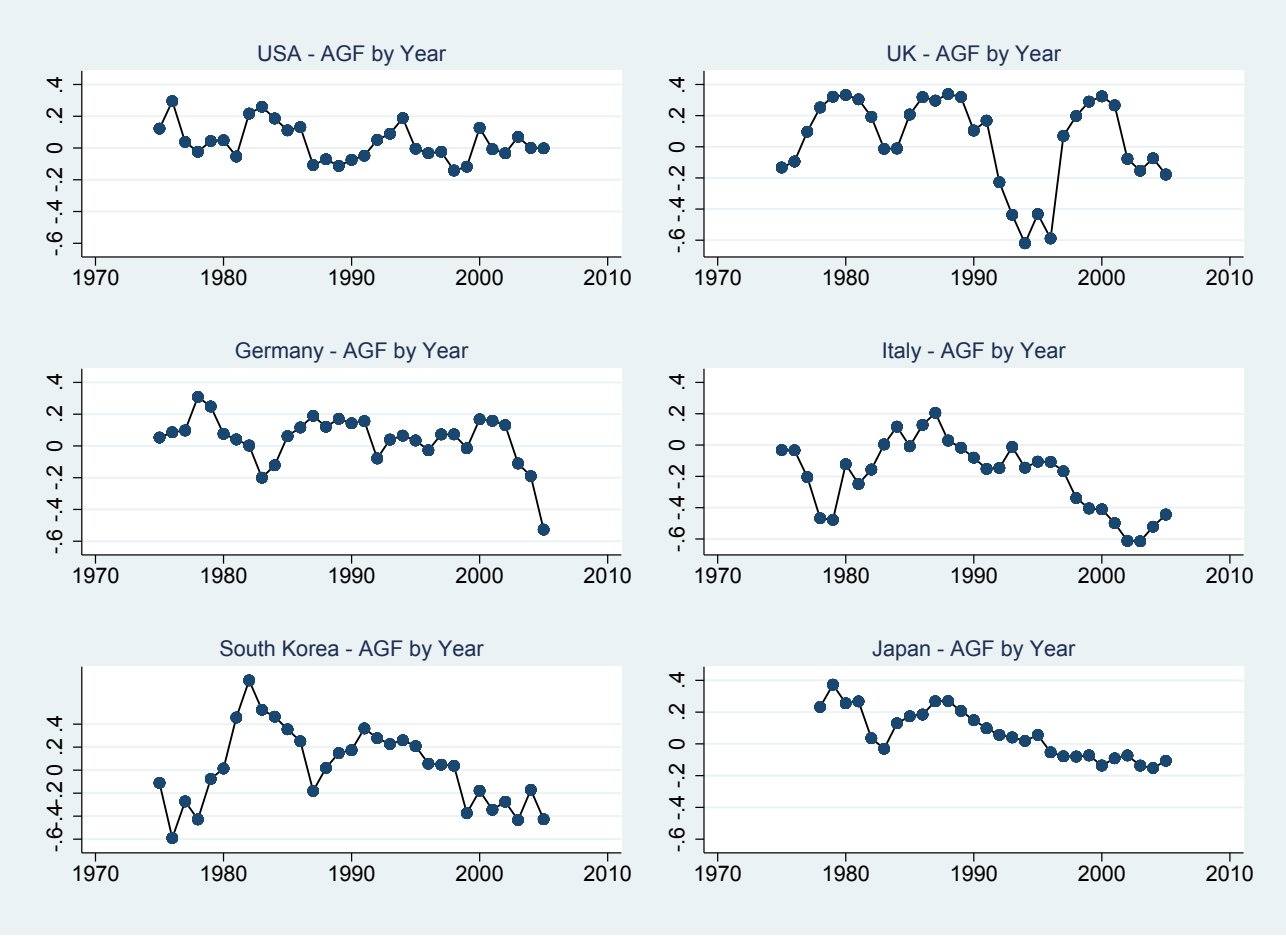
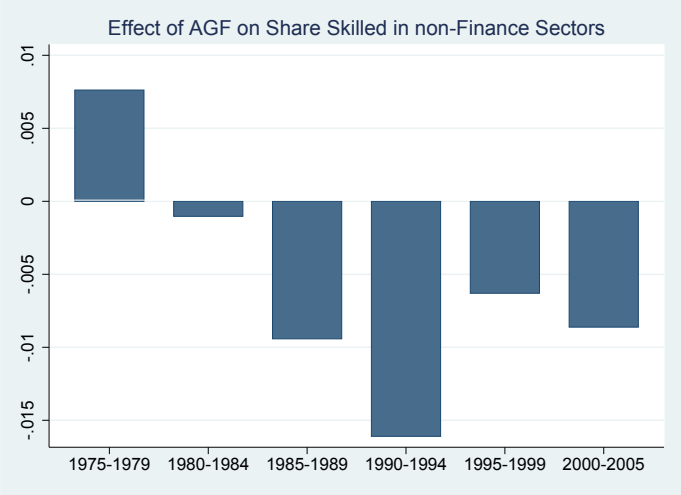


