

Mind the Cap: The Effects of Regulating Bankers' Pay

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October 28, 2021

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Abstract

This paper investigates how external restrictions to the possibility of paying large bonuses affect firms' remuneration schemes and their ability to attract and retain workers. To answer this question, we study the effects of the Dutch bonus cap policy, which set a 20% limit to the ratio between variable and fixed pay for all workers employed in the banking industry in the Netherlands. Using social-security data covering the population of firms and workers, we employ a dynamic difference-in-difference approach that compares banks to other financial institutions not covered by the regulation. We find that treated employees experience a sharp drop in variable pay, which is partly compensated by an increase in their fixed pay. As a result of the observed changes in compensation, we find evidence of small negative effects on banks' ability to attract and retain workers.

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1 Introduction

Whilst not the main cause of the 2008 Great Financial Crisis, there is a widespread consensus among supervisors and regulatory bodies that inappropriate remuneration practices in the financial industry - characterized by high bonuses for successes, without clawbacks for failures - encouraged short-termism and excessive risk-taking contributing to the losses of the financial sector.¹ This *bonus culture* characterized not only investment firms but also banks, contributing therefore to the fragility of systematically relevant financial institutions.² Because the malfunctioning of large and complex financial institutions has the potential to have serious negative consequences for the real economy and to impose negative externalities on the whole society, after the crisis policy-makers all over the world felt the urge to introduce new regulations addressing the misaligned incentives caused by bankers' remuneration structure and their bonuses. For example, as a way to strengthen the financial system, The Financial Stability Forum issued, already in 2009, the Principles for Sound Compensation Practices which called for compensation practices to be increasingly tied to the risk assumed by financial firms and to be more aligned with long-term profitability considerations.³ The new recommendations were issued for all significant financial institutions but were considered especially critical for large, systemically important firms.

This paper focuses on one of the regulations introduced after the crisis with the aim of improving the stability of the financial sector by restructuring its compensation practices: the Dutch bonus cap policy (*Wet beloningsbeleid financiële ondernemingen*, henceforth Wbfo),

¹This argument was sustained also by the Nobel prize-winning economist Joseph Stiglitz: “*The system of compensation almost surely contributed in an important way to the crisis. It was designed to encourage risk-taking - but it encouraged excessive risk-taking. In effect, it paid them to gamble. When things turned out well, they walked away with huge bonuses. When things turned out badly - as now - they do not share in the losses. Even if they lose their jobs, they walk away with large sums.*”; Independent, 24 March 2008.

²Bell and Van Reenen [2014] show evidence in line with the presence of misaligned incentives caused by bankers' remuneration structure in the UK banking industry. In particular, they show that bankers' share of earnings experienced no decline between the peak of the financial boom in 2007 and 2011, despite the outbreak of the crisis at the end of 2008.

³The Financial Stability Forum (FSF) was an international body monitoring and making recommendations about the global financial system. It consisted of major national financial authorities - such as finance ministries, central bankers, and international financial bodies. In 2009 the G20 nations transformed the FSF into the Financial Stability Board (FSB), expanding its membership and mandate. The Principles for Sound Compensation Practices issued in 2009 called for effective governance of compensation, and for compensation to be adjusted for all types of risk, to be symmetric with risk outcomes, and to be sensitive to the time horizon of risks.

which reduced the relative importance of performance-pay in certain sub-sectors of the Dutch financial industry. More specifically this policy, which was announced in 2012 and came into effect in 2015, imposes a maximum limit of 20% to the ratio between the variable and fixed component of remuneration of the workers employed in the Dutch banking industry. Instead, it does not affect the compensation schemes of workers employed in other financial sub-sectors characterized by smaller financial investment firms.

Because of the systemic role that banks play both for the stability of the financial sector as well as for the real economy, the banking industry has long been subject to more regulation than the rest of the financial industry. Thus, on the one hand, the decision taken by the Dutch government to regulate pay schemes more rigorously in this particular sector can be seen as a way to reinforce the traditionally stricter direct regulation of banks' activities in an attempt to foster the stability of the whole financial sector. On the other hand, however, the harsher regulation imposed on bankers' pay could lead to unfair competition by making Dutch banks a less attractive workplace compared to other financial and non-financial firms not covered by the Wbfo. In particular, because pay-for-performance can in principle be used as an effective tool to attract and retain the most productive workers (Lazear 2018), a regulation such as the Wbfo which imposes limits to the relative importance of variable pay could have particularly large negative effects on banks' ability to attract and retain talented workers.

Against this background, we use employer-employee administrative data from Statistics Netherlands and, relying on a dynamic difference-in-difference design, we compare banks to financial firms not affected by the Wbfo to answer two main questions. First, given the dramatic rise in pay taking place in the financial sector in the past few decades (Philippon and Reshef 2012; Bell and Van Reenen 2014; Böhm et al. 2018; Célérier and Vallée 2019), we are interested in how the Wbfo affected the level and structure of pay in the banking industry. In particular, we investigate whether total pay in banks decreased as a consequence of the policy or whether banks made up for the reduction in variable pay via an increase in fixed pay, thereby leaving total pay unchanged but modifying its composition in terms of the relative importance of the fixed and variable component.

Second, because performance-pay schemes are often seen as a possible tool to influence

workers’ sorting, we analyze how restrictions to paying large bonuses affect banks’ ability to attract and retain workers. Finding an answer to this question in the context of the banking industry in particular, and of the financial sector more in general, is especially important. In fact, the escalation of performance-pay and the associated bonus culture that took over the banking sector from the late 1990s is in part connected to the increased competition for talents in the financial industry (Desai 2012).⁴ Given the potential importance of financial incentives when competition for talent is high (Cuñat and Guadalupe 2009; Fabbri and Marin 2012; Célérier and Vallée 2019; Frydman 2019), Dutch banks have argued that a policy such as the Wbfo, which limits their ability to pay large bonuses, will lead to unfair competition for workers. For example, the 2015 Annual Report of the ING Group states that the bonus cap might result in an uneven playing field for ING in the Netherlands because its introduction “*may restrict our ability to offer competitive compensation compared with companies (financial and/or non-financial) that are not subject to such restrictions and it could adversely affect ING Group’s ability to retain or attract qualified employees*”.

To test this claim, we can exploit some unique features of the Dutch registry data which, by covering the career trajectory of each worker, allows us to follow employees who leave a firm into their next job. Thanks to this feature, we not only investigate whether the bonus cap affected workers’ entry and exit to and from banks but we can also characterize the career’s trajectories of workers who leave their banks. In particular, we look at the group of workers separating from their firms after the introduction of the Wbfo and test whether treated and control employees differ in their probability of being re-employed in the financial sector and of changing treatment status, i.e. moving from a firm affected by the bonus cap to a firm not affected by it and vice-versa.

We present three main results. First, comparing banks to other financial institutions not affected by the Wbfo we show that the policy was indeed effective in putting a cap on

⁴In particular, Desai [2012] argues that the remarkable compensations offered by the new emerging industry of hedge funds and private equity funds, which experienced a dramatic growth during the 1990s, increased the competitions for “top workers” in the financial sector at the expenses of traditional banks. As a result, Desai [2012] states that “*Faced with fierce new rivals for business and talent, investment banks turned into risk takers that compensated their best and brightest with contracts embodying the essence of financial-markets-based compensation*”. In line with this evidence, a number of papers have shown a strong link between increasing competition for the best employees and financial incentives offered by firms (Cuñat and Guadalupe 2009; Fabbri and Marin 2012; Célérier and Vallée 2019; Frydman 2019).

bonuses, as the probability of having a variable pay ratio above 20% significantly decreased for treated employees compared to control employees going almost to zero by 2019, i.e. 4 years after the implementation of the bonus cap policy. We show that this decrease is driven by a sharp drop in variable pay, not fully compensated by an increase in fixed pay. In fact, we find that following the introduction of the regulation workers in the banking sector see their total salary decrease with respect to workers employed in sectors not affected by the policy. Moreover, we document that the negative effect on total pay was stronger, both in relative and in absolute terms, for the employees at the top of the within-firm salary distribution before the policy introduction.

Second, we show that the observed changes in the structure and level of pay increased the probability that workers employed in banks before the Wbfo introduction leave their firms. Despite the fact that the negative effect on total pay is stronger for the top-earners, we do not find that the separation rate of this group of workers is more severely affected. This might be due to the fact that the skills of top-earners are very specific to their industry and not so easily transferable across even narrowly defined sectors. Because of these potential frictions and to the extent that pre-policy earnings can be taken as a proxy for ability, our results suggest that the policy did not affect the separation rates of talented workers more than those of the rest of the workforce. We also find that the policy introduction reduced banks' hiring rate. Coupled together, these results suggest that the change in pay induced by the bonus cap negatively affected banks' ability to attract and retain workers compared to other financial institutions not affected by the regulation.

Finally, we provide evidence on whether the Wbfo changes the career trajectories of bankers. We show that before the introduction of the bonus cap the majority of bankers leaving their employers were either re-employed in firms operating outside the financial industry or in another bank. However, because the Wbfo affected the compensation structures of the whole banking industry, the policy should have decreased the attractiveness of getting employed in a different bank as an outside option for treated workers. In line with this, we find that the policy increased the tendency of bankers who leave their employers to exit the financial sector and find a job in firms operating in another industry, possibly to avoid the bonus cap. Consistently with this result, we also find that the small group of workers

who, after leaving their banks, are re-employed in the financial sector become more likely to change treatment status, i.e. to move to a financial institution not affected by the policy.

The rest of the paper is organized as follows: in the next section, we summarize the literature on the effects of variable pay highlighting its theoretical predictions and our contributions with respect to existing work. Section 3 describes in more details the bonus cap policy. Next, we describe the data and the sample used for the analysis. Section 5 describes the empirical strategy while section 6 reports our results on pay, retention, and hiring. Finally, the last section concludes.

2 Literature review and contribution

Performance-based pay has become increasingly common since the beginning of the 1980s. Lemieux et al. [2009] report that in the US the incidence of performance-pay jobs among salaried workers increased from less than 45% in the late 1970s to almost 60% in the late 1990s. The financial sector is no exception and increased bonuses in this sector account for two-thirds of the rise in the share of earnings going to those at the very top of the pay distribution in the UK after 1999 (Bell and Van Reenen 2014). Despite the increased importance of performance-based pay, understanding its causal impact on how firms define their compensation, retention, and hiring policies has been challenging because compensation schemes - and their changes over time - are generally endogenous to both firms' and workers' (unobservable) characteristics.

From a theoretical perspective in fact, performance-based pay is associated with higher output both because of its incentive effect, as the average worker should exert more effort and produce more when facing performance-based pay, and because of productivity sorting, as different incentive schemes should attract different types of workers. Specifically, offering a wage that is based on measured performance and that should better reflect individual's productivity is expected to attract and retain the most productive workers and discourage the least productive ones, resulting in a beneficial sorting effect ultimately improving the composition of the workforce in the firm. For these reasons, in the last few decades variable pay schemes such as bonuses have become a very common remuneration practice for firms

(Lazear and Shaw 2007; Lazear 2018). However, the firms who decide to offer such payment schemes and the workers who sort into these companies are likely to have some specific characteristics that can hardly be controlled for in an empirical study.

Existing papers testing the theoretical predictions related to performance-based pay have generally overcome the challenge of endogenous pay structure by either relying on laboratory experiments or on field experiments taking place in individual firms. This body of work supports the theoretical prediction that performance-based pay is associated with higher output (Lazear 2000; Shearer 2004; Bandiera et al. 2007; Bloom and Van Reenen 2007; Dohmen and Falk 2011) and shows that productivity sorting explains an important part, and in some cases all, of the higher output observed under variable-pay schemes (Lazear 2000; Bandiera et al. 2007; Dohmen and Falk 2011; Banker et al. 2015; Sandvik et al. 2018).⁵

However, we do not know to what extent the results found by laboratory and field experiments would carry over in a non-experimental setting. In particular, even field experiments taking place in firms rely on data from individual firms and do not have information on the pay structure of competitors in the industry. Therefore they can not answer the question of to what extent different compensation schemes within and across industries actually affect the allocation of talented workers across firms. In this paper, thanks to the unique setting we study and to the use of registry data, we can fill these gaps in the literature. In particular, by studying a governmental policy affecting remuneration schemes for certain firms in the financial sector, we can add to the previous literature by both investigating how firms compensation policies respond to an external constraint (i.e. not designed by economists in agreement with the firm) and how the reaction affects the career trajectories of their employees, which we can follow onto their new job once they leave the firm.

