The impact of economic freedom on the gender pay gap: evidence from a survey of UK households

Abstract

Purpose-Using survey datasets, this work explores the impact of economic freedom on the gender pay gap in the UK.

Design/methodology/approach-The analysis combines Economic Freedom of the World data with the Understanding Society (USoc) Microdata series

Findings-The results document that economic freedom positively affects the gender pay gap. When the components of the index are considered, the findings indicate different effects of various types of policy, i.e. less government spending, stronger trade liberalization conditions and levels of corruption lead to higher gaps; stronger legal and property rights and a sounder money system have no impact on the gap. Moreover, a stronger impact in the manufacturing industry, part-time workers and those who work in the non-London regions is observed.

Practical implications-The findings imply that reductions to government spending programmes can potentially aggravate the gap in hourly wages paid between males and females and should, therefore, be implemented. It may be also possible to provide females the training or education necessary to effectively compete in the workforce, before eliminating any spending programme they rely on.

Keywords: Economic freedom; Gender pay gap; UK; Survey data

JEL Classification: J31; C33

1. Introduction

There is an extensive literature examining the gender pay gap in the case of the U.S. (Heinz and Normann, 2016; Mandel and Semyonov, 2014) offering certain competing hypotheses that attempt to explain the presence of this gap. A strand of the literature argues that the differential is a natural product of experience and self-selection. One

theory implies that differences in human capital formation play a significant role in explaining the gap (Polachek, 1981), while the relative weighting of income in utility functions across genders contributes as well (Forton, 2008). Differences in how females negotiate wages (Schwieren, 2012) or the type of compensation received (e.g., performance based-pay) might also play a role (McGee et al., 2015). Another strand argues that the income discrepancy is unrelated to gender characteristics and instead is a product of discrimination (Lundberg and Startz, 1983). Moreover, Card et al. (2016) focus on sorting and bargaining as drivers of gender income differences, while Adda et al. (2017) show that losses in skills associated with career interruptions and sorting are important drivers of the gender gap and relate to fertility decisions. Blau and Kahn (2017) find that the three most important factors explaining the current gender wage gap in the US are occupation, industry and experience.

Another factor that may influence the gender pay gap is government policy and regulation. Zweimüller et al. (2008) find that 'market oriented' countries have lower gender wage gaps. Stroup (2008) also finds that market economies are more beneficial to gender equality. The intuition is that 'market oriented' economies promote equal opportunities for all by removing barriers to entry, which allows females to have access to jobs that otherwise may not have been available to them.

In terms of the association between governmental policies and gender pay gaps, the literature has recommended certain mechanisms that potentially explain this link. More specifically, legal mechanisms aiming at minimum wage levels seem to be crucial for a number of reasons, including most notably that females are more likely than males to be concentrated in minimum wage jobs and in sectors where there is limited scope for collective bargaining (Rubery and Grimshaw, 2011). Minimum wage policies have long been recognized as a means to lift workers out of poverty, and have also been shown to protect female's income and close gender pay gaps. Bearing in mind the potential limitations of such initiatives, three issues are salient when evaluating the role of minimum wage policies in gender equality: i) the way the minimum wage is set, ii) the level at which the minimum wage is set, and iii) the scope of the minimum wage legislation with respect to the coverage of types of workers or organisations. In this respect, legal rights to freedom of association and collective bargaining are essential tools for empowering females and securing their place in information sharing, consultations and negotiations (Gernigon et al., 2000).

Another type of such mechanisms is one of the most important features of the gendered division of labour at present associated with the disproportionately high number of females in atypical work compared with males: although such work permits them to remain in the labour market, it can have a detrimental impact on their pay, career development, promotion prospects and pensions (Ashiagbor, 2006). Forms of work previously regarded as atypical, including part-time work, fixed-term work, agency work, and home working, are now occupying a greater role in the public policy discourse on employment regulation.

Finally, there are divergent views on the impact of trade unions and collective bargaining as mechanisms that have favourable or detrimental impacts on the gender pay gap. In particular, there is a growing body of evidence that labour markets with strong systems of collective regulation are more likely to deliver gender equality than those where collective regulation is weak and employers in charge of wage setting. Hayter and Weinberg (2011) consider these 'institutionalists', who recognize that institutions can usefully advance multiple social and economic objectives in contrast to the 'distortionists'. Mandel and Shalev (2009) also explore gender and class equality issues across 17 advanced economies and conclude that policies that reduce class inequalities have favourable impacts on the aggregate gender pay gap.