Figure 4: AGFW and Skilled Labor in Non-finance Sectors: Heterogeneity

This figure plots estimates from regressions of the share of skilled workers in a given country-sector-year on the adjusted growth of finance wages (AGFW) in that country-year, similar to the baseline specification (3). The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value-added premiums are computed over five-year horizons (from year $t-5$ to year t). The sample period is 1970-2005 and includes 24 countries. All specifications include country×sector and year fixed effects. In Panel A, we estimate separate regressions for each adjacent five-year periods. In Panel B, we estimate separate regressions across quartiles of countries' GDPs.

Panel A. Variation over Time



Panel B. Variation over GDP quartiles

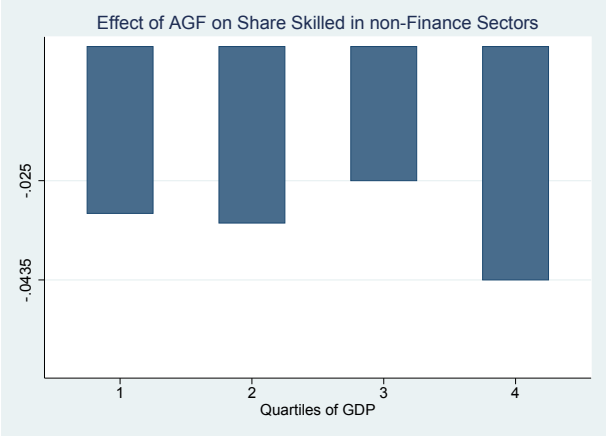


Figure 5: AGFW and Skilled Labor in Non-finance Sectors: Non-linearity

This figure plots estimates from a regression of the share of skilled workers in a given country-sector-year on five variables delineating the quintiles of the adjusted growth of finance wages (AGFW) in that country-year, similar to the baseline specification (3). The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t). The sample period is 1970-2005 and includes 24 countries. All specifications include country×sector and year fixed effects.