The next contribution of our analysis is that we focus on the effects of performance-pay on high-skilled workers. Previous studies based on laboratory and field experiments generally focused on the effects of performance-pay in the context of simple routine tasks. Much less is known about the effects of variable pay when considering more complex white-collar jobs

⁵In particular, the seminal work by Lazear [2000], which studies the effects of switching from hourly wages to piece-rate using output data from Safelite Glass Company, shows that ignoring the sorting effect would lead to a dramatic overestimation of the incentive effects. Indeed, half of the estimated increase in productivity due to changing compensation is the result of sorting toward more able workers.

such as managers and professionals, even though performance-pay workers tend to be highly concentrated in the upper end of the wage distribution (Piketty and Saez 2003; Lemieux et al. 2009; Bell and Van Reenen 2014).

The impact on sorting of a policy restricting performance-pay of high-skilled workers in a skill-intensive industry is not clear ex-ante. On the one hand, because of their higher productivity, high-skilled individuals should be particularly responsive to a limitation in their variable pay and therefore they might be more likely than lower-skilled workers to look for a new job once affected by a bonus cap. On the other hand, however, because the skill-set of highly qualified workers tends to be firm and industry-specific, they might be more likely than lower-skilled workers to face high frictions when trying to change job even across narrowly defined sectors. This is particularly important in the context of the policy we study: because the bonus cap policy affects the whole banking sector but not other industries within finance, bankers who want to avoid the bonus cap by looking for a new job would need to leave the banking industry and re-locate in other sectors within or outside finance. In conclusion, the effect of restricting performance-based pay on firms' ability to attract and retain high-skilled workers is likely to depend on how transferable workers' skills are and on workers' outside option within and/or outside the financial industry. Therefore one of the contributions of our analysis is that we can assess the importance of the two hypothesis just outlined by studying the effects of a bonus cap covering highly qualified workers employed in the skill-intensive financial industry.

In answering this question, our analysis relates also to the empirical and theoretical body of work studying how pay schemes in the financial sector interact with workers' behavior and characteristics. In particular, recent empirical evidence has shown that, despite the argument that large bonuses are needed to retain "top performers" in finance, the large increase in relative pay seen in the financial sector was not accompanied by a corresponding increase in the relative talent of finance workers (Philippon and Reshef 2012; Bell and Van Reenen 2014; Böhm et al. 2018) and, if anything, was rather accompanied by evidence of poor actual performance and severe moral hazard.⁶ Two recent theoretical papers by Thanassoulis [2012]

⁶See for example the Salz Review (2013), an independent review of Barclays' business practices commission by Barclays' board following a series of misconducts for which the company was forced to pay several hundred million dollars in fines.

and Bénabou and Tirole [2016] propose an explanation to this paradox which lies in the way in which competition for the most productive workers can interact with firms incentive schemes. The starting point of both papers is that, given the systemic relevance of banks, the perceived need to attract talented workers to the banking industry with potentially inappropriate remuneration schemes inducing excessive risk-taking can impose particularly large costs on society. The two analyses then show theoretically that competition for talent in the financial sector can generate negative spillovers for the rest of the society by driving market levels of bankers remuneration above the social optimum. From a policy perspective, the papers also show that a cap on bonuses could restore balance in incentives and decrease negative externalities by lowering firms' default risk.

In this paper, we provide evidence on the relationship between paying large bonuses and firms' ability to attract and retain workers in the banking industry, a particularly important sector. In doing so we complement the empirical work above-mentioned by taking the opposite perspective: instead of investigating whether the dramatic increase in pay in the financial sector effectively changed the workforce composition, we study whether a restriction in the relative importance of variable pay in the banking sector does influence the probability that different types of workers leave affected firms and we describe in which types of jobs they are re-employed. We also complement the above-mentioned theoretical work which shows that high-powered incentives in the financial sector can backfire by inducing excessive risk-taking by providing evidence on whether, on the other hand, a reduction in such incentives hinders firms' ability to retain their workers and to attract new ones.

3 The Dutch bonus cap policy

While our analysis focuses on the Netherlands, improving the financial sector risk management and aligning its pay incentives with sustainable performance was a goal shared by Europe as a whole. In line with this, in 2014 the European Commission implemented the Capital Requirement Directive IV (CRD IV), which, among other things, imposed a bonus cap covering credit institutions⁷ and investment firms in Europe.⁷ More in particu-

⁷See Table A2 in Appendix A2, which provides an overview on the main policies introduced after the crisis to regulate pay schemes in the financial sector both at the European level and in the Netherlands more

lar, the CRD IV represents the currently adopted regulation on banking prudential capital requirements and was introduced with the overarching goal to strengthen the resilience of the European banking sector by addressing the implementation of the Basel III recommendations.⁸ However, even though the main role of the CRD IV was to implement the Basel III capital rules, it was also used to introduce other reforms, such as the cap on bonuses. Specifically, the CRD IV stipulates that variable remuneration cannot exceed 100% of the annual fixed remuneration for *identified staff* of banks and investment firms, where the group of identified staff includes individuals whose professional activities affect the risk profile of the financial institution. However, the bonus cap imposed by the CRD IV is not considered to be particularly stringent as it allows financial institutions to increase the bonus cap at 200% conditional on shareholder approval.⁹

While the CRD IV is binding for all Member States, the regulation provides that each state could introduce more restrictive bonus cap provisions. In line with this, the Dutch coalition government announced in October 2012 their intention to introduce the so-called Act on Remuneration Policies of Financial Undertakings (in Dutch *Wet beloningsbeleid financiële ondernemingen*; henceforth Wbfo) to lower the CRD IV cap of variable remuneration to fixed remuneration at 20%. The proposal was adopted by the Dutch Lower House in October 2014 and came into effect in February 2015.¹⁰ The Dutch bonus cap is relatively strict compared to other regulations valid in the rest of Europe for two main reasons. First, the cap at 20% is much lower than the 100% cap imposed by the CRD IV.¹¹ Second, it covers

in particular.

⁸Different from the CRD IV, the Basel III regulatory framework on the maintenance of capital conservation and counter-cyclical capital buffers is not a law but rather a voluntary set of internationally agreed standards developed by supervisors and central banks, which include for example amendments to the definition of capital and counterparty credit risk and the introduction of a leverage ratio and liquidity requirements.

⁹Increasing the cap beyond 100% requires a vote in favor from at least 66% of shareholders representing a quorum of at least 50% of voting shares. If that quorum is not achieved, then a 75% majority is required. According to the Mercer's Global Financial Services Executive Compensation Snapshot Survey, 70% of EU-based banks requested approval from shareholders or the parent company to extend the variable pay cap to 200% of total fixed compensation.

¹⁰The cap became effective in 2015 for all employees starting their job-spell in that year. A transition year was granted to employees who started their employment before 2015, for which the Wbfo was enforced in 2016.

¹¹There are only three other European countries, namely Cyprus, Denmark, and Iceland, which set a bonus cap lower than the one mandated by CRD IV. However, all these countries have set a maximum cap higher than the 20% cap valid in the Netherlands. Moreover, the bonus cap in Cyprus and Denmark can be increased to 100% or more with shareholder approval.

more employees as it applies not only to identified staff but to all workers employed in firms covered by the regulation.¹²

The Wbfo however holds only for systematically relevant financial firms, such as banks, while it does not affect smaller investment institutions, such as private equity and venture capital firms.¹³ This is despite the fact that, as we will show in section 4.3, investment firms not covered by the Wbfo tend to be characterized by a higher variable pay ratio than banks. There are however several reasons that can explain why the Dutch government decided to regulate banks more strictly than other financial firms. First, moral hazard problems are particularly severe in banks because their business model relies on dispersed creditors and small depositors who do not have the incentives nor the competence to monitor and evaluate banks' risk-taking behavior and solvency (Dewatripont and Tirole 1994). In addition, despite the crucial role that banks play for the real economy, banks' shareholders do not internalize the negative externalities that excessive risk-taking imposes on society as a whole through the losses it generates for bondholders, depositors, and taxpayers (Bebchuk and Spamann 2009). For these reasons, banks have long been subject to a substantial body of regulations that limits their choices concerning investments, lending, and capital reserves. The decision taken by the Dutch government to regulate bankers' pay can therefore be seen as a way to reinforce the traditional direct regulation of bank's activities in an attempt to discourage excessive risk-taking and to foster the stability of the whole financial sector.

4 Data and sample

We use administrative micro-data on the entire population of Dutch employees from Statistics Netherlands over the period 2008-2019. The main dataset we employ is the Job and Wages Register (Polisbus), which is based on employees' contracts and monthly income statements. This dataset contains numerous variables related to job characteristics, including detailed information on earnings, hours worked, type of contract, date of job start and job end, and

¹²See Appendix A2 for a list of employees categories who are exceptionally not covered by the Wbfo.

¹³On top of the banking industry, the Wbfo covers also the insurance sector, which however is excluded from our analysis. In section 4.1 we provide more details about the group of financial industries covered by the Wbfo and the reasons why we exclude some of them from our analysis.

a firm identifier. We use individual and firm identifier to link the Job and Wage Register to other data sources covering individual and household characteristics (such as gender, age, nationality, marital status, presence of children, and home location) and firm characteristics (such as 5-digit industry code and firm size). Because firm characteristics are computed annually and because performance-based compensation is not paid evenly across the calendar year, we aggregate the monthly data of the Job and Wages Register at the annual level.¹⁴

In terms of sample selection, our analysis includes only full-time workers employed in the financial industry and who are between 21 and 67 years old. We keep only financial firms that, before the policy announcement, employed at least 10 employees and paid out at least once a bonus equivalent to 20% or more of fixed pay. To investigate the effects of the Wbfo on workers' compensation structure and probability of separation, we keep only observations in which the employee works at the same firm as he did in 2011, before the policy announcement. By focusing on this sample of workers, which we refer to as the sample of incumbents, we measure how the policy affects firms' compensation schemes while controlling for compositional changes, i.e. net of hiring strategies, that are investigated separately using data on all workers. We use the last year before the policy announcement (i.e. 2011) as reference year to define the incumbents' sample because we found anecdotal evidence that, in preparation to the new regulation, treated firms started adjusting their compensation schemes some years before its implementation.¹⁵ In this way, we can allow for the possibility of anticipatory behaviors.

In the following subsections, we define the specific sectors that are included in our treatment and control groups, the different measures of salary used in the analysis, and present some descriptive statistics.

¹⁴Performance-based payments are typically paid out in April, May or December.

¹⁵For example, the 2014 Annual Report of the ING Group states that already in that year the Supervisory Board met to discuss possible adjustments to the remuneration policy in preparation for the Wbfo and that during the meetings of the Remuneration Committee “*much time was devoted to adjust the ING Bank remuneration policy [...] in preparation of the future Wbfo legislation*”.

4.1 Treated and control sectors

Our analysis focuses on firms operating in the financial sector, which, according to the Dutch Firm Industry Classification (Standaard Bedrijfsindeling; SBI) is defined as all the five-digit industries between 64000 and 66300.¹⁶ To distinguish the sectors affected by the 20% bonus cap policy, referred to as the *treated sectors*, from those not covered by it, referred to as the *control sectors*, we follow the classification of Weitzel et al. [2018], who worked together with the Dutch Ministry of Finance to identify these two groups of industries. According to the report by Weitzel et al. [2018], the bonus cap policy applies to the banking sector, the insurance sector, and to a small heterogeneous residual category of financial firms. The firms not covered by the Wbfo instead are pension funds and the great majority of the remaining investment firms.¹⁷

To pin down the effect of the bonus cap policy on the outcomes of interest, we need to ensure that the only regulatory difference between treated and control sectors is the Wbfo. To this end, we re-define the treatment and control group by excluding some financial industries from our working sample. In particular, in the treatment group we keep only the banking sector and we exclude the insurance sector as it falls under the European Solvency-II regulation, which includes extra rules on remuneration schemes. We also exclude the residual non-banking non-insurance sectors from the treatment group because of its very heterogeneous nature and its small size.¹⁸ Finally, we exclude pension funds from the control group as they fall under the Pensions Act, which includes specific regulations on sound remuneration under the Code Pension Funds.

Given the above selection of industries, Table 1 provides information about the relative importance of the different micro-sectors included in the treatment and control group used in our regression analysis. Within the banking industry, which makes up our entire treatment group, the most relevant category is that of general retail banks under which 88% of the treated firms fall. The remaining share is constituted by cooperative banks, saving

¹⁶The SBI, the industrial classification used in the Netherlands, follows the EU industry classification (Nomenclature statistique des activites economiques; NACE Rev. 2) up to the 4-digit level

¹⁷More information can be found in footnote 32 of the policy report by Weitzel et al. [2018] (in Dutch). See Table A1 in Appendix A1 which reports a complete list of 5-digit financial industries indicating whether they are covered by the Wbfo.