Overall, collective regulation can be both a source of reducing gender pay inequalities and establishing and reinforcing gender pay inequalities. The now extensive literature has documented the importance for gender equality of institutional complementarity between social welfare and gender policies on the one hand, and employment organisation on the other (Stier et al., 2001). Although different regime types are likely to favour one group of females relative to another, or, females vs males, this does not mean that action cannot be taken to try to remedy the particular form of gender pay inequality that dominates in that particular institutional environment.

The goal of this work is to examine, for the first time in the literature, the relationship between government policies and the gender pay gap in the U.K. The analysis uses the methodology by Giedeman et al. (2015) who study government's effects on racial income gaps. To measure government policy, the analysis uses the Economic Freedom of the World index (EFW), interpreted as a measure of 'market

orientation,'; it is a measure of regulations and policies across the country. In this context, a higher score in the index represents an increased reliance on individual decision making and less governmentally imposed barriers to entry. For an extensive review of studies using the EFW index, see Hall and Lawson (2014). The intuition behind this area of research is that the presence of economic freedom increases the likelihood of voluntary transactions that are wealth creating. The key question relevant to this work is whether this positive association between economic freedom and income differs across gender, and thus may either exacerbate or mitigate the gender income gap. There are also reasons to suspect differential impacts across components, as was found by Zweimüller et al. (2008) in their cross-country analysis.

Government spending may also have a differing effect across each gender. The level of government spending is thought to be a function of numerous factors, including citizen demand (Black, 1958). Lott and Kenny (1999) hypothesize that the increased government spending occurring in the 1930s is partly attributable to females being granted the right to vote, as they were more likely to vote in favour of wealth transfers than males. This suggests government spending programmes may benefit females more than males. Consequently, a reduction in the government spending component of the index may be associated with an increase in payment for females, and a decrease in income for males.

Becker (1958) argues that if employers are discriminating, then these individuals do not behave in a profit-maximizing manner. Due to this, non-discriminating firms will enter the market and earn higher profits. Over time, employers who discriminate against any group, including females, are ultimately pushed out of the market by competitive forces. Previous empirical studies have tested this hypothesis in specific markets (Hellerstein et al., 2002). Other research has shown that increased globalization, and, thus, increased competition from overseas competitors, further helps to decrease the gender wage gap (Autor et al., 2013; Connolly, 2017). Alternatively, a less regulated market could cause the gender wage gap to increase. For example, assume that there are no minimum wage laws. Since females are typically over-represented at the lower end of the wage distribution, it is possible that these laws help to reduce the gender wage gap. Similarly, if higher levels of government spending allow more services to be provided to females, such as day care and other forms of child assistance, this could differentially affect females if the

woman is more likely to stay home and take care of the children than their partner. Zweimüller et al. (2008) consider these issues in a cross-country model, finding that countries with more 'market oriented' government policies have a lower gender wage gap.

The analysis combines the EFW data with the Understanding Society (USoc) Microdata series to determine the association between economic freedom, and its respective components, and the gap in pay between males and females in the U.K. It also uses variables in the series as controls, including age and education, as well as year fixed effects. Given the years of data available in both datasets, the analysis generates a panel, ranging from 2009 to 2016. When looking at economic freedom overall, the findings show that while an increase in freedom positively affects the pay of both males and females, its positive effect on males is larger in magnitude. Moreover, the disaggregated results highlight that females and males are different in ways that policymakers should consider. For example, the findings show that reductions in government expenditure programmes are associated with increases in the pay of both males and females. Thus, it seems that females may be also dependent on government spending programmes, implying that changing these policies needs to be done with care.

2. Data

The analysis makes use of two datasets. The first is the Understanding Society (USoc) Microdata to determine the association between economic freedom, or its respective components, and the gap in wage pay between males and females in the U.K. The USoc database is provided by the University of Essex, the Institute for Social and Economic Research, covering the waves 2003-2015. The database is a longitudinal annual survey of families with all individuals across all waves remaining in the panel. All members of the household aged 16 and above are interviewed annually, while a set of demographics, educational, and labour-market information is also recorded, including historical data on working hours and the socio-economic background. Information also reports measures of hours of work for those in work. The database includes 23,909 respondents, while it considers three education groups: GCSEs, representing those who leave education at 16 without completing high school education, A-levels, representing those with a high-school diploma or equivalent, and

Degree, representing those who graduate from college (3-year degree). The largest group is that with lower education attainment, and this is true for both males and females. Only about 13% of our sample has a degree. Individuals who are working at the time of the interview are asked to report their occupation and industry, and these are classified using standard classification codes, SOC and SIC, respectively. For comparability over time, we converted all classifications into the most recent ones, SOC2010 (3-digit) and SIC2007 (2-digit). Finally, the marital status size variable is defined as a dummy variable that takes one for individuals with one child, two with two children and three with three or more children. Given the years of data available in both datasets, the analysis generates a panel, ranging from 2009 to 2016. Table I presents summary statistics of these data.