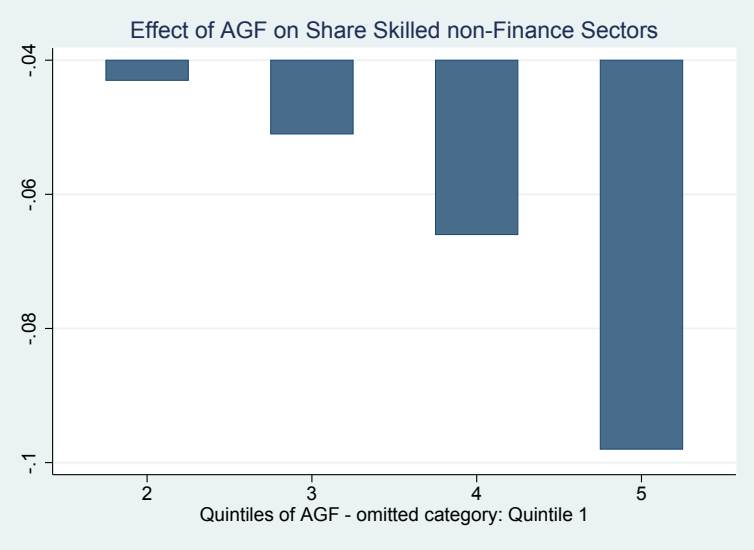


Table I: Adjusted Growth of Finance Wages: Summary Statistics

The table displays summary statistics for the adjusted growth of finance wages (AGFW). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value added premiums are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. We present statistics for the whole sample (i.e., all country-sector-year) and by sub-periods.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Adjusted Growth of Finance Wages, n=5 Years					
	N.obs.	Mean	St.dev.	p.25	p.50	p.75
Full Sample	5,827	0.043	0.238	−0.084	0.053	0.192
1975-1985	1,061	0.101	0.232	−0.013	0.095	0.253
1986-1995	1,967	0.071	0.245	−0.063	0.076	0.201
1996-2005	2,799	0.001	0.227	−0.133	0.014	0.164
	Panel B. Adjusted Growth of Finance Wages, n=3 Years					
	N.obs.	Mean	St.dev.	p.25	p.50	p.75
Full Sample	6,445	0.029	0.181	−0.064	0.030	0.138
1973-1985	1,281	0.066	0.168	−0.038	0.051	0.194
1986-1995	2,044	0.031	0.187	−0.054	0.031	0.125
1996-2005	2,964	0.009	0.177	−0.077	0.020	0.124

Table II: Adjusted Growth of Finance Wages by Country

The table displays summary statistics for the adjusted growth of finance wages (AGFW) for each country separately. The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value added premiums are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries.

	(1)	(2)	(3)	(4)	(5)	(6)
		n=5 Years			**n=3 Years**	
	N.obs.	Mean	St.dev.	N.obs.	Mean	St.dev.
Australia	323	0.082	0.358	357	0.046	0.254
Austria	357	0.027	0.173	391	0.018	0.167
Belgium	357	0.091	0.072	391	0.050	0.061
Czech Republic	102	0.076	0.285	136	0.058	0.222
Denmark	357	0.225	0.274	391	0.142	0.214
Spain	357	0.016	0.204	391	0.014	0.161
Finland	527	−0.047	0.312	561	−0.003	0.236
France	357	0.068	0.090	391	0.039	0.068
Germany	527	0.044	0.155	561	0.007	0.160
Greece	153	−0.008	0.077	187	0.013	0.077
Hungary	102	−0.064	0.114	136	−0.014	0.124
Ireland	221	0.126	0.249	255	0.068	0.187
Italy	527	−0.195	0.222	561	−0.112	0.161
Japan	476	0.065	0.150	510	0.039	0.116
South Korea	527	0.022	0.320	561	0.016	0.219
Luxembourg	153	−0.018	0.106	187	−0.048	0.149
Netherlands	374	0.104	0.153	408	0.062	0.145
Poland	102	0.304	0.133	136	0.213	0.160
Portugal	153	0.223	0.120	187	0.176	0.093
Slovakia	102	−0.352	0.220	136	−0.201	0.227
Slovenia	102	0.190	0.137	136	0.124	0.121
Sweden	340	0.164	0.145	374	0.093	0.130
United Kingdom	527	0.044	0.278	561	0.022	0.219
United States	527	0.037	0.112	561	0.023	0.099

Table III: Skilled Workers, Skilled Wage Premium, and Labor Productivity: Summary Statistics

The table displays summary statistics for the share of skilled workers and the wage premium at the country-industry-year level. The wage premium is defined as the share between the average wage of a skilled full-time employee (FTE) divided by the average wage of a full-time employee of medium or low skills. The sample period is 1970-2005 and includes 24 countries. We present statistics for the whole sample (i.e., all country-sector-year) and by subperiods.