¹⁸See Table A1 which reports the number of workers employed in each group of treated and control sectors.

banks, and stock credit companies. The controls group is more heterogeneous in terms of sectoral composition: almost 42% of firms are identified as investment funds, almost 24% are participation companies, such as private equity and venture capital firms, and almost 17% are institutions dealing with risk and damage evaluation. The residual micro-industries of the control group are made up of firms providing other financial services such as managing pension funds or financial holdings.

4.2 Earnings variables

To investigate how banks adjusted their compensation schemes following the introduction of a 20% bonus cap, we look at changes in the following components of annual remuneration:

Fixed pay: we define fixed pay as the sum of standard wages and standard non-performance-based bonuses, such as end-of-year bonuses or payments related to holiday time.¹⁹ We also consider fixed remuneration any payments due to over-time work, as long as these hours are paid at the standard wage rate.

Variable pay: variable pay is defined as the sum of two components: variable cash payments and variable in-kind payments. Variable cash payments include performance-based bonuses paid in cash, but also some non-performance related bonuses such as job start and job end bonuses. Because these two components cannot be observed separately in the data, we isolate the performance-based component of variable pay by excluding from our analysis on pay schemes the year of job start and the year of job end of each job spell. Variable in-kind pay includes performance-based bonuses paid out as financial instruments such as stocks, but also some small non-performance based transfers such as the allowance of a company phone or the use of a company car. Unfortunately, also these two types of in-kind allowances are not separately identifiable in the data.²⁰ However, because non-performance based in-kind transfers are likely to be time-invariant within a job-spell, we are likely to be

¹⁹Our definition of fixed pay follows the European Banking Authority guidelines on sound remuneration policies (EBA/GL/2015/22) according to which benefits are set out in the employee's job contract independently on any performance criteria should be considered as part of fixed pay.

²⁰The only component of non-performance based in-kind transfer we can separately identify is the allowance of a company car, which, in line with the European Banking Authority guidelines (EBA/GL/2015/22), we include in the fixed-pay component of remuneration.

absorbed by job-spell fixed effects used in our analysis.

Total pay: total pay is defined as the sum of fixed and variable pay.

Variable pay ratio: the variable pay ratio is measured as variable pay over fixed pay in a given year. This is the variable directly affected by the Wbfo regulation which binds the ratio to be equal to 20% at maximum.

4.3 Descriptive statistics

Table 2 shows some descriptive statistics calculated using the entire sample of employees working at treated or control firms.²¹ More specifically, the table includes firm-level average values of employees' compensation and workforce characteristics in 2011, the year before the bonus cap announcement. The Table shows that there were some differences in pay structures between treated and control firms before the policy announcement. In particular, average variable pay in the control group was higher than in the treatment group (21,390 Euro versus 13,981 Euro), while fixed pay was lower (71,399 Euro versus 78,756 Euro). However, although the relative importance of fixed and variable pay differed between the two groups, average total pay was very similar (92,737 vs 92,789 for treated and control firms respectively). Consistently with the higher (lower) level of variable (fixed) pay in the control group, also the ratio between variable and fixed pay was higher, both on average and when looking at the top 10th percentile values. In particular, while in the treatment group variable pay represents on average 13% of fixed pay and its 90th percentile value is almost 31%, the corresponding values for the control group are approximately 18% and 41%. However, in both groups the share of individuals with a ratio of variable pay to fixed pay above 20% is around 20%.

In terms of workforce characteristics, treated firms employed a higher share of female workers and in both treated and control firms the majority of employees had completed higher education. Finally, the sample of firms considered in the treatment group - 43 banks in total - and in the control group - 118 financial institutions in total - are very different in

²¹While treatment status is defined at the sector level, for brevity we sometimes refer to treated (control) individuals or treated (control) firms, by which we mean workers employed in firms operating in one of the treated (control) sectors.

terms of firm size, with banks employing on average more than 1,000 individuals and control firms employing almost 50 individuals.

Figure 1 shows the evolution of average variable, fixed, and total pay over three time periods and by treatment group. The three time periods we define are: between 2008 and 2011, i.e. before the bonus cap policy was announced; between 2012 and 2015, i.e. after the policy announcement but before the cap became effective for all treated workers; and between 2016 and 2019, i.e. once the policy was fully effective. The bars show a descriptive pattern that is in line with the policy objectives. In particular, while variable pay was quite constant until 2015 both in the treatment and in the control group, once the policy became effective it diverged increasing by almost 4 thousand euros in the control group and decreasing by almost 5 thousand euros in the treatment group. The increase in variable pay experienced by firms in the control sectors drives the observed increase in their average total pay between 2016 and 2019. Instead, despite an increase in their fixed pay, the average total pay of firms in the treatment group decreased between the second and third period. As we will show in section 6, these patterns are confirmed by our regression results.

Before moving to present our empirical strategy, we investigate how much of the over-time variation in performance-based pay of workers employed at the same firm is driven by aggregate firm performance, i.e. whether the firm had an exceptionally good or bad year, and how much is instead driven by differences in individuals' workers' performance. As we do not have data on workers and firm performance, we instead report the values of the adjusted R^2 obtained from regressing the logarithm of worker-level variable pay on: (i) firm-year fixed effects; (ii) job-spell fixed effects; (iii) both sets of fixed effects. The values of the adjusted R^2 we obtain are respectively 0.42, 0.39, and 0.69. This simple analysis suggests that while performance at the firm-level explains some of the variation in variable pay observed across workers within the same firm, there is still a lot of individual heterogeneity. In particular workers' fixed effects explain a share of variation in variable pay comparable to that explained by firm-year fixed-effects. However, limiting the relative importance of pay-for-performance could in principle reduce the importance of individual heterogeneity and reduce differences in pay across workers of different ability. Therefore, in Figure 2 we study the effects the policy had on the dispersion of variable pay in treated and control firms. In particular,

Figure 2 plots the trends in the coefficient of variation (CV) of variable pay with respect to its 2011 level for the treated and the control group separately as well as the difference in the trends between the two groups. The graph shows that, differently from control firms, the CV of treated firms decreased over time with respect to its 2011 value. In line with this, the difference in the CV between treated and control firms is also negative in the years following the announcement of the Wbfo. These estimates suggest that, by reducing the importance of pay-for-performance, the bonus cap policy led to a reduction in the dispersion of variable pay in the banking industry.

5 Empirical strategy

In section 5.1 we detail the empirical strategy used to detect the effect of the bonus cap policy both on the remuneration structure of incumbents and on their probability of ending their job spell and we also discuss the relevant identifying assumptions. In section 5.2 we describe the empirical framework we use to look at the effects of the policy on firms' hiring rate using data on the full sample of employees.

5.1 Analysis on pay and retention of incumbents

To estimate the effect of the 20% bonus cap on employees' compensation structure and probability of separation we employ a dynamic difference-in-difference (DiD) model, which allows us to flexibly investigate the dynamics of firms reactions to the policy announcement and implementation. Using individual-level observation on the sample of incumbents, we define as treated (control) all those employees who, before the policy announcement, were (not) employed in the banking sector, consistently with the categorization of sectors described in section 4.1.

Identification based on DiD models relies on the parallel trends assumption, which states that the treatment group, absent the reform, would have followed the same time trend as the control group for the outcome variables of interest. While this assumption is not directly testable, in section 6 we provide supporting evidence through the use of several periods of pre-reform data, showing that the treatment and control groups exhibit a similar pattern

until the reform was announced in 2012. Another threat to the identification of treatment effects in DiD models is the possibility of spillover effects between the treatment and control groups. In the setting we study spillovers are particularly likely to occur if treatment and control industries are well interconnected in terms of labor mobility. Therefore we check for how severe is the concern of spillovers by focusing on the pre-policy period 2008-2011 and identifying which were the most important industries from which employees joined the treatment or control sectors and the main industries where treated and control employees went to once they left their firms.

We find that treated and control sectors are not interconnected in terms of labor mobility. In particular, the Appendix Table 3 shows that the first most important sectors for both joiners and leavers in the treatment as well as control sectors is temporary employment.²² Industries within the broadly defined financial sector also play an important role. In particular, the second most important industry from which employees join banks before the Wbfo announcement is the banking sector. The banking industry is also the second most important destination for employees leaving a bank. The insurance sector also represents another important industry for joiners and leavers for the treatment group as well as for the control group. However, both in entry and in exit, competition for workers is definitely not limited to the financial sector as at least 70% of the workers who joining and leave the treatment and control group are not employed in that industry. Taken together, the pre-policy patterns on labor mobility show that there is an interconnection between treated units (i.e. between different banks) but not across treatment and control groups, which reassures us about the validity of our empirical approach. In addition, as explained in section 4.1 our analysis excludes observations on firms in the insurance sector where, given its role for labor mobility both for the treatment and control group, spillovers are more plausible.

For each incumbent employee i working in firm f in year t we estimate the following

²²Employees who work at a temp work agency (TWA) or who get a job placement through an intermediary organization will be part of the TWA sector group in the Dutch registry data. This is because the registry data does not allow us to observe the sector code of the client firm and therefore the TWA is considered the formal employer of this group of workers. The relatively high number of transitions between TWAs and the financial sector suggests that financial institutions make frequent use of the services of temporary work intermediary companies. In line with this, note that in the Netherlands TWAs are often commercial companies, and getting a job through a TWA is not considered a negative signal nor something typical of unskilled workers only.

regressions:

$$Y_{ift} = \alpha + \sum_{t=2008}^{2019} \beta_t Year_t + X'_{ift} \lambda + \eta_r + \gamma_{if} + \epsilon_{ift} \quad (1)$$

$$Y_{ift} = \alpha + \sum_{t=2008}^{2019} \delta_t (Bank_{if} * Year_t) + X'_{ift} \lambda + \eta_r + \gamma_{if} + \phi_t + \epsilon_{ift} \quad (2)$$

where Y_{ift} is any of our pay variable of interest or a dummy variable equal to one if in that year the worker leaves the firm; X_{ift} is a vector of characteristics of individual i and of his job-spell with firm f , including dummies controlling for gender, age (8 categories), marital status, parenthood, Dutch nationality, type of contract, and firm size categories (1-19; 20-199; 200-499; 500 employees or more); and η_r are fixed effects for 35 public employment service regional areas. Finally, γ_{if} represent fixed effects for each employer-employee match which account for any time-invariant characteristics of the worker, the firm, and the match between the two. Standard errors are clustered at the job-spell level.

Equation 1 is estimated for treated and control employees separately and the coefficients β_t illustrate how the outcome variables of these two groups change over time with respect to 2011, our reference year. To estimate whether compensation schemes and retention rates of firms subject to the bonus-cap policy have adjusted differently from that of control firms, we estimate the dynamic difference-in-difference strategy outlined in equation (2), where the coefficients δ_t capture dynamic treatment effects.

In terms of identifying variation, note that by including job-spell fixed-effects γ_{if} we are exclusively focusing on changes in the outcomes of interest within a job spell, i.e. until an employee leaves the firm. The advantage of studying within job-spell changes in pay on the sample of employees hired before the policy announcement (the incumbents), is that we are automatically controlling for the effect that compositional changes due to employees switching between firms could have on firms' compensation structures through the hiring and separation margins.

5.2 Analysis on hirings at the firm level

To investigate the effect of the bonus cap on banks' ability to attract workers we use a panel of firm-year observations computed on the whole sample of employees (including those joining the firm after the policy change or leaving the firm before the policy announcement). Specifically, we estimate an equation of the following form, where f and t index firm and year:

$$Y_{ft} = \alpha + \sum_{t=2008}^{2019} \delta_t (Bank_f * Year_t) + X'_{ft} \lambda + \gamma_f + \phi_t + \epsilon_{ft} \quad (3)$$

The outcome variable is defined as the ratio between the number of workers joining the firm in a given year divided by the total number of workers employed in the firm in 2011. Therefore the coefficient of interest δ_t captures the dynamic differential effect of the bonus-cap policy on the ability of treated firms, as opposed to control firms, to attract new workers as a share of their size at baseline. The vector X_{ft} includes the following variables: proportion of female employees in the firm, average age of the workforce, proportion of employees with low- middle- high-level education, proportion of employees with a partner, proportion of employees with a child, proportion of employees with a Dutch nationality, proportion of employees with a permanent contract, firm size groups (1 to 19 employees, 20 to 199 employees, 200 to 499 employees; and 500 employees or more). Finally, γ_f denotes firm fixed effects and ϕ_t represents year fixed effects. Standard errors are clustered at the firm level.

6 Results

In the following subsections we identify how the bonus cap policy affected banks' pay level and structure by showing our results on the variable pay ratio, as well as on fixed, variable, and total pay separately. Next, we investigate how the observed change in pay schemes affected separations and hiring.