The second primary data set we draw upon is the Economic Freedom of the World (EFW) index. This index measures the restrictions that are put in place by governments. The index uses a variety of data from government and non-government sources to assemble it, which is based on a 0 to 10 scale, with 10 being the most economically free. The index measure the degree of economic freedom in five broad areas: **Size of Government**: government spending, taxation, and the size of government-controlled enterprises increase, government decision-making is substituted for individual choice and economic freedom is reduced, **Legal System and Property Rights**: protection of persons and their rightfully acquired property is a central element of both economic freedom and civil society, **Sound Money**: inflation erodes the value of rightfully earned wages and savings and sound money is thus essential to protect property rights; when inflation is not only high but also volatile, it becomes difficult for individuals to plan for the future and thus use economic freedom effectively, **Freedom to Trade Internationally**: freedom to exchange is essential to economic freedom, which is reduced when freedom to exchange does not include businesses and individuals in other nations, and **Regulation**: governments not only use a number of tools to limit the right to exchange internationally, they may also develop onerous regulations that limit the right to exchange, gain credit, hire or work for whom you wish, establish minimum wage laws, or freely operate your business. We observe more variance when examining the respective components in comparison to variation found in the overall index. The size of government index exhibits the greatest variation and the legal system and property rights index is the most stable.

[Table I here]

3. Empirical analysis

Following Hoover et al. (2015), the analysis estimates the effect of higher levels of economic freedom on the log of hourly pay, separately for males and females:

$$\log(\text{hourly earnings})_{it} = \sum_{j=0}^{p} \beta_1 \log(\text{EconFreedom}_{t-j}) + \beta_2 X_{it} + \gamma_{1i} + \gamma_{2t} + \varepsilon_{it} \quad (1)$$

where log(hourly earnings) represents the log of the hourly earnings for males or females i in year t, while we also consider the difference in the log of hourly earnings between males and females (i.e., gender pay gap). The primary independent variable of interest is the log of EconFreedom, which is the EFW index. The baseline regressions include the aggregate index only. Subsequent regressions include the five major components of the EFW index. X represents other control variables, such as age, education and marital status. Finally, γ_{1i} and γ_{2t} show individual and time fixed effects, respectively, and ε_{it} is the error term. The empirical analysis is carried out through the panel GMM approach, recommended by Blundell and Bond (1998).

The results are presented in Tables II through VII. Table II includes results using the overall EFW index, with Tables III through VII decomposing the index into its five components. The estimates of the control variables are reported only in Table II, while they are dropped in the other tables due to space constraints (however, they are available upon request). The first column of each table shows the results for the male only sample, the second column shows the results for the female only sample, and the final column shows the results for the difference between male and female hourly earnings, which can be interpreted as the gender pay gap. As we see in Table II, higher levels of economic freedom are contemporaneously associated with higher hourly earnings for both males and females. Both coefficients are statistically significant at the 1% level. However, the association is larger for males than for females, leading to an overall positive association with differences in hourly earnings that is statistically significant. The same is also true with respect to the lagged one index, indicating the dynamic impact of economic freedom on the gender pay gap. Given that both variables under consideration are expressed in logs, the economic

interpretation illustrates that an 1% contemporaneous increase in the EFW index leads to a 0.736% increase in males' earnings, 0.688% in females earning, and a 0.665% increase in the pay gap.

Overall, these results suggest that while economic freedom may be beneficial for both males and females, it has a larger effect on males and, therefore, has a positive effect on the gender pay gap. Intuitively, this basic result may stem from the fact that the benefits of increased economic freedom often comes in the form of entrepreneurial activity (Nyström 2008) and the entrepreneurship rates between males and females are historically different (Estrin and Mickiewicz, 2011).

In terms of the remaining control variables, higher working ages seem to positively contribute to the gender pay gap, while although education positively contributes to the wages of both genders, it contributes more to males than to females, and therefore, widens the gender pay gap. In other words, being older and more educated indicates an opportunity of having acquired greater amounts of human capital, which justifies the positive effect on wage pay in both genders, although human capital in males exceeds that of females; thus, these differences in the market value of human capital seem to lead to specialization whereby the person (males) with the greater market earnings potential receives higher pay, while females have lower incentives in the labour market. Finally, the marital status also seems to exert a positive, albeit a weakly significant, impact on the gender pay gap, indicating that married males affect the gap more than married females. This outcome receives support from the literature (Jordan et al., 2012). Certain studies have found evidence of the 'motherhood penalty' hypothesis, i.e. females who are mothers are perceived as less competent and less committed to their organizations compared with positive stereotypes of fathers who are viewed as more committed to their organizations (King, 2008).