	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A. Share of Skilled Workers			
	N.obs.	Mean	St.dev.	p.25	p.50	p.75
Full Sample	5,827	0.166	0.157	0.055	0.112	0.232
1975-1985	1,061	0.145	0.145	0.040	0.094	0.207
1986-1995	1,967	0.147	0.146	0.045	0.099	0.207
1996-2005	2,799	0.188	0.163	0.070	0.133	0.260
			Panel B. Wage Premium of Skilled Workers			
	N.obs.	Mean	St.dev.	p.25	p.50	p.75
Full Sample	5,827	1.740	0.366	1.551	1.724	1.869
1975-1985	1,061	1.742	0.608	1.531	1.738	1.826
1986-1995	1,967	1.709	0.266	1.562	1.713	1.849
1996-2005	2,799	1.761	0.298	1.541	1.724	1.932
			Panel C. Finance Wage Premium			
	N.obs.	Mean	St.dev.	p.25	p.50	p.75
Full Sample	358	1.576	0.322	1.350	1.506	1.719
1975-1985	67	1.572	0.454	1.230	1.373	1.845
1986-1995	122	1.536	0.286	1.323	1.407	1.719
1996-2005	169	1.606	0.279	1.428	1.534	1.699

Table IV: Adjusted Growth of Finance Wages and Talent Allocation: Baseline

This table reports estimates from various regressions of the share of skilled workers in a given country-sector-year on the adjusted growth of finance wages (AGFW) in that country-year, or its component. The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium ($\triangle(\overline{wage}^{skill}_{c,fin})$) and the growth of the finance value-added premium ($\triangle(\overline{va}^{skill}_{c,fin})$), where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in section II). The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. In column (1), the dependent variable is the share of skilled workers in the financial sector. In columns (2) to (6), the dependent variable is the share of skilled workers in each of the 13 non-finance sectors. Specifications include country×sector, year, or country fixed effects, as noted at the bottom of the table. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007), and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p<0.10,^{**}p<0.05,^{***}p<0.01$.

	(1) Skilled Finance	(2) Skilled Non-finance	(3) Skilled Non-finance	(4) Skilled Non-finance	(5) Skilled non-Finance	(6) Skilled Non-finance
			Panel A. Horizon: n=5 Years			
AGFW	0.037***	−0.035***	−0.122**	−0.035***		
	(5.15)	(−3.21)	(−2.07)	(−3.21)		
$\triangle(\overline{wage}^{skill}_{c,fin})$					-0.015*	
					(-1.90)	
$\triangle(\overline{va}^{skill}_{c,fin})$						0.028**
						(2.38)
Observations	450	5,827	5,827	5,827	5,827	5,827
Adjusted R^2	0.95	0.97	0.01	0.28	0.97	0.97
			Panel B. Horizon: n=3 Years			
AGFW	0.025***	−0.022**	−0.083**	−0.022**		
	(3.94)	(−2.26)	(−2.00)	(−2.21)		
$\triangle(\overline{wage}^{skill}_{c,fin})$					-0.007	
					(-1.27)	
$\triangle(\overline{va}^{skill}_{c,fin})$						0.017*
						(1.80)
Observations	498	6,445	6,445	6,445	6,445	6,445
Adjusted R^2	0.94	0.93	0.01	0.28	0.97	0.97
Country×Sector FE	X	X			X	X
Year FE	X	X		X	X	X
Country FE				X		

Table V: Adjusted Growth of Finance Wages and Talent Allocation: Robustness

This table reports estimates from various regressions of the share of skilled workers in a given country-sector-year on the adjusted growth of finance wages (AGFW) in that country-year (specification (3)). The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, where the finance wage premium is computed as the average wage of skilled workers in finance relative to the average wage of skilled workers in the economy, and the finance value-added premium is defined as the value added per skilled worker in finance relative to the average value added per skilled worker in the economy (as defined in Section II). The growth rates of the finance wage and value added premiums are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. In column (1), we use a weighted least-squares (WLS) approach, with weights defined using country-year GDP. In column (2), we consider the one-year-ahead $(t+1)$ share of skilled workers as the dependent variable. In column (3), we consider the share of sectors' skilled workers defined as the number of skilled workers employed in a sector divided by the total number of skilled workers. In column (4), we modify the definition of the AGFW and use the growth of the share of the finance wage bill in countries' total wage bill and the growth of the share of value added of the financial sector in countries' GDP. In column (5), we further control for sectors, employment ($\triangle(emp^n)$) and value-added growth ($\triangle(va^n)$). In column (6), we further control for variables related to countries' financial development using data from the *World Bank Global Financial Development Database*. All specifications include country×sector and year fixed effects, as noted at the bottom of the table. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007) and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$.

