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To my mother

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Chapter 1: Institutional changes in the Greek labour market during the Economic Adjustment Programmes

1.1 Introduction

On the 3rd of May 2010 Greece signed a bailout package to cope with the debt crisis. Some months earlier, the Greek government had projected a budget deficit of 12.1 per cent of GDP. Although the initial reactions for the EU were minimal and member stated, the country was left to deal herself with the situation (Katsimi and Moutos, 2010), in the spring of 2010 the threatening nature of the crisis was ominous.

The bailout package (or the First Economic Adjustment Programme for Greece) was offered to Greece, by the European Commission (representing the Eurogroup), the European Central Bank (ECB) and the International Monetary Fund (IMF) and included