Certain diagnostic tests are reported at the bottom of Table II. It is evident that both the test for AR(2) of disturbances and the difference-in-Hansen tests fail to reject the respective nulls. Thus, these tests support the validity of the instruments used, while difference-in-Hansen tests imply the exogeneity of the instruments employed. In the estimation process, eight instruments (i.e., a constant and seven lags of hourly earnings) have been used.

[Table II here]

In the following part of the empirical analysis, we estimate the link between the economic freedom index and the gender pay gap with a different sample period by using the period prior and after the global financial crisis in 2008. The results, reported in Table IIa, provide solid empirical evidence that the link has got stronger in the regime after the crisis, implying the necessity of interventions through institutional strengthening of the business environment.

[Table IIa here]

We next explore how the main index components affect the pay of males and females differently in Tables III through VII. The results in Table III suggest that less government spending is associated with increases in the pay gap. This finding could be due to the fact that females may rely on government assistance, in terms of jobs and aid programmes, which has a negative effect on their earnings. In addition, females' relative skills and the degree of discrimination they face can be affected by equal employment opportunity laws and regulations, as well as by government policies directed at the difficulties of combining work and family. The presence of government programmes makes labour appear as a non-commodity insofar as it substitutes for wages, either directly by means of income transfers or indirectly by providing free or subsidized goods and services. The key effect of this process is that it increases workers' reservation wages. In addition, high levels of this process tend to stifle the growth of low-wage jobs in the private service sector (Iversen, 2005). This sectoral dynamic also has the effect of lowering class inequality. Finally, a welfare state reduces intraclass inequality, since in the absence of uniform social rights, part-time and intermittent workers are more vulnerable to wage discrimination. Each one of these effects powerfully influences the gender pay gap, since workers in the overlapping categories of low-wage, service and part-time employment are disproportionately female.

By contrast, facilitation of females' employment by adjusting working time to household demands reduces their motivation to compete with males for lucrative but demanding jobs and increases the motivation of private employers to practice statistical discrimination against females. Such discrimination is fed by the limited selectivity of female workers under conditions of high female labour force

participation, and by their eligibility for social rights that are rarely used by males and which are perceived as lowering females' commitment to work. A one percent decrease in government size is associated with approximately a 0.70 percent point increase in the pay gap.

[Table III here]

The results in Table IV suggest that a stronger legal and property rights system leads to increases in hourly wages paid for both females and males. The effect of this increase is slightly larger in magnitude for females. Thus, it is likely that such a stronger legal system and property rights has a non-significant effect on the pay gap. The findings seem to receive empirical support from the literature (Geddes and Lueck, 2002; Fernandez, 2009).

[Table IV here]

Next, the sub-component of sound money, i.e. money supply, inflation, freedom to own foreign currency accounts, is directly related to the extent of competition on product markets. For instance, low inflation rates and low money supply growth rates are expected to have an effect on the degree of competition in the economy. In turn, according to Becker's (1957) model of employer taste discrimination, increased competition may impact on the pay gap by affecting employers' ability to discriminate against females. Employers that pay male employees a wage premium in order to indulge discriminatory tastes, thus accruing additional costs, are unable to compete with others who do not have such preferences as the opening of the product market to new entrants forces a move towards more efficient production. Therefore, we get a negative correlation between the level of product market competition and employer taste discrimination, enforcing the positive role of competition in achieving equality in gender pays. Table V clearly illustrates that a sounder money environment increases hourly wages paid of both genders, with the impact on the gap being again statistically insignificant.

[Table V here]

In reality, trade liberalization is a multifaceted phenomenon; it is a policy package, consisting most importantly of reduction in tariff rates accompanied by freer flow of foreign capital. Both these policies are likely to have concurrent effects on

gender pay gap. The widening pay gap in some countries mainly due to fall in female wages is often attributed to the informalisation of labour and lowering of females' bargaining power. Since females concentrate in labour-intensive manufacturing firms and services, their relative bargaining power does not rise even as labour demand increases due to globalisation, or due to the potential threat of relocation of firms to lower wage sites. In contrast, males working mainly in non-tradables and capital-intensive industries have more bargaining power to demand higher wages (Braunstein and Brenner, 2007).

There also exist a plethora of evidence that documents persistent and even increasing gender pay gaps as a consequence of liberalization (Menon and Rodgers, 2009). Table VI considers the subcomponent of the freedom to trade internationally. The results clearly show that more freedom to trade internationally clearly benefits both genders in terms of hourly wages, but the effect seems to be substantially stronger for males, while it also leads to a higher, and statistically significant, pay gap. The estimates signify that an 1% increase of the sub-index leads to an 0.51% increase in the gender pay gap.