6.1 Effects on pay schemes: Compliance with the policy

We start by investigating whether firms in the banking sector complied with the Wbfo regulation. To do this, we use the sample of incumbents and we build a dummy equal to one if an employee variable pay ratio in a given year is above 20% and equal to zero otherwise. Using this outcome variable, Figure 3 plots the β coefficients from equation (1), both for the treated and control group, and the δ coefficients from equation (2) with 95% confidence intervals. The figure shows that the probability that the variable pay ratio exceeds 20% evolves on a similar trend for employees working in banks or in control firms before 2012, the year in which the policy was announced. The year right after the announcement however, this probability peaks upwards by more than 15 percentage points for treated employees. Because in 2013 the policy is not effective yet, the rise in the variable pay of the treatment group ratio suggests that banks compensate workers ex-ante for the forthcoming reduction in the variable pay ratio by taking advantage of the fact that in that year they can still give out very large bonuses to their employees.

The difference between treated and control employees in the probability of having a variable pay ratio above 20% returns to be indistinguishable from zero between 2014 and 2016. However, in line with the policy goal, from 2017 onward the probability of having a ratio of variable pay to fixed pay above 20% decreases for treated employees as opposed to control employees, with treated employees being 7 percentage points less likely than control employees to have a variable pay ratio above 20%. Because the 2011 share of incumbents that had a variable pay ratio above 20% in the treatment group was equal to 7.8% and considering that by 2019 the probability of having a ratio above 20% decreased by 5 percentage points for this group of workers, 4 years after its introduction the policy was almost entirely successful in achieving its goal.²³ The figure also shows that differences between treated and control employees are mainly driven by changes to the outcome variable of treated employees, while the ratio for control employees is quite stable over time.

While Figure 3 shows the effect for the entire workforce, Figure 4 distinguishes between

²³Some plausible reasons for why the probability of having a ratio above 20% has not decreased to zero by 2019 might be connected to the fact that some categories of employees, which can not be identified in our data, can be exempted from the policy. See Appendix A2 for more details on these exceptions.

the effect of the policy on top earners, defined as the group of employees who were in the top 10 percentile of the salary distribution within their firms at least once before the policy announcement, versus the effect it had on all other employees. We look at heterogeneous effects across these two categories of workers for two main reasons. First, because variable pay tends to be concentrated in high-paying positions, the bonus cap policy should affect top earners more. Indeed, within the group of treated individuals whose total pay was in the top 10 percentile of their firm salary distribution, 23.1% had a variable pay ratio above 20% in the pre-policy period, compared to a share equal to 4.6% for the rest of the workforce. The corresponding shares for employees in the control group are 27.4% and 14.4%. Second, given the theoretical predictions concerning the effects of performance-based pay on productivity sorting, we are interested in investigating whether adjustments in employees' pay depend on their compensation in the pre-policy period, which can be considered partly indicative of their level of ability.

The top graph of Figure 4, which plots the difference-in-difference coefficients for the group of top-earners and for all other employees, shows that the effects of the policy are magnified on the sample of top-earners. In particular, with respect to the rest of the workforce, top-earners experience both a higher peak in the probability of having a variable pay ratio above 20% in 2013 and a greater drop in the following years. Moreover, the drop in variable pay starts earlier for this group of workers, with statistically negative estimates obtained already in 2014. In order to test if the DiD results estimated on the group of top-earners are actually driven by a drop in the outcome variable of treated employees, the bottom graph of Figure 4 focuses on the group of top-earners only and distinguishes between treated and control employees. In line with the policy goal, the bottom graph shows that top-earners working in the banking sector experienced a significant drop in the probability of having a variable pay ratio above 20% from 2014 onward, while the trends for top-earners working in the control sectors are quite stable over time. In particular, because the 2011 value of the outcome variable for top earners was 23% in the treatment group and the bottom graph shows that, by the end of the sampled period, there is a drop of 20 percentage points with respect to the 2011 value, we conclude that by 2019 there are almost zero top-earners with a variable pay ratio above 20%.

Overall, these findings seem to suggest that following the policy announcement, but before the policy implementation, banks temporarily increased the variable pay ratio of all their employees, possibly in order to compensate them for future losses. In order to be ready to comply with the regulation however, banks drastically reduced the variable pay ratio of top-earners already in 2014, while the ratio of the rest of the workforce follows this downward trend from 2016 onward. Taken together these results suggest that the policy was successful in decreasing the variable pay ratio of workers employed in the banking industry below 20%. However, the observed decrease in the variable pay ratio can be consistent with different changes in banks' compensation policies: it can be either driven by a decrease in the variable component of pay or by an increase in the fixed component of pay (or by a combination of both). In the next subsection, we investigate the relative importance of these two margins and the resulting implications for total pay.

6.2 Effects on pay schemes: Variable, fixed, and total pay

The top graph of Figure 5 tests whether the decrease in the variable pay ratio was driven by a drop in variable pay. To investigate this, we plot the trends in the ratio of variable pay to the level of total pay in 2011 for treated and control employees, and the difference-in-difference coefficient with 95% confidence intervals.²⁴ In line with the results of Figure 3, variable pay of treated incumbent workers increased in 2013 but then decreased from 2014 onward. In particular, in the treatment group the ratio has decreased by almost 7 percentage point by 2019, which correspond to a drop of more than 60% with respect to the 2011 average of 0.104.

To check for whether banks compensated for the drop in variable pay with an increase in fixed pay, the bottom graph investigates changes in fixed pay (in logarithm). While before the policy announcement fixed pay was on a quite comparable trend for treated and control employees, in 2014 - in correspondence to the decrease in variable pay of treated employees just described - fixed pay in the banking sector started increasing significantly faster than fixed pay of control employees. This trend continues until the end of the sample period when

²⁴We prefer using the ratio of variable pay to total pay in 2011 rather than variable pay in logarithm as the former allows us to include observations with zero variable pay in the analysis.

fixed pay of treated employees becomes 5% higher than that of control employees.

While the results of Figure 5 suggest that treated firms respond to the bonus cap policy by decreasing variable pay as well as increasing fixed pay, Figure 6 investigates the implications of the observed changes for total pay. In particular, the top graph shows the trends in total pay (in logarithm) for treated and control employees, as well as the difference-in-difference coefficients with 95% confidence intervals. From the difference-in-difference coefficients, we can see that the increase in fixed pay was not sufficient to fully compensate for the decrease in variable pay observed in Figure 5. In fact, from 2014 onward the level of total salary of workers in the banking sector was between 3% and 5% lower than that of workers employed in the control sectors. In the bottom graph of Figure 6 we investigate which type of employees was more affected by the drop in total pay and we find that the negative effect on total pay was greater for the group of top-earners.

6.3 Effects on separations, career trajectories, and hirings

In this subsection, we investigate whether the bonus cap policy affects banks' ability to retain and attract workers. First, we look at whether the policy influences the probability that incumbent workers leave the firm in which they were employed in 2011. Results are plotted in Figure 7 which shows the dynamic DiD effects on a dummy variable which is equal to one if the worker leaves the firm in that year and equal to zero otherwise. Since this analysis is based on the sample of incumbents, by construction this outcome variable is equal to zero until 2011 and therefore we plot coefficients from 2011 onward. The DiD coefficients plotted in the top graph of Figure 7 show that from 2016 onward treated employees were significantly more likely to leave their firm than control employees. In particular, by 2019 treated workers were more than 5 percentage points more likely to have ended their job spell than control employees.

The bottom graph of Figure 7 analyzes whether there are differences in the separation probability by income type comparing top earners with the rest of the workforce. The graph shows that, although top earners experienced a higher drop in their total pay after the policy introduction (showed in the bottom graph of Figure 6), the separation rate for the

two groups of employees follows very similar trends, with no statistical difference between the two. There are various reasons which could explain why the effects on separation are not stronger for top-earner. First, the skill set of top-earners might be more firm- and industry-specific and this could limit their labor mobility more than that of lower-skilled and less experienced workers. Moreover, top-earners in our sample are on average almost 48 years old both in the treatment and in the control group, while the corresponding average age of the rest of the workforce is 42. The fact that they are older can also create more frictions in looking for a new job following the drop in earnings. Therefore our results seem to suggest that, potentially because of differential frictions in the labor mobility of different groups of workers, the policy homogeneously increased the separation rate in the banking industry and it did not affect high-earners differently from the rest of the workforce.

Next, we exploit the very unique features of our data to describe what happens to the career trajectories of employees who leave their firm in the years following the policy introduction. To do this we focus on each year on the group of incumbent employees who leave their firm in that year and that are re-employed in another firm within 365 days.²⁵ In Figure 8 we plot the probability that a worker belonging to this group remains in the finance industry (top graph) and, in case of re-employment within finance, whether he moves from a treated sector to a control sector and vice-versa (bottom graph). The top graph shows that conditional on leaving the firm in a given year, treated workers are up to 20 percentage points less likely than control workers to remain employed within the finance sector. This result squares well with the trends reported in the Appendix Table 3 and described in section 5.1. In particular, Table 3 shows that before the policy announcement almost 70% of the employees in the treated and control sector did not remain in finance when leaving their job, suggesting that banks competed for workers mainly with firms outside the financial industry. Within the finance sector however, the banking industry represented the most important option for workers leaving a bank as 9% of employees leaving their banks were re-employed within the banking sector before the policy announcement. However, because

²⁵We check that the probability of finding a job conditional on having left the firm the previous year does not differ between treated and control employees and we find that there are no statistical differences between the two groups in the probability of being unemployed once they leave the firm. As we can not distinguish between voluntary quits and firings, this result reassures us that we are likely to be comparing similar types of separations across the treatment and control group.

the Wbfo affected the compensation structure of the whole banking sector, the policy should have decreased the attractiveness of getting employed in another bank as an outside option. In line with this, our results show a decrease in the probability of being re-employed in the finance sector in favor of jobs outside this industry.

The bottom graph instead shows that conditional on being re-employed in finance, treated workers are more likely to change treatment status, i.e. moving from a bank to another financial institution not affected by the bonus cap policy, than control employees.²⁶ Although estimates are sometimes imprecisely estimated, this result suggests that the small group of treated employees who leave their banks and remain in finance might try to escape the restriction on bonuses imposed by the Wbfo by moving towards sectors not affected by it.

Finally, using the whole sample of workers, Figure 9 shows how the policy affected the hiring rate of firms by plotting the difference-in-difference estimates from equation 3, where the outcome variable is defined as the ratio between the total number of workers joining the firm in a given year over the total number of workers employed in 2011. Because the difference-in-difference coefficients are negative, the figure shows that the bonus cap policy reduced banks' ability to attract workers compared to the control group, generating a 5 percentage point gap with respect to the difference between the two hiring rates in 2011. Note that a gap of 5 percentage points is sizable given that in 2011 the hiring rate was very similar in treated and control firms and namely equal to 13% in treated firms and 14% in control firms.

Overall, the results of this section show that the bonus cap policy increased the separation rate and reduced the hiring rate of banks, therefore negatively affecting their ability to retain and attract workers. However, results for separation do not differ for top-earners, suggesting that the policy is not differentially affecting the retention rate of different types of workers. Moreover, treated workers who leave their firms are less likely than control workers to remain in finance, suggesting that competition for workers does not necessarily occur only within the finance industry. Finally, we find that the minority of treated workers who leave their bank and remain in finance are more likely to move to the control sector. Taken together

²⁶Note that the probability of changing treatment status when leaving the firm and staying in the financial sector was 9.3% for treated workers and 6% for control workers in 2012, which is our reference year.

these results suggest that the bonus cap might disadvantage banks in retaining their workers to the benefit of other firms, operating mainly outside the financial sector, that were not affected by the policy.

7 Conclusions

Excessive risk-taking in the financial sector has played an important role in the 2008-2009 financial crisis and there is widespread consensus that compensation structure in the financial industry - characterized by high bonuses for successes without claw backs for failures - might have encouraged it by shielding its workers from a large fraction of possible losses. This *bonus culture* was prevalent also in banks and by contributing to the fragility of the banking sector, which plays a crucial role for the real economy, it imposed particularly large costs for society. To mitigate the impact of these negative externalities, policymakers in the whole of Europe introduced new regulations aimed at setting guidelines and limits to remuneration policies in the financial industry. In this paper, we study the effects of one such policy: the Dutch bonus cap policy (or *Wbfo* in Dutch) which set the maximum limit of 20% to the ratio between variable pay and fixed pay in the banking industry.

Using registry data from the Netherlands we compare the earnings of workers employed in the banking sector to those employed in other financial firms not affected by the regulation to investigate how banks have responded to the policy both in terms of level and structure of their compensation schemes. First, we find that the policy was effective in reducing the share of employees with a ratio of variable pay to fixed pay above 20%. The decrease in the ratio was driven both by a drop in variable pay and by an increase in fixed pay. However, as the overall effect on total pay was negative, particularly so for those employees at the top of the earnings distribution before the policy announcement, our results suggest that the increase in banks' fixed pay component did not fully compensate the workers for their losses in variable pay.