	(1) WLS (w=GDP)	(2) Lead Skilled Non-finance	(3) Rel. Skilled Non-finance	(4) Aggregate AGFW	(5) Skilled Non-finance	(6) Skilled Non-finance
			Panel A. Horizon: n=5 Years			
AGFW	−0.113***	−0.034***	−0.003***	−0.035***	-0.032***	−0.035**
	(−11.17)	(−2.90)	(−5.46)	(−3.44)	(-2.96)	(−2.29)
$\triangle(va)$					-0.060**	
					(-2.42)	
$\triangle(emp)$					-0.009	
					(-1.10)	
Rel. Size Fin. Sector						1.447
						(0.79)
Bank Private Credit/GDP						−0.122
						(−0.59)
Mkt Capitalization/GDP						0.031
						(0.48)
Bank Assets/GDP						0.112
						(0.54)
Bank Deposits/GDP						0.002
						(1.32)
GDP per capita						−0.000
						(−1.02)
Bank Crisis 5 years						0.047
						(0.95)
Observations	5,827	5,518	5,827	5,827	5,827	4,833
Adjusted R^2	0.98	0.97	0.96	0.97	0.97	0.98
Country×Sector FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X

	(1) WLS (w=GDP)	(2) Lead Skilled Non-finance	(3) Rel. Skilled Non-finance	(4) Aggregate AGFW	(5) Skilled Non-finance	(6) Skilled Non-finance
Panel B. Horizon: n=3 Years						
AGFW	−0.082***	−0.025***	−0.002***	−0.022**	-0.020**	−0.021
	(−10.72)	(−2.63)	(−4.11)	(−2.51)	(-2.14)	(−1.57)
$\triangle(va)$					-0.041*	
					(-1.97)	
$\triangle(emp)$					-0.008	
					(-1.19)	
Rel. Size Fin. Sector						0.494
						(0.34)
Bank Private Credit/GDP						−0.097
						(−0.48)
Mkt Capitalization/GDP						0.043
						(0.67)
Bank Assets/GDP						0.064
						(0.34)
Bank Deposits/GDP						0.002
						(1.37)
GDP per capita						−0.000
						(−1.13)
Bank Crisis 5 years						0.062
						(1.25)
Observations	6,445	6,136	6,445	6,445	6,445	5,269
Adjusted R^2	0.98	0.97	0.95	0.97	0.97	0.98
Country×Sector FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X

Table VI: Is Finance Special? Placebo Tests

This table reports estimates from regressions of the share of skilled workers in a given country-sector-year on adjusted growth measures in non-finance sectors. The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). For a given country-year, the adjusted growth of a given sector k is defined as the difference between the growth of that sector's wage premium (or discount) and the growth of that sector's value-added premium (or discount), where the wage premium is computed as the average wage of skilled workers in sector k relative to the average wage of skilled workers in the economy (including or excluding finance), and the value-added premium is defined as the value added per skilled worker in sector k relative to the average value added per skilled worker in the economy (similar to how we define the AGFW in section II). The growth rates of the wage and value-added premiums are computed over five-year horizon (from year $t-5$ to year t). The sample period is 1970-2005 and includes 24 countries. We report the coefficient estimates corresponding to each measure of the adjusted growth. All specifications include country×sector and year fixed effects. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007), and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$.

Sector:	(1)	(2)
	Including Finance	**Excluding Finance**
Finance	−0.035 * **	
	(−3.44)	
Mining and Quarrying	0.015	0.015
	(1.59)	(1.52)
Manufacturing	0.019	0.016
	(1.05)	(0.95)
Utilities	0.007	0.008
	(0.67)	(0.76)
Construction	−0.009	−0.009
	(−1.18)	(−1.27)
Wholesale and Retail Trade	0.011	0.013
	(0.82)	(0.94)
Hotels and Restaurants	0.023	0.024
	(1.41)	(1.37)
Transport and Storage	0.033	0.034
	(1.55)	(1.50)
Real Estate	−0.024*	−0.022*
	(−1.83)	(−1.89)
Public Administration	0.009	0.011
	(0.39)	(0.49)
Education	0.010	0.013
	(0.60)	(0.69)
Health Services	−0.009	−0.012
	(−0.37)	(−0.46)
Community and Social Services	0.013	0.012
	(0.93)	(0.96)