[Table VI here]

The link between corruption and gender pay gaps has not been explicitly explored in the literature. This link touches the strand of the literature that has investigated the impact of corruption on the wage gap between the skilled and the unskilled, while skilled and unskilled workers are engaged in both production and corruption related activities (Marjit and Mandal, 2008; Marjit and Mukherjee, 2009).

The results of this literature document that wage gaps can move up or down with corruption depending on which sector loses less when capital cost increases with an increase in return to capital. The impact on wages depends on the factor intensity rankings within the 'productive', as well as the 'corruptive' sectors. Lowering the degree of corruption reduces the size of the corruption sector, though wage-distribution can go either way. This part of the analysis also relates to the literature on earning differentials between males and females and between public sector gender gap and private sector gender gap, which is very limited as well. Most studies find that the male/female earnings differential is larger in the private sector (Rosenfeld and Kalleberg, 1998). Panizza (2001) finds that while corruption and public sector

efficiency are not correlated with average public sector wages are positively correlated with the high-skills versus low-skills wage differential in the public sector.

Table VII reports the results of the impact of the corruption index on gender pay gap. The findings document that higher corruption levels exert a positive effect on both gender hourly wages paid, as well as on the pay gap, since the effect seems to be stronger for the case of males. In economic terms, a one percent increase of the corruption sub-index leads to practically 0.69 percent increase in the gender pay gap.

[Table VII here]

4. The role of the type of the business environment

At the time of the interview, respondents also revealed the type of business they were working in. We separate the sample based on that type of business into: self-employed workers, those who work in the manufacturing industry, those who work in the services industry and those who work in the energy and water industry. The results are shown in Table VIII. They document that the EFW index affects positively (and is statistically significant) the gender pay gap across all types of business, while it turns out to exert the strongest effect in magnitude terms in the case of the manufacturing industry and the weaker effect in the case of self-employed workers.

[Table VIII here]

Moreover, this part of the empirical analysis repeats the above estimations, but this time just for the female participants. The new results, presented in Table VIIIa, illustrate that the economic freedom index has no impact on gender pay gap in the case of self-employment (female entrepreneurs), while it exerts a strong index in the case of the remaining type of occupations.

[Table VIIIa here]

5. The role of the full- and part-time employment

In the next experiment, we repeat the analysis based on the full- and part-time type of employment. High status and well-paid careers are predominantly full-time,

highly demanding, competitive and 'progressive' (Evetts, 2000), with part-timers and those with significant career 'breaks', in consequence, often regarded by employers as less dedicated, less professional and more 'time deviant'. Thus, given that significant child rearing and other household responsibilities limit their full participation in the labour market, females' ability to pursue careers and their earnings potential can be expected to be particularly constrained spatially and temporally (Jarvis et al., 2001). The new findings are reported in Table IX. They illustrate that the EFW index has a clear positive, strong and statistically significant effect on the gender pay gap for both types of workers, although is more substantial for those who work on a part-time basis.

[Table IX here]

6. The London factor

In this final section of the empirical analysis, we divide our sample into those who work in the London area and those in other regions. The results are reported in Table X. A clear feature of these findings is that the regional gender-pay-gap effect of not working in London is much larger than that of working in the London area. Such findings seem to support theories of reduced labour mobility within the female workforce, which leads to labour supply imbalances and, therefore, reduced earnings in certain areas (namely, all but London). It seems that London has a much larger and integrated job market than other regions, and hence, it is likely to lessen gender pay gap issues.

[Table X here]

Finally, this part of the analysis considers the type of occupation used for the purposes of deriving the results reported in Table VIII (i.e., self-employed workers, manufacturing, services, and energy and water) to determine whether there are specific sectors of activity that are immune to the London effect. The new results are presented in Table XI and they clearly highlight the similarity of the results presented previously, thus, lending further support to this effect, irrespectively the type of occupation in association with regional differences.

[Table XI here]

7. Conclusion

This paper examined the effect of government policy towards markets on the pay gap between males and females. The findings documented that a more market oriented (less regulated) economic environment was positively associated with the pay of both genders. However, the positive association seemed to be larger in magnitude for males. When it disaggregated the index, the results highlighted that decreases in government spending, more freedom to trade internationally and more corruption were statistically associated with increases in the gender pay discrepancy. The results also indicated that there was a strong impact on the gender pay gap for those working in the manufacturing industry, the part-time workers and those in the UK regions outside of London.