Next, we investigate whether the change in banks' pay schemes affects their ability to attract and retain workers. We show that the bonus cap policy negatively affects banks' ability to attract workers, as their hiring rate grows slower than that of control firms following the

introduction of the bonus cap. Second, we find that a few years after the policy announcement, separation rates of treated workers increased faster than those of control workers. However, we do not find that this trend is magnified for top-earners, despite the fact that this category experienced the highest drop in total pay as a result of the regulation. Finally, we exploit the fact that our data allows us to follow the entire career trajectories of workers, to describe what happens to bankers leaving the banking industry after the introduction of the regulation. We find that the introduction of the policy increased the already high probability that workers leaving their banks are re-employed outside the financial sector. We also find that the minority of treated workers remaining in finance after they leave their banks are more likely than control employees to change treatment status, i.e. to go from the banking sector to a financial sector not affected by the bonus cap regulation. These results seem to suggest that the cap on bonuses negatively affected banks' ability to attract and retain workers to the benefit of other firms, mainly non-financial, unaffected by the regulation.

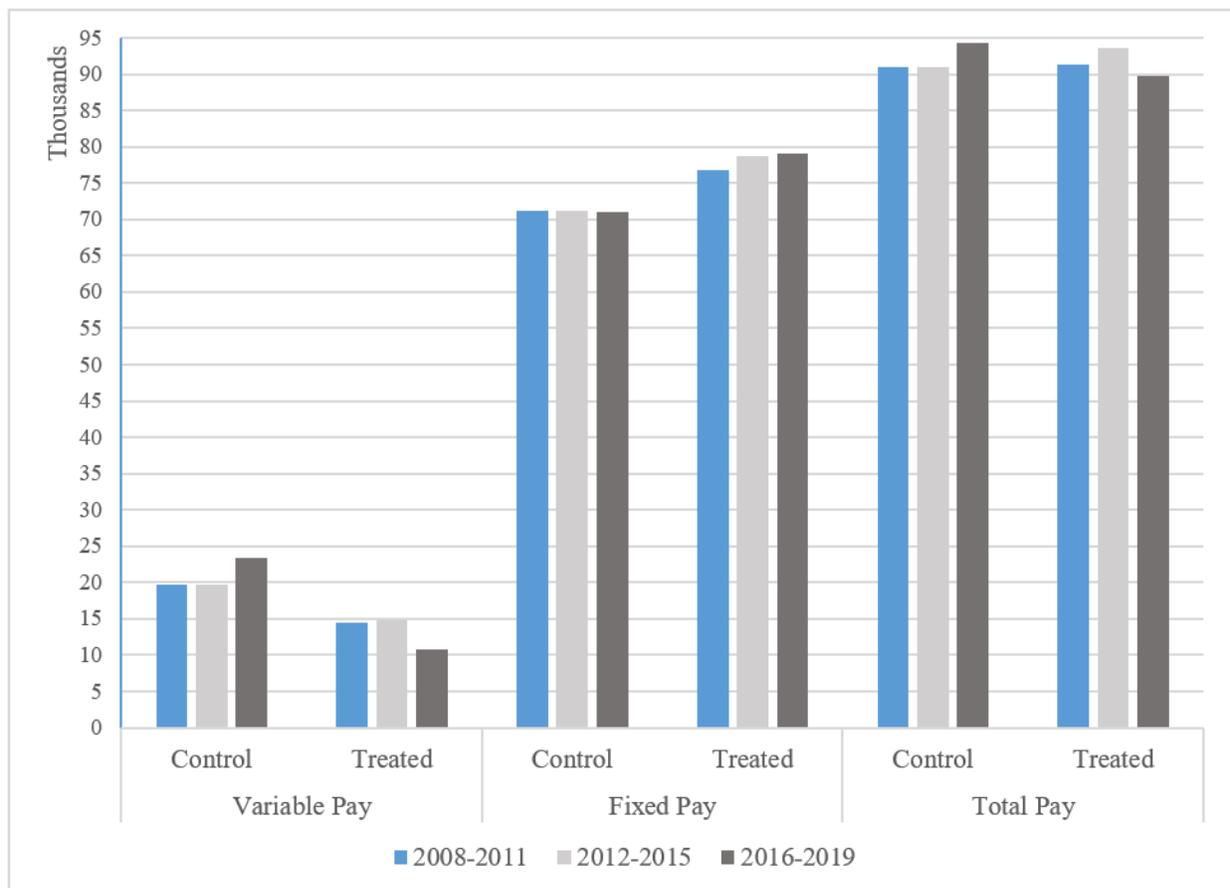
References

- O. Bandiera, I. Barankay, and I. Rasul. Incentives for managers and inequality among workers: Evidence from a firm-level experiment. *The Quarterly Journal of Economics*, 122(2):729–773, 2007.
- R. D. Banker, S.-Y. Lee, G. S. Potter, and D. Srinivasan. An empirical examination of the impacts from termination of a performance-based incentive plan. 2015.
- L. A. Bebchuk and H. Spamann. Regulating bankers’ pay. *Georgetown Law Journal*, 98:247, 2009.
- B. Bell and J. Van Reenen. Bankers and their bonuses. *The Economic Journal*, 124(574): F1–F21, 2014.
- R. Bénabou and J. Tirole. Bonus culture: Competitive pay, screening, and multitasking. *Journal of Political Economy*, 124(2):305–370, 2016.
- N. Bloom and J. Van Reenen. Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122(4):1351–1408, 2007.
- M. J. Böhm, D. Metzger, and P. Strömberg. ‘since you’re so rich, you must be really smart’: Talent and the finance wage premium. *Riksbank Research Paper Series*, (137):18–3, 2018.
- C. Célérier and B. Vallée. Returns to talent and the finance wage premium. *The Review of Financial Studies*, 32(10):4005–4040, 2019.
- V. Cuñat and M. Guadalupe. Globalization and the provision of incentives inside the firm: The effect of foreign competition. *Journal of Labor Economics*, 27(2):179–212, 2009.
- M. Desai. The incentive bubble. *Harvard Business Review*, 2012.
- M. Dewatripont and J. Tirole. *The prudential regulation of banks*. MIT press, 1994.
- T. Dohmen and A. Falk. Performance pay and multidimensional sorting: Productivity, preferences, and gender. *American Economic Review*, 101(2):556–90, 2011.

- F. Fabbri and D. Marin. What explains the rise in ceo pay in germany? a panal data analysis for 1977-2009. 2012.
- C. Frydman. Rising through the ranks: the evolution of the market for corporate executives, 1936–2003. *Management Science*, 65(11):4951–4979, 2019.
- E. P. Lazear. Performance pay and productivity. *American Economic Review*, 90(5):1346–1361, 2000.
- E. P. Lazear. Compensation and incentives in the workplace. *Journal of Economic Perspectives*, 32(3):195–214, 2018.
- E. P. Lazear and K. L. Shaw. Personnel economics: The economist’s view of human resources. *Journal of economic perspectives*, 21(4):91–114, 2007.
- T. Lemieux, W. B. MacLeod, and D. Parent. Performance pay and wage inequality. *The Quarterly Journal of Economics*, 124(1):1–49, 2009.
- T. Philippon and A. Reshef. Wages and human capital in the us finance industry: 1909–2006. *The Quarterly Journal of Economics*, 127(4):1551–1609, 2012.
- T. Piketty and E. Saez. Income inequality in the united states, 1913–1998. *The Quarterly journal of economics*, 118(1):1–41, 2003.
- J. Sandvik, R. Saouma, N. Seegert, and C. Stanton. Analyzing the aftermath of a compensation reduction. Technical report, National Bureau of Economic Research, 2018.
- B. Shearer. Piece rates, fixed wages and incentives: Evidence from a field experiment. *The Review of Economic Studies*, 71(2):513–534, 2004.
- J. Thanassoulis. The case for intervening in bankers’ pay. *The Journal of Finance*, 67(3):849–895, 2012.
- G. Weitzel, S. Rosenkranz, D. Janssen, J. Verhoeckx, and A. Fenneman. Rapport evaluatie wet beloningsbeleid financiële ondernemingen. 2018.

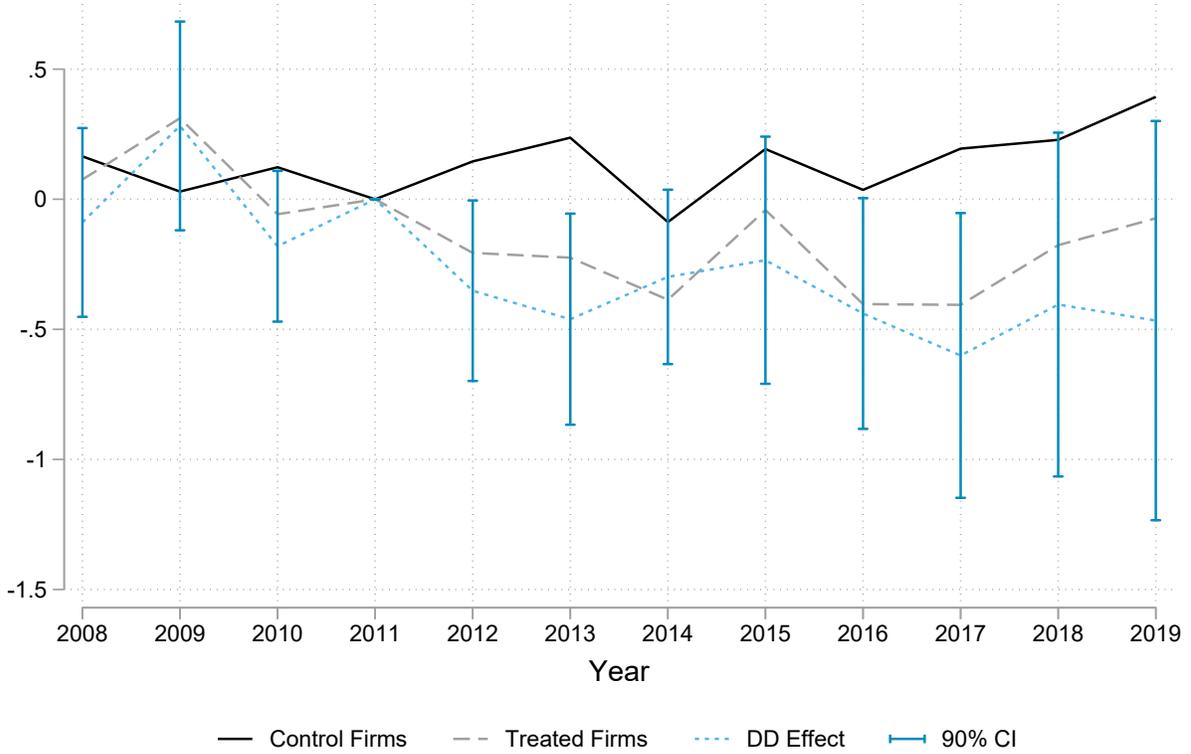
Figures

Figure 1: Evolution of the components of pay



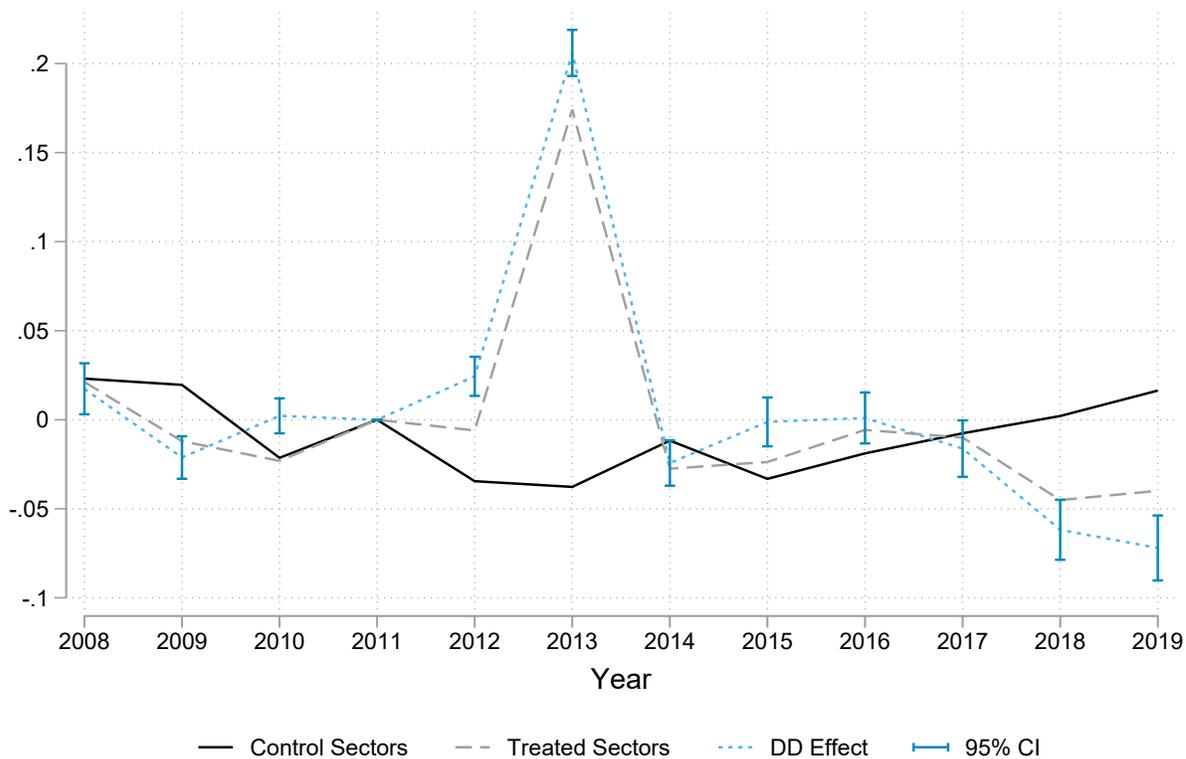
This figure shows firm-level averages of variable, fixed, and total pay calculated on the full sample of workers employed in treated or control firms in a given year and then averaged between three time periods. The three time periods we define are: between 2008 and 2011, i.e. before the bonus cap policy was announced; between 2012 and 2015, i.e. after the policy announcement but before the cap became effective for all treated workers; and between 2016 and 2019, i.e. once the policy was fully effective.