Table VII: Adjusted Growth of Finance Wages and Talent Allocation: Cross-sectional Tests

This table reports estimates from various regressions of the share of skilled workers on the interaction between the adjusted growth of finance wages (AGFW) in that country-year and a sector's characteristic Ψ (specification (4)). The share of skilled workers in a given country-sector-year corresponds to the fraction of workers holding a university degree (or equivalent). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, as defined in section II. The growth rates of the finance wage and value-added premiums are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. Sectors' characteristics include (1) input similarity to finance, (2) the intensity of supplies to finance, (3) R&D intensity, (4) scientists' intensity, (5) leverage ratio, and (6) investment in communication and technology. All specifications include country×sector, and country×year fixed effects, as noted at the bottom of the table. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007) and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Transitioning Costs		Innovativeness		Need of Finance		Returns Skilled	
Ψ:	Input Sim.	Fin. Uses	R&D Intensity	Scientist	Leverage	ICT	Wages	VA/hour
Panel A. Horizon: n=5 Years								
AGFW× Ψ	-0.037***	−0.130***	−0.315***	−0.411*	0.002	0.097*	−0.024**	0.017***
	(-3.39)	(−3.66)	(−2.78)	(−1.71)	(0.03)	(1.77)	(−2.28)	(4.59)
Observations	5,827	5,827	5,009	5,009	5,009	5,400	5,827	5,827
Adjusted R^2	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.99
Panel B. Horizon: n=3 Years								
AGFW× Ψ	-0.029***	−0.084***	−0.202**	−0.271***	0.015	0.068*	−0.019**	0.011***
	(-3.00)	(−3.66)	(−2.10)	(−3.04)	(0.33)	(1.75)	(−2.29)	(3.53)
Observations	6,445	6,445	5,541	5,541	5,541	5,976	6,439	6,439
Adjusted R^2	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Country×Sector FE	X	X	X	X	X	X	X	X
Country×Year FE	X	X	X	X	X	X	X	X

Table VIII: Adjusted Growth of Finance Wages and Real Outcomes: Industry Level

This table reports estimates from regressions of various measures of sectors' and countries' economic performance on the adjusted growth of finance wages (AGFW) (specification (5)). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, as defined in section II. The growth rates of the finance wage and value-added premiums are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. In columns (1)-(3) and (6)-(8), we consider three measures of sectors' performance based on the KLEMS data: output, value added, and total factor productivity (TFP). For each measure, we consider both values in levels (logs), and three-year-ahead growth rates (from year t to year $t+3$). In columns (4)-(5), we consider two measures of sectoral performance based on data from Worldscope: M/B Ratio is the average market-to-book ratio in a sector; Sales Growth is the average sales growth at a one-year horizon. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007) and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$.

Dep. Variable:	(1) Log Output	(2) Log VA	(3) TFP	(4) M/B Ratio	(5) Sales Growth	(6) ΔLog Output	(7) ΔLog VA	(8) ΔTFP
Panel A. Horizon: n=5 Years								
AGFW	0.004	0.006	0.012	−0.005	0.008	−0.000	0.003	−0.004
	(0.81)	(0.94)	(0.79)	(−0.17)	(0.31)	(−0.01)	(0.14)	(−0.15)
Observations	5,827	5,827	3,428	3,111	3,040	4,900	4,890	2,912
Adjusted R^2	0.99	0.99	0.42	0.45	0.16	0.52	0.51	0.23
Panel B. Horizon: n=3 Years								
AGFW	0.002	0.004	-0.005	−0.022	0.037	0.026	0.018	0.003
	(0.56)	(0.80)	(-0.32)	(−0.60)	(1.70)	(1.42)	(1.08)	(0.12)
Observations	6,445	6,445	3,724	3,222	3,147	5,518	5,518	3,208
Adjusted R^2	0.99	0.99	0.42	0.45	0.16	0.55	0.52	0.21
Country×Sector FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X