The findings have also important practical implications for understanding the mechanisms that give rise to the gender pay gap. In particular, there are practical implications for the role of policies facilitating economic freedom in businesses in gender pay differences. For instance, the results are expected to carry significant implications on the future growth of women-led businesses. Consequently, the findings point to potential indirect effects of gender in the growth modelling, arguing that female entrepreneurs could potentially start their business ventures with less capital than males and this is expected to have a negative effect on high-growth enterprises. In addition, the results could be interpreted as an indication of the introduction of an additional element of selection. The direction of such selection is unclear a priori; however, it seems reasonable when the analysis usually focuses on high-level, traditionally male-oriented professions. If this is the case, then studies of such occupational subgroups will understate the extent of discrimination. Female's relative skills and the degree of discrimination they face can be affected by equal employment opportunity laws and regulations, as well as by government policies directed at the difficulties of combining work and family. Such government policies could emphasize the important role for wage structure in determining how females fare relative to males, regardless of their relative quality of corresponding qualifications.

The results also point to evidence associated with the development of the concept and implications of identity, defined as a sense of belonging to a social category, combined with a view about how people who belong to that category should behave. Departures from these norms are perceived as generating costs and hence people seek to avoid them.

Furthermore, given male's and female's differing skill levels and locations in the economy (by occupation, industry, and firm), a better organized economic freedom business environment can have a significant effect on the gender pay gap. In particular, the more compressed pay/wage structures due to the greater role of unions and other centralized pay setting institutions have served to lower the gender pay gap by bringing up the bottom of the pay distribution. This evidence could become increasingly relevant to the UK as minimum wage hikes, some quite substantial, are being contemplated at many levels of government.

The findings with respect to the sub-component of the economic freedom index in relevance to corruption, also imply that according to the marginalization theory, females are on average, often excluded from positions and decision-making areas where greed corruption is likely to occur. It is therefore expected that female's perception of this type of corruption to be in fact lower than male's perceptions. Gaining a closer understanding of gender pay differences in perceptions of different forms of corruption may hold the key to a closer understanding of how and why the demand for anticorruption reforms differs across certain segments of a country's population.

Finally, there are substantial practical implications in a sense that persistent gender payment gaps indicate gender differences in occupations and industries as the most important measurable factors explaining these gender wage gap. Thus, gender differences in location in the labour market remains exceedingly relevant. The continued importance of gender differences in employment by industry and occupation, as well as by firm, suggest the fruitfulness of research aimed at better understanding the underlying reasons for these gender difference as well as their consequences, as well as providing better recommendations for the needed policies that facilitate the business environment through which such gender differences can be mitigated or eliminated.

The key message is that gender pay equity needs to be pursued through a policy package that promotes inclusive and transparent labour market, alongside specific measures to address gender pay equity. Initiatives to improve the pay of females within specific firms or organisations may have limited effects, if these firms are able to outsource work to lower paying firms or if gender equity is achieved within the workplace through downgrading of pay for males as collective regulation is weakened or abolished. Strengthening and extending employment standards, through higher minimum wages, more equal rights for workers and more extensive and inclusive collective bargaining need to be combined with effective and new gender specific measures to address the undervaluation of female's work, not limited to measures which focus on within firm comparisons with males, and to build on the essential individual legal rights to equal treatment by extending duties on employers actively to promote gender equality. To bring these two elements together and widen support and understanding of gender pay equity policies, consideration should be given to generalising a right to fair pay and equal pay for work of equal value within an employing organisation to increase awareness and understanding, though this should not be allowed to detract from efforts to remedy the undervaluation of female's work.

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Table I. Summary statistics

	Males				Females			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Pay (in hourly earnings by working-time)	12.34	3.88	8.69	14.48	10.85	3.96	5.37	13.52
Age	41.7	14.39	25.2	55.0	41.9	12.46	25.4	55.0
Education	0.38	0.12	0.29	0.43	0.27	0.11	0.18	0.36
Marital status	58.29%	0.09	43.58%	66.81%	55.16%	0.08	40.18%	63.48%
Males	11,346	No. of observations	79,422					
Females	12,563	No. of observations	87,941					

Variable	Mean	SD	Min	Max
EFW Index	7.96	0.07	6.89	8.08
Size of government	5.60	0.25	4.32	6.04

Legal system and property rights	7.90	0.07	6.81	7.98
Sound money	9.70	0.13	8.50	9.84
Freedom to trade internationally	8.54	0.18	7.27	8.78
Corruption	8.06	0.21	6.78	8.38

Table II. The role of economic freedom in the gender pay gap: The overall EFW index

Variables	Males	Females	Gender gap
log(EconFreedom)	0.736***	0.688***	0.665***
	[0.00]	[0.00]	[0.00]
log(EconFreedom(-1))	0.396**	0.387**	0.362**
	[0.03]	[0.03]	[0.05]
Age	0.029**	0.025**	0.023**
	[0.03]	[0.04]	[0.05]
Education	0.037***	0.028***	0.026***
	[0.00]	[0.00]	[0.00]
Marital status	0.024*	0.015*	0.014*
	[0.06]	[0.08]	[0.08]
Diagnostics			
R^2	0.64	0.61	0.61
AR(2)	[0.38]	[0.49]	[0.34]
Difference Hansen test	[0.78]	[0.86]	[0.61]
No. Of observations	79,422	87,941	167,363