Figure 2: Coefficient of variation of variable pay



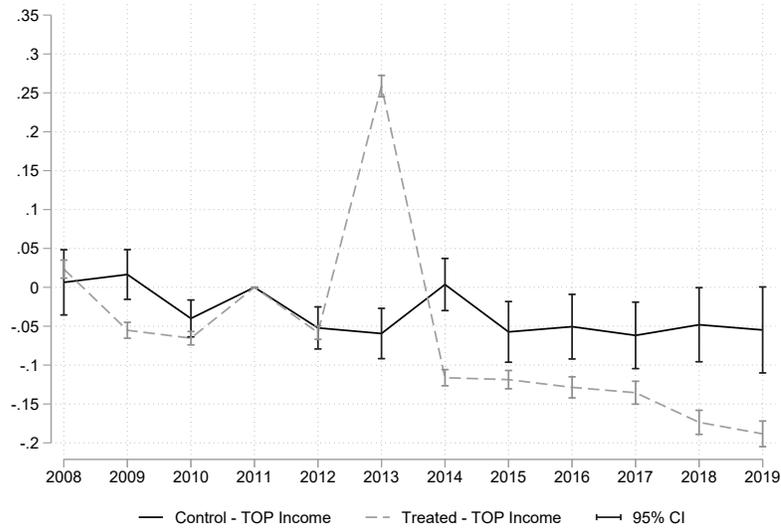
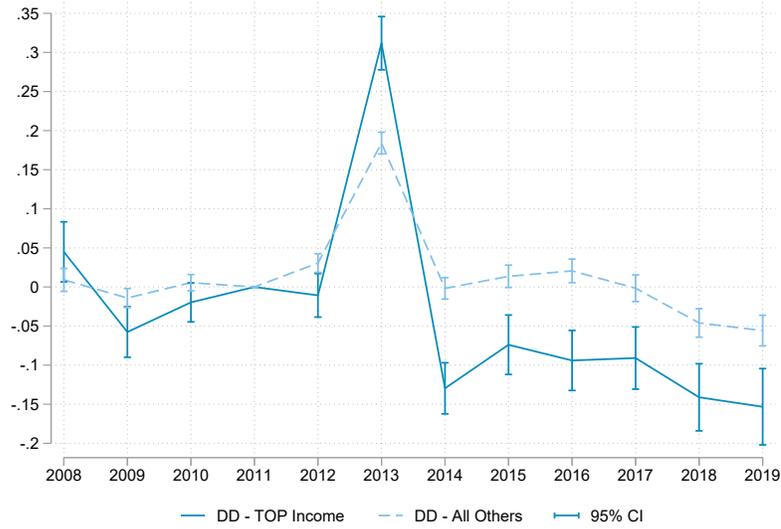
This figure is estimates on the entire sample of workers employed in a treated or control firm in a given year. The outcome variable, namely the coefficient of variation, is defined as the ratio between the standard deviation and the average of variable pay calculated at at the firm level, which we then aggregate across all treated (dashed gray line) and control firms (solid black line) separately. The figure plots also the difference between the changes in the CV of treated and control firms (blue line) and its 90% confidence intervals. All coefficients are plotted against the 2011 value, which is normalised to zero and using firm fixed effects. Standard errors are clustered at the firm-level.

Figure 3: Incidence of bonus ratio above 20%



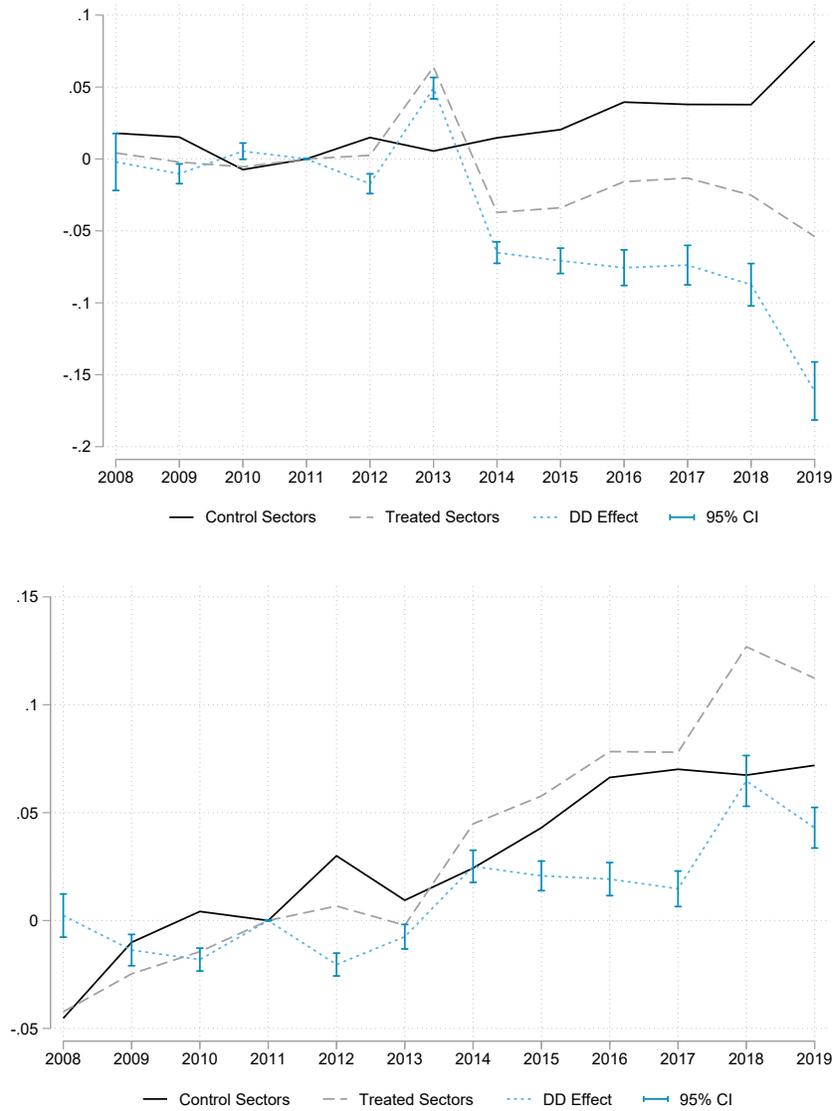
This figure is estimated on the sample of incumbents, which we define as workers who were employed in a treated or control firm in 2011, the year before the policy announcement. The outcome variable is a dummy equal to one if the variable pay ratio of an employee is above 20% and equal to zero otherwise. The figure plots the yearly coefficients from equation (1) for both treated and control employees, represented by the dashed gray line and the solid black line respectively. It also shows the dynamic difference-in-difference coefficients and 95% confidence intervals from equation (2), represented by the dotted blue line. All coefficients are plotted relative to their value in 2011, which is normalized to zero. Standard errors are clustered at the job-spell level.

Figure 4: Incidence of bonus ratio above 20%: Top-earners versus non top-earners



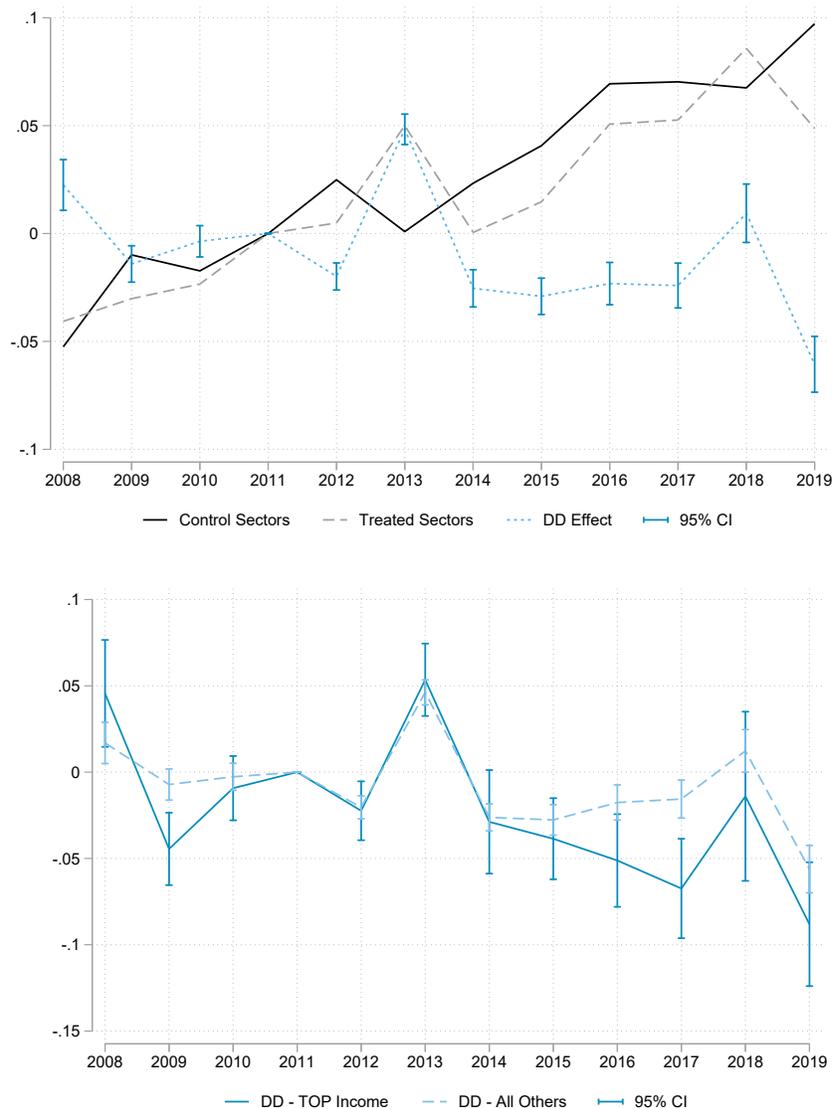
This figure is estimated on the sample of incumbents, defined as the group of workers employed in a treated or control firm in 2011. The outcome variable is a dummy equal to one if the variable pay ratio of an employee is above 20% and equal to zero otherwise. The top graph plots the dynamic difference-in-difference coefficients and 95% confidence intervals from equation (2) for two groups of employees separately. The solid line represents the effect on the sample of top-earners, defined as employees who, before 2012, were at least once in top 10 percentile of the salary distribution within their firm. The dashed line represents the effect on all remaining employees. The bottom graph shows the effect separately for treated and control employees belonging to the group of top earners. Standard errors are clustered at the job-spell level.