Table IX: Adjusted Growth of Finance Wages and Real Outcomes: Country Level

This table reports estimates from regressions of various measures of sectors' and countries' economic performance on the adjusted growth of finance wages (AGFW) (specification (5)). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, as defined in section II. The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. In columns (1) and (2), we consider countries' performance, measured using nominal GDP, both in logs and with three-year-ahead growth rates; *R&D Exp. over GDP* is the share between total R&D expenditures and GDP; *Share STEM* and *Share Business/Law* are the shares of country-year graduates in STEM fields and with business/law degrees, using data from Unesco. *Log Patents* and *Log Trademarks* are the log of patent applications and trademark applications in each country-year; *Log. Sci. Articles* is the logarithm of the number of scientific articles published by authors affiliated with institutions in the country; *High − Tech Export* is the share of high-tech manufacturing exports over the total value of manufacturing exports in the country-year. These last four variables are from the World Development Indicators tables compiled by the World Bank. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007), and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$.

Dep. Variable:	(1) Log GDP	(2) ΔLog GDP	(3) R&D Exp. over GDP	(4) Share STEM	(5) Share Business/Law	(6) Log Patents	(7) Log Trademks.	(8) Log Sci. Articles	(9) High-Tech Export
Panel A. Horizon: n=5 Years									
AGFW	0.004	0.036	0.042*	0.001	−0.002	0.035	0.032	0.013	−0.007
	(0.40)	(0.07)	(1.85)	(0.30)	(−0.87)	(0.99)	(1.52)	(0.75)	(−0.02)
Observations	450	426	199	107	107	398	396	144	326
Adjusted R^2	0.89	0.07	0.98	0.94	0.91	0.94	0.94	0.99	0.92
Panel B. Horizon: n=3 Years									
AGFW	0.000	0.050	0.033**	0.003	−0.002	0.002	0.025	0.011	0.039
	(0.05)	(1.17)	(2.46)	(0.96)	(−0.93)	(0.08)	(1.66)	(1.00)	(0.14)
Observations	498	426	210	111	111	442	438	144	342
Adjusted R^2	0.88	0.06	0.98	0.93	0.90	0.94	0.96	0.99	0.93
Country FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X

Table X: **Adjusted Growth of Finance Wages and the Banking System**

This table reports estimates from regressions of various measures of the riskiness, efficiency, and competitiveness of the banking sector at the country-year level on the adjusted growth of finance wages (AGFW) (specification (5)). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, as defined in section II. The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. All outcome variables are measured at the country-year level in the *Global Financial Development Database* (version June 2016). *Provision N.P. Loans* is the total amount of provisions divided by the overall value of non-performing loans ; *Regulatory Cap/Assets* is the total amount of regulatory capital over the total amount of assets by banks operating in the country; *Bank Z − Score* is the Z-Score – a proxy for the probability of default of the country's commercial banking system; *Lend − Dep. Spread* is the average spread between lending interest rates and deposit interest rates; *Overhead/Assets* is the total amount of overhead expenses of banks in the country scaled by total assets; *All Costs/Income* is the share between the total costs and the net income of banks in the country; *Asset Concentration* is the sum of the assets of the three largest commercial banks in the country divided by the total assets of the banking system; *Lerner Index* is a proxy for the markup of the banking industry; *5 − Bank Concentration* is the sum of the assets of the five largest commercial banks in the country divided by the total assets of the banking system. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007) and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p<0.10,^{**}p<0.05,^{***}p<0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Riskiness			Efficiency			Competitiveness	
Dep. Variable:	Provisions N.P. Loans	Regulatory Cap./Assets	Bank Z-score	Lend-Dep. Spread	Overhead/ Assets	All Costs/ Income	Asset Concentration	Lerner Index	5-Bank Concentration
Panel A. Horizon: n=5 Years									
AGFW	0.163	0.478	0.540	−0.141	0.191	2.069	−3.893 ∗ ∗	−0.015	−1.941
	(0.02)	(0.25)	(1.45)	(−0.77)	(1.08)	(0.99)	(−2.37)	(−0.83)	(−1.62)
Observations	144	216	216	322	215	215	210	214	195
Adjusted R^2	0.57	0.56	0.72	0.54	0.59	0.77	0.94	0.19	0.83
Panel B. Horizon: n=3 Years									
AGFW	2.774	0.200	0.499	0.036	0.286	−0.022	−0.886	−0.021	−0.414
	(0.67)	(0.12)	(1.43)	(0.32)	(1.51)	(−0.02)	(−0.96)	(−0.85)	(−0.61)
Observations	150	229	229	354	228	228	223	227	208
Adjusted R^2	0.57	0.56	0.74	0.55	0.63	0.54	0.75	0.21	0.82
Country FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X