Notes: The number of lags in the Economic Freedom variable was determined through the Akaike criterion. AR(2) is the test for autocorrelation of order 2. Hansen is the test for the overidentification check for the validity of instruments. The difference-in-Hansen test checks the exogeneity of the instruments. Figures in brackets denote p-values. *: $p \leq 0.10$; ***: $p \leq 0.01$. All estimations were performed under fixed effects and with time dummies.

Table IIa. The role of economic freedom in the gender pay gap: The overall EFW index-The role of the 2008 global financial crisis

Variables	Males	Females	Gender gap
Before the 2008 global financial crisis regime			
log(EconFreedom)	0.519***	0.496***	0.452***
	[0.00]	[0.00]	[0.00]
log(EconFreedom(-1))	0.241**	0.216**	0.227**
	[0.05]	[0.05]	[0.05]
Diagnostics			
R^2	0.55	0.52	0.54
AR(2)	[0.36]	[0.45]	[0.32]
Difference Hansen test	[0.72]	[0.80]	[0.54]
No. Of observations	33,186	39,075	82,261
After the 2008 global financial crisis regime			
log(EconFreedom)	0.894***	0.826***	0.830***
	[0.00]	[0.00]	[0.00]
log(EconFreedom(-1))	0.411***	0.402***	0.396**
	[0.01]	[0.01]	[0.02]
Diagnostics			
R^2	0.68	0.65	0.64
AR(2)	[0.42]	[0.53]	[0.38]
Difference Hansen test	[0.82]	[0.89]	[0.65]
No. Of observations	46,236	48,866	85,102

Notes: As in Table II.

Table III. The role of economic freedom in the gender pay gap (government size)

Variables	Males	Females	Gender gap
log(EconFreedom) (Government size)			
	-0.871***	-0.818***	-0.699***
	[0.00]	[0.00]	[0.00]
log(EconFreedom) (Government size)$_{-1}$			
	-0.403***	-0.375**	-0.358***

	[0.01]	[0.03]	[0.01]
Diagnostics			
R^2	0.57	0.53	0.54
AR(2)	[0.40]	[0.52]	[0.39]
Difference Hansen test	[0.82]	[0.89]	[0.65]
No. Of observations	79,422	87,941	167,363

Notes: As in Table II.

Table IV. The role of economic freedom in the gender pay gap (legal system and property rights)

Variables	Males	Females	Gender gap
log(Economic Freedom) (Legal system and property rights)			
	0.603***	0.616***	0.597***
	[0.01]	[0.00]	[0.01]
log(Economic Freedom) (Legal system and property rights)$_{-1}$			
	0.216***	0.225***	0.171**
	[0.01]	[0.00]	[0.04]
Diagnostics			
R^2	0.57	0.53	0.54
AR(2)	[0.40]	[0.52]	[0.39]
Difference Hansen test	[0.82]	[0.89]	[0.65]
No. Of observations	79,422	87,941	167,363

Notes: As in Table II.

Table V. The role of economic freedom in the gender pay gap (sound money)

Variables	Males	Females	Gender gap
log(EconomicFreedom) (Sound money)			
	0.568***	0.553***	0.464*
	[0.01]	[0.01]	[0.07]
log(EconomicFreedom) (Sound money)$_{-1}$			
	0.194**	0.179**	0.144*
	[0.03]	[0.05]	[0.07]
Diagnostics			
R^2	0.52	0.48	0.53
AR(2)	[0.44]	[0.56]	[0.42]
Difference Hansen test	[0.84]	[0.84]	[0.64]
No. Of observations	79,422	87,941	167,363

Notes: As in Table II.

Table VI. The role of economic freedom in the gender pay gap (freedom to trade internationally)

Variables	Males	Females	Gender gap
log(EconomicFreedom) (Freedom to trade internationally)			
	0.595***	0.559***	0.507***
	[0.00]	[0.00]	[0.01]
log(EconomicFreedom) (Freedom to trade internationally)$_{-1}$			
	0.219***	0.182**	0.165**
	[0.01]	[0.03]	[0.04]
Diagnostics			
R^2	0.58	0.53	0.56
AR(2)	[0.46]	[0.53]	[0.45]
Difference Hansen test	[0.81]	[0.80]	[0.62]
No. Of observations	79,422	87,941	167,363

Notes: As in Table II.