Figure 5: Variable pay (Top); fixed pay (Bottom)



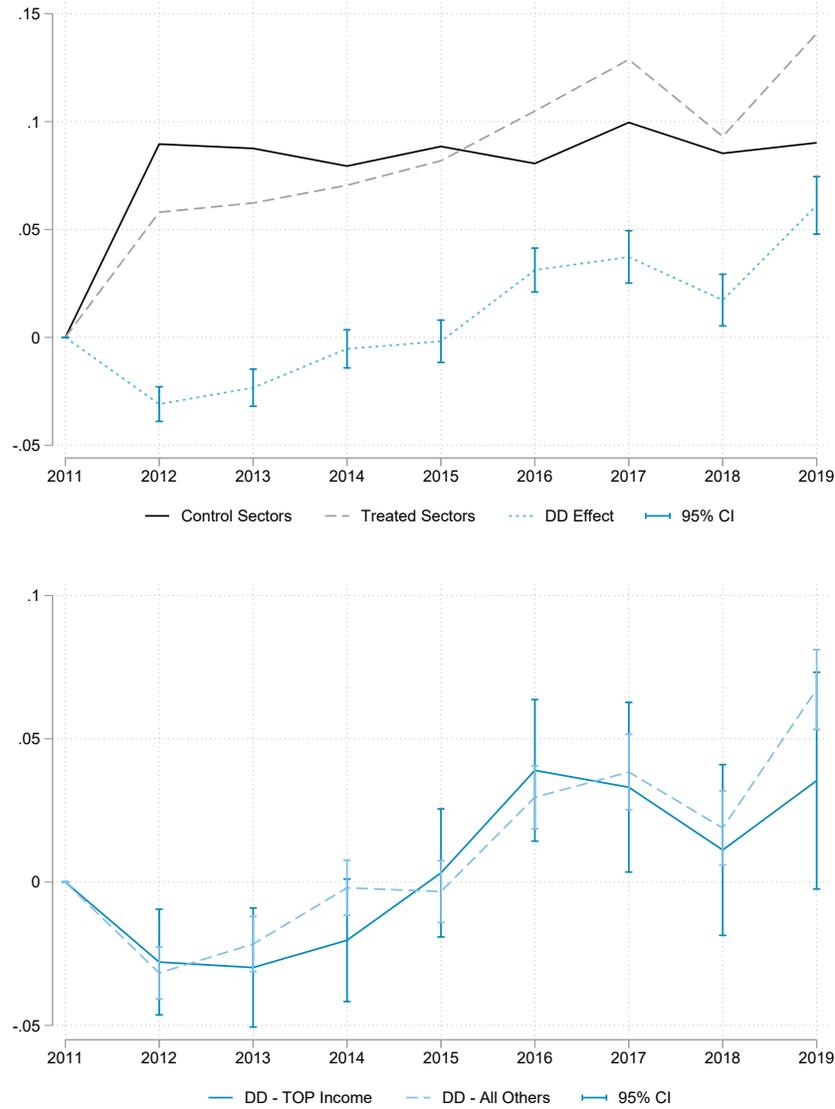
This figure is estimated on the sample of incumbents, which we define as workers who were employed in a treated or control firm in 2011. The outcome variables are the ratio of variable pay over total pay in 2011 (top graph) and the logarithm of fixed pay (bottom graph). The figures plot the yearly coefficients from equation (1) for both treated and control employees, represented by the dashed gray line and the solid black line respectively. It also shows the dynamic difference-in-difference coefficients and 95% confidence intervals from equation (2), represented by the dotted blue line. Standard errors are clustered at the job-spell level.

Figure 6: Log total pay: all employees (Top); top-earners vs non top-earners (Bottom)



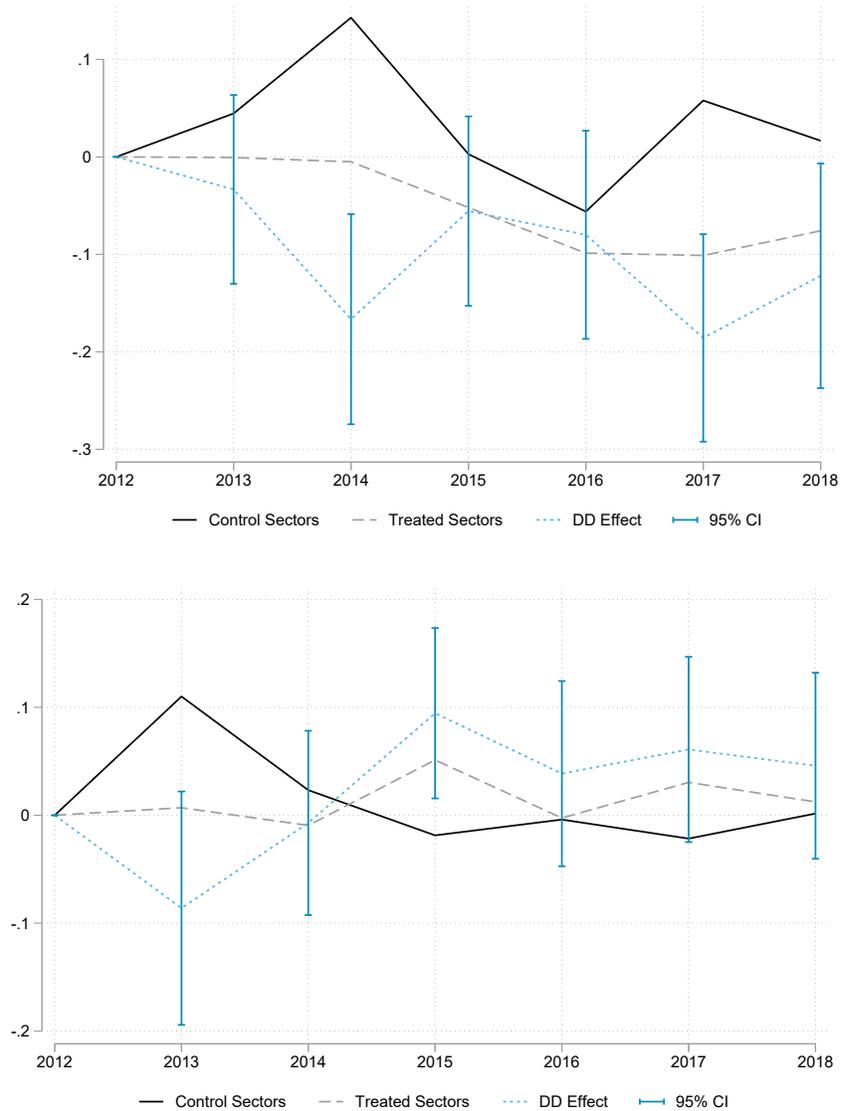
This figure is estimated on the sample of incumbents, which we define as workers who were employed in a treated or control firm in 2011. The outcome variable is the logarithm of total pay. The top graph plots the yearly coefficients from equation (1) for both treated and control employees, represented by the dashed gray line and the solid black line respectively. It also shows the dynamic difference-in-difference coefficients and 95% confidence intervals from equation (2), represented by the dotted blue line. In the bottom graph, difference-in-difference coefficients are showed separately for top-earners, defined as employees who before 2012 were at least once in top 10 percentile of their firm salary distribution, and for all other employees. Standard errors are clustered at the job-spell level.

Figure 7: Separation rate: all employees (Top); top-earners vs non top-earners (Bottom)



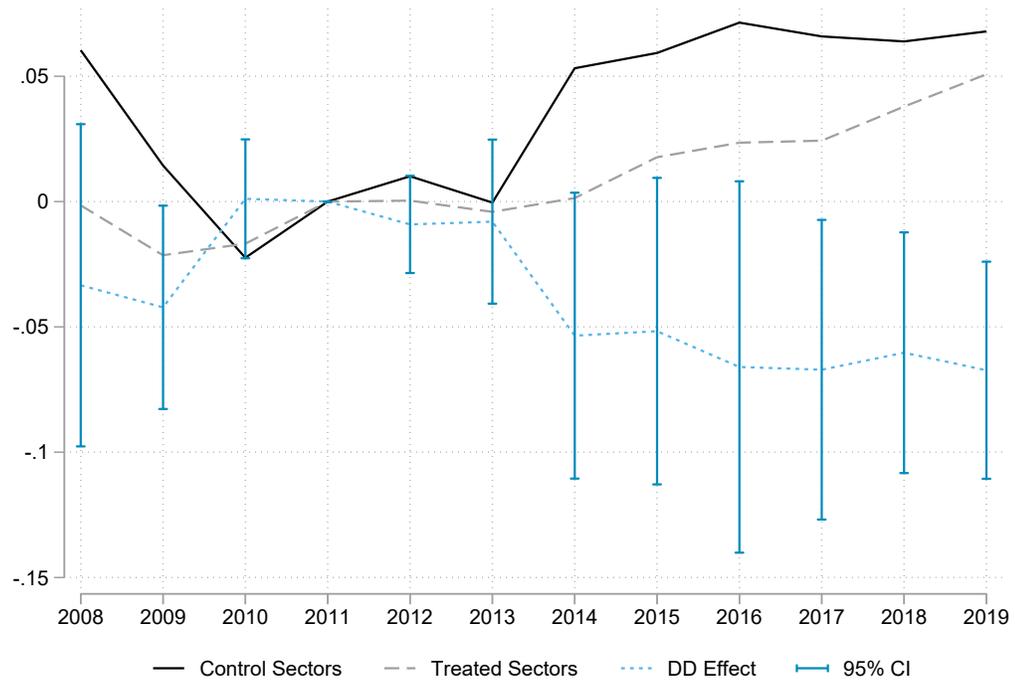
This figure is estimated on the sample of incumbents, defined as the group of workers employed in a treated or control firm in 2011. The outcome variable is a dummy equal to one if in that year the employee leaves the firm. The top figure plots the yearly coefficients from equation (1) for both treated and control employees, represented by the dashed gray line and the solid black line respectively. It also shows the dynamic difference-in-difference coefficients and 95% confidence intervals from equation (2), represented by the dotted blue line. In the bottom graph, difference-in-difference coefficients are shown separately for top-earners, defined as employees who, before 2012, were at least once in top 10 percentile of the salary distribution within their firm, and for all other employees. Standard errors are clustered at the job-spell level.

Figure 8: Probability of: staying in finance (Top); changing treatment status (Bottom)



This top figure is estimated on the sample of incumbent employees that in each year leave their firm and that are re-employed in a different firm within the following 365 days. The outcome variable is a dummy equal to one if the workers' following job is within the finance sector and equal to zero otherwise. The bottom graph is estimated only on the group of employees who remain in finance once they have left the firm. The outcome variable for this graph is defined as a dummy variable equal to one if the worker changes treatment status, i.e. goes from the treatment groups to a control group or vice-versa, and equal to zero otherwise. The estimates of both figures come from a cross-sectional regression with standard errors clustered at the job-spell level. Because the analysis is estimated on the sample of incumbents, i.e. employees employed in a treated or control firm in 2011, both outcomes are not-defined before 2011, and therefore we use as reference 2012. Also, because we do not observe employees for the full year of 2019, the analysis stops in 2018.

Figure 9: Hiring rate



This figure is estimated using the full sample of employees working in treated or control firms between 2008 and 2019. The outcome variable is defined as the firm-level ratio between the number of people joining a firm in a given year over the total number of employees in 2011. The figure plots the yearly coefficients for both treated and control employees, represented by the dashed gray line and the solid black line respectively. It also shows the dynamic difference-in-difference coefficients and 95% confidence intervals, represented by the dotted blue line. Standard errors are clustered at the firm level.

Tables

Table 1: Sectoral representation of the treatment and control groups

Sectoral composition (2011)	Treated	Control
General banks	88.4%	
Other banks <i>(cooperative, saving, stock credit)</i>	11.6%	
Investment funds <i>(in financial assets, real estate, with restricted entry)</i>		41.5%
Participation companies		23.7%
Risk and damage evaluation		16.9%
Financial holdings		7.6%
Management of pension funds		5.9%
Other services <i>(in insurance, guarantee funding, market makers)</i>		4.2%

This Table shows the share of firms operating within the different treated and control sectors included in our analysis. Sectors are defined at the 5-digit level following the Dutch Industry Classification (Standaard Bedrijfsindeling; SBI).

Table 2: Descriptive statistics

2011 Values	Treated	Control
Compensation		
Variable pay	13,981	21,390
Var pay if non-zero	14,991	23,810
Fixed pay	78,756	71,399
Total pay	92,737	92,789
Ratio	13.0%	17.9%
Ratio 90th pct value	30.8%	41.4%
% Ratio above 20% cap	16.9%	20.0%
Workforce characteristics		
% Female	33.2%	27.9%
Average Age	43.2	41.3
% Low-education	5.2%	6.1%
% Mid-education	32.8%	36.6%
% High-education	62.0%	57.3%
Firm size	1322	47
N of firms	43	118

This Table shows unweighed average values of employees compensation and workforce composition at the firm-level for the year 2011. The different components of pay are defined as in section 4.2. *Var pay if non-zero* measure the average value of variable pay excluding employees who didn't receive any variable pay in that year. *Ratio* indicates the average ratio between variable and fixed pay, while *Ratio 90th pct value* indicates its 90th percentile value. *% Ratio above 20% cap* indicates the share of employees whose ratio is above 20%, which is the maximum value imposed by the policy. Education is categorized into lower, secondary, and tertiary education following the International Standard Classification of Education.