Online Appendix: Finance, Talent Allocation, and Growth

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Not for Publication

Table A.1: Growth of Finance Value Added and the Effectiveness of Finance

This table reports estimates from various regressions of the sensitivity of aggregate investment at the country-year level to the average Tobin's Q on the growth of finance value added over the prior 5 years (Panel A) and 3 years (Panel B) in that country-year. Investment-Q sensitivities are measured at the country-year level from weighted-least-squares regressions using firm-year observations from Worldscope. Regressions are weighted using the absolute value of the t-statistics attached to the estimated coefficients, which capture the precision of the estimates. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007) and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$.

	(1)	(2)	(3)
	Investment-Q Sensitivity		
	Horizon: n=5 Years		
Growth Fin. VA	0.196***	0.172***	0.179**
	(2.76)	(2.85)	(1.99)
Observations	295	295	295
Adjusted R^2	0.03	0.14	0.23
	Horizon: n=3 Years		
Growth Fin. VA	0.161***	0.101**	0.092*
	(3.28)	(2.00)	(1.67)
Observations	303	303	303
Adjusted R^2	0.02	0.13	0.22
Year FE		X	X
Country FE			X

Table A.2: **Adjusted Growth of Finance Wages and Real Outcomes: Country Level (2)**

This table reports estimates from regressions of various measures of sectors' and countries' economic performance on the adjusted growth of finance wages (AGFW) (specification (5)). The AGFW for a given country-year is defined as the difference between the growth of the finance wage premium and the growth of the finance value-added premium, as defined in section II. The growth rates of the finance wage and value-added premia are computed over five-year horizons (from year $t-5$ to year t) or over three-year horizons (from year $t-3$ to year t). The sample period is 1970-2005 and includes 24 countries. In columns (1) and (2), we consider countries' performance, measured using nominal GDP, both in logs and with three-year-ahead growth rates. In columns (3), (4), and (5), we consider the share of country-year graduates in STEM fields, services fields, and business and law degrees, using data from Unesco. In columns (6) and (7), we consider the log of patent applications and trademark applications in each country-year, and in column (8), the logarithm of the number of scientific articles published by authors affiliated with institutions in the country. The last three variables are from the World Development Indicators tables compiled by the World Bank. Across all specifications, standard errors are clustered at the country level, and the corresponding t-statistics are reported in parentheses below the coefficients. We follow Donald and Lang (2007), and assess statistical significance using the critical values from a t(24) distribution to account for the small number of clusters. Statistical significance is reported as follows: $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$.

Dep. Variable:	(1) Share Services	(2) R&D Technicians p.c.	(3) R&D Researchers p.c.	(4) Patents p.c. Residents	(5) Patents p.c. Non-residents	(6) Patents p.c. All	(7) Sci. Articles p.c.	(8) GDP p.c.
				Panel A. Horizon: n=5 Years				
AGFW	0.009	−0.009	0.007	−0.126	0.025	−0.034	−0.034∗	208.2
	(1.11)	(−0.61)	(1.44)	(−1.44)	(0.94)	(−0.69)	(−1.75)	(0.80)
Observations	107	117	188	419	420	419	398	450
Adjusted R^2	0.88	0.99	0.99	0.87	0.53	0.78	0.98	0.92
				Panel B. Horizon: n=3 Years				
AGFW	0.003	0.008	0.006∗	−0.092	0.002	−0.037	−0.015	42.36
	(0.96)	(0.94)	(1.72)	(−1.55)	(0.09)	(−1.06)	(−1.12)	(0.25)
Observations	111	128	199	465	466	465	410	498
Adjusted R^2	0.86	0.99	0.99	0.85	0.47	0.74	0.98	0.93
Country FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X