Table VII. The role of economic freedom in the gender pay gap (corruption)

Variables	Males	Females	Gender gap
log(EconomicFreedom) (Corruption)			
	0.774***	0.736***	0.687***
	[0.00]	[0.00]	[0.00]
log(EconomicFreedom) (Corruption)$_{-1}$			
	0.346***	0.325***	0.337***
	[0.01]	[0.01]	[0.01]
Diagnostics			
R^2	0.63	0.57	0.59
AR(2)	[0.48]	[0.50]	[0.49]
Difference Hansen test	[0.77]	[0.83]	[0.67]
No. Of observations	79,422	87,941	167,363

Notes: As in Table II.

Table VIII. The role of economic freedom in the gender pay gap-type of business: The general EFW index

Variables	Self-employed workers	Manufacturing	Services	Energy and water
log(EconomicFreedom)	0.475*	0.646***	0.579***	0.548***
	[0.06]	[0.00]	[0.00]	[0.00]
$\log(\text{EconomicFreedom})_{-1}$	0.241*	0.273***	0.214***	0.192**
	[0.08]	[0.00]	[0.01]	[0.02]
Diagnostics				
R^2	0.54	0.68	0.62	0.58
AR(2)	[0.38]	[0.43]	[0.46]	[0.41]
Difference Hansen test	[0.61]	[0.67]	[0.62]	[0.55]
No. of observations	29,295	89,236	39,879	8,953

Notes: As in Table II.

Table VIIIa. The role of economic freedom in the gender pay gap-type of business: The general EFW index and female participants

	Female participants			
Variables	Self-employed workers	Manufacturing	Services	Energy and water
log(EconomicFreedom)	0.184	0.905***	0.763***	0.814***
	[0.13]	[0.00]	[0.00]	[0.00]
$\log(\text{EconomicFreedom})_{-1}$	0.063	0.408***	0.346***	0.397***
	[0.21]	[0.00]	[0.00]	[0.00]
Diagnostics				
R^2	0.37	0.75	0.69	0.64
AR(2)	[0.43]	[0.46]	[0.48]	[0.45]
Difference Hansen test	[0.64]	[0.71]	[0.66]	[0.59]
No. of observations	24,684	35,398	23,977	5,882

Notes: As in Table II.

Table IX. The role of economic freedom in the gender pay gap (full- vs part-time employment): The overall EFW index

Variables	Full-time	Part-time
log(EconomicFreedom)	0.718***	0.775***
	[0.01]	[0.01]
$\log(\text{EconomicFreedom})_{-1}$	0.357**	0.389***
	[0.04]	[0.01]
Diagnostics		
R^2	0.59	0.56
AR(2)	[0.49]	[0.54]
Difference Hansen test	[0.68]	[0.76]
No. Of observations	105,549	61,814

Notes: As in Table II.

Table X. The role of economic freedom in the gender pay gap (the London factor): The overall EFW index

Variables	Working in London	Working in other regions
log(EconomicFreedom)	0.625***	0.798***
	[0.01]	[0.00]
$\log(\text{EconomicFreedom})_{-1}$	0.252**	0.316***
	[0.03]	[0.01]
Diagnostics		
R^2	0.66	0.57
AR(2)	[0.58]	[0.48]
Difference Hansen test	[0.75]	[0.59]
No. Of observations	94,217	73,146

Notes: As in Table II.

Table XI. The role of economic freedom in the gender pay gap-type of business: The general EFW index-The London factor by occupation

Variables	Self-employed workers	Manufacturing	Services	Energy and water
Working in London				
log(EconomicFreedom)	0.613***	0.639***	0.602***	0.591***
	[0.00]	[0.00]	[0.00]	[0.00]
$\log(\text{EconomicFreedom})_{-1}$	0.277*	0.296**	0.275**	0.249*
	[0.06]	[0.04]	[0.04]	[0.07]
Diagnostics				
R^2	0.57	0.71	0.65	0.60
AR(2)	[0.40]	[0.47]	[0.51]	[0.44]
Difference Hansen test	[0.64]	[0.65]	[0.60]	[0.58]
No. of observations	20,951	33,822	34,137	5,305
Working in other regions				
log(EconomicFreedom)	0.832***	0.861***	0.784***	0.790***

	[0.00]	[0.00]	[0.00]	[0.00]
$\log(\text{EconomicFreedom})_{-1}$	0.382**	0.404**	0.368**	0.327**
	[0.04]	[0.03]	[0.04]	[0.05]
Diagnostics				
R^2	0.62	0.76	0.69	0.64
AR(2)	[0.46]	[0.53]	[0.56]	[0.50]
Difference Hansen test	[0.68]	[0.67]	[0.64]	[0.63]
No. of observations	16,138	26,927	26,093	3,988

Notes: As in Table II