Table 3: Main industries of joiners and leavers in the period 2008-2011

4-digit Industry	Treated		Control	
	Join from	Go to	Join from	Go to
Temporary Employment (7820)	26.4%	13.1%	13.7%	10.8%
Banks (6419) *	10.7%	9.0%		
Computer programming and consulatncy activities (6201, 6202)	4.4%	1.2%		
Non-life insurance (6512) *	2.9%	3.0%	4.8%	3.5%
Business consultancy activities (7022)	2.6%	3.4%	2.7%	
Accounting, and auditing activities; tax consultancy (6290)	1.7%	1.9%		
Activities of insurance agents and brokers (6622) *	1.5%			
General public administration activities (8411)		1.6%		
Totals	15,002	16,224	3,566	3,021

This Table is computed on the sample of individuals who join or leave the treated and control industries between 2008 and 2011. The Table reports 4-digit industries for which we observe at least 100 workers join from or go to. The last row of the Table displays the total number of individuals who leave or join the treatment and control group during this period. 4-digit sectors codes followed by an asterisk (*) are part of the financial industry.

Appendix

A1 Treated and control sectors and workers flows

In our analysis treated and control sectors are defined within the financial industry using 5-digit SBI codes. In particular, we follow the classification in Weitzel et al. [2018], who, working together with the Dutch Ministry of Finance, operated a distinction between bonus-cap industries and non-bonus cap industries. Table A1 builds on Weitzel et al. [2018] and displays a conceptual categorization of sectors depending both on whether they were affected by the Wbfo bonus-cap policy and on the type of industry.¹ Note that, as explained in section 4.1, our main analysis includes in the treatment and control group only the category of sectors defined as *Banks* and *Other control sectors*. This sample selection is motivated by the fact that they are the only two groups of sectors that, with the exception of the Wbfo, fall under exactly the same regulations. This ensures that our analysis estimates the effect of the bonus cap. The table also shows the total number of incumbents belonging to each category of sectors in 2011.

A2 Regulatory framework

This section includes Table A2, which summarises the main policies regulating pay schemes in the financial sector introduced at the European level and in the Netherlands starting from the outbreak of the financial crisis until the introduction of the Wbfo. The table provides information regarding the time-line of the policies introduction, the main regulatory requirements, and the categories of sectors and employees affected by them.

¹The categorization by Weitzel et al. [2018] excludes certain financial industries because it is unclear whether they are covered or not by the Wbfo. The excluded sectors are: Mortgage banks and building funds (64921), Municipal credit banks and commercial finance companies (64922), Administration of financial markets (66110), Mortgage, credit and currency brokers, bank and savings bank agencies (66193). Thus we also exclude these sectors from the analysis. Moreover, we also exclude Central banking (SBI code 64110) and Trust offices (SBI code 66191) because of their very different regulatory nature. Also, all sectors in Weitzel et al. [2018] for which we do not have any observations are automatically excluded.

In this section we also give more details regarding the coverage of the Wbfo. In particular, while the Wbfo generally holds for all employees working in the treated sectors, there are few exceptions. Namely, it does not cover: (1) employees in the Netherlands who are not fully covered by a collective labour agreement. For this group of workers variable remuneration is capped at 100% of fixed remuneration, providing that the average variable remuneration of the total group of employees not covered by a collective labour agreement does not exceed 20%. (2) For employees working more than 50% of total hours abroad but in the European Economic Area (EEA) the bonus cap is set at 100% while for those working outside the EEA is set at 200%. (3) For employees working in branch offices of credit institutions or investment firms that have their headquarters in an EU Member State, the applicable bonus cap follows the CRD IV provisions. (4) The Wbfo does not hold for employees working at investment firms that do business solely for themselves with own equity and capital, have no external clients and are a local undertaking. While unfortunately we are not able to identify employees not covered by collective agreements and hours worked abroad, a report by the Dutch Ministry of Finances reports that less than 1% of employees of Dutch banks falls under exception (1) or (2). Regarding exception (3), our data does not allow us to separately identify branches of European firms. Finally, it is likely that we are excluding employees falling under exception (4) because we only consider firms with at least 10 employees.

Tables

Table A1: All treated and control sectors

Groups	Sectors affected by the bonus-cap	Sectors not affected by the bonus-cap
<p>Banks N of employees in 2011: 55,130</p>	<p>Copperative banks (64191); Stock credit companies (64192); Saving banks (64193); General banks (64194)</p>	
<p>Insurances N of employees in 2011: 38,342</p>	<p>Life insurance (65111); Insurance in-kind (65112), Non-life insurance, including health insurance (65120); Reinsurance (65200)</p>	
<p>Residual category N of employees in 2011: 7,762</p>	<p>Financial leasing (64910); Bill-brokers and other credit granting n.e.c (64924); Stockbrokers, investment consultants etc. (66120); Insurance agents (66220); Fund management (66300)</p>	
<p>Pension funds N of employees in 2011: 4,761</p>		<p>Pension funds and saving funds (65301); Corporate pension funding and saving funds (65302); Pension funding for specific professional groups (65303); Other pension funding (65309)</p>
<p>Other control sectors N of employees in 2011: 5,181</p>		<p>Financial holdings (64200), Investment funds in financial assets (64301); Investment funds in real estate (64302); Investment funds with restricted entry (64303); Participation companies (64923); Market makers (66192); Risk and damage evaluation (66210); Management of pension funds (66292); Guarantee funding (66293); Other services related to insurance and pension funding (66299)</p>

Table A2: Summary of regulations on remuneration in the financial sector prior to Wbfo

When	What	Who
2009	EC Recommendations General principles on remunerations, not legally binding	Identified staff
<p>In April 2009, the European Commission published two recommendations concerning remuneration policies in the financial services sector: Recommendation 2009/384/EC and Recommendation 2009/385/EC</p>	<p>The Recommendation sets out general principles regarding remuneration policies that apply to all financial undertakings having their registered office in a European Union (EU) Member State.¹ The general goal of the two recommendations is to establish, implement and maintain a remuneration policy which is consistent with long-term interests of the financial undertaking, promotes effective risk management and does not induce excessive risk taking. The principles of the remuneration policies focus on structure², performance measures³ and governance⁴. The EC Recommendation 384 and 385 are recommendations without any legal base.</p>	<p>The principles contained in the 384 Recommendation apply to the remuneration of those category of staff whose professional activities have a material impact on the risk profile of the financial undertaking, whereas Recommendation 385 is specific to directors' remuneration only.</p>
2011	EC Capital Requirements Directive III (CRD III) Only a limited amount of variable pay is payable upfront and in cash	Identified staff
<p>The Directive 2010/76/EU on capital requirements and the supervisory review of remuneration policies came into effect on January 1, 2011, complementing the EC recommendations on remuneration policies of April 2009⁵.</p>	<p>The CRD III regulation includes rules on remuneration policies concerning the governance, risk alignment and transparency in credit institutions and investment firms⁶. The main implication of CRD III for variable remuneration is that this type of remuneration should affect incentives such that it serves the long-term interests of the firm. The four main implications are:</p> <ol style="list-style-type: none"> 1) Guaranteed variable remuneration should not be allowed; 2) A substantial portion of variable pay, at least 40 to 60%, should be deferred over a period of at least three to five years; 3) A substantial portion of variable pay, at least 50%, should be paid out as non-cash financial instruments, i.e. in-kind pay. This pay-out in financial instruments includes shares or share-linked instruments of the credit institution or investment firm; 4) Through malus or clawback arrangements the variable pay can be reduced upon negative performances. 	<p>The CRD III affects employees who play a key role in the firm's risk profile, referred to as <i>identified staff</i>, including executives and senior staff responsible for management or independent control functions.</p>

When	What	Who
NL Regulation on Sound Remuneration Policies (Rbb Wft 2011)		
2011	Expands CRD III to additional sectors	Identified staff
<p>The Regulation on Sound Remuneration Policies (in Dutch: Regeling beheerst belongingsbeleid (Rbb)) falls under the Financial Supervision Act 2011 (in Dutch: Wet nancieel toezicht (Wft)) and was introduced by DNB. It builds on the CRD III and came into effect on January 1, 2011.</p>	<p>The main component of Rbb Wft 2011 is having a wider scope than CRD III, affecting, besides credit institutions and investment firms, also other firms in the financial economic sector, including clearing institutions, special purpose reinsurance vehicles, premium-based pension providers and insurers. Note that pension funds do not fall under the Rbb Wft 2011.</p>	<p>Rbb Wft 2011 affects identified staff only.</p>
NL Bonus Prohibition Act		
2012	Blocks bonus payment for state-supported firms	Board Members
<p>The Bonus Prohibition Act (in Dutch: Wet bonusverbod staatsgesteunde ondernemingen) was announced and came into effect in June 2012.</p>	<p>The Bonus Prohibition Act of 2012 for state-supported financial undertakings stipulates that financial undertakings that received help from the central government in the aftermath of the Great Financial Crisis - from 2012 onwards - were not allowed to award variable remuneration to board members.</p>	<p>The Bonus Prohibition Act affects only Board Members⁸.</p>
EC Capital Requirements Directive IV (CRD IV)		
2014	100% Bonus Cap	Identified staff
<p>While the proposal for this directive was published already in 2011. The European Commission published Directive 2013/36/EU, CRD IV, in the Official Journal of the European Union on the 30th of September 2013, replacing CRD III and coming into force on January 1, 2014.</p>	<p>The overarching goal of CRD IV is to strengthen the resilience of the EU banking sector, addressing the implementation of the Basel III capital rules⁸. Therefore, while the main role of CRD IV was to implement in the EU the Basel III reforms, which include amendments to the definition of capital and counterparty credit risk and the introduction of a leverage ratio and liquidity requirements, CRD IV was also used to introduce non-Basel III reforms, such as the cap on bankers' bonuses⁹. CRD IV stipulates that the maximum ratio of variable pay to fixed pay is 100%¹⁰. This can be increased to 200% with the approval of shareholders¹¹. Member states are allowed to set a lower maximum ratio of variable pay to fixed pay. The entities impacted by this Directive are, broadly speaking, credit institutions and investment firms within the Markets in Financial Instruments Directive (MiFID) - this includes all retail and investment banks, but also other forms of investment firms such as hedge funds.</p>	<p>The bonus cap rules only applies to the group of identified staff, that is employees whose professional activities have a material impact on the risk profile of the firm.</p>

When	What	Who
2014	NL Regulation on Sound Remuneration Policies (Rbb Wft 2014) Expands CRD VI to additional sectors	Identified staff

The Regulation on Sound Remuneration Policies under the Financial Supervision Act, Rbb Wft 2014, amends the Rbb Wft 2011 and came into effect on August 1, 2014. Similar to the Rbb Wft 2011 and CRD III, the Rbb Wft 2014 is based on the CRD IV and extend its rules not only to credit institutions and investment firms but also to clearing institutions, special purpose reinsurance vehicles, premium-based pension providers and insurers. Rbb Wft 2014 affects identified staff only.

¹ Financial undertakings are defined as performing any of the following business activities on a professional basis: (a) accepting deposits and other repayable funds; (b) providing investment services; (c) providing insurance services; and (d) activities similar to those set out in point (a), (b) or (c). A financial undertaking therefore includes credit institutions, investment firms, insurance undertakings and pension funds.

² In terms of structure of the remuneration policy, the recommendation is to have an appropriate balance of fixed remuneration and variable remuneration and to set a maximum limit on the variable remuneration component.

³ Concerning performance measures, it is recommended that if remuneration is performance related, the assessment of performance should be set in a multi-year framework to link it to longer term performance and that the actual payment of bonuses is deferred over several years spreading it over the business cycle of the company.

⁴ Regarding governance, it is recommended that the procedures for determining remuneration should be clear and internally transparent, and the general principles of the remuneration policy should be established by the (supervisory) board of the company

⁵ CRD III builds on CRD II and earlier directives, which do not contain rules on remuneration policies.

⁶ Credit institutions are defined as undertakings whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account. Investment firms are referred to as any legal person whose regular occupation or business is the provision of one or more investment services to third parties and/or performance of one or more investment activities on a professional basis.

⁷ Differently from CRD IV, the Basel III regulatory framework on the maintenance of capital conservation and countercyclical capital buffers is not a law but instead a voluntary set of internationally agreed standards developed by supervisors and central banks.

⁸ The Wbfo amends the Bonus Prohibition Act by increasing its coverage to the whole group of identified staff. This is the only rule of Wbfo that does not hold for all employees but only for identified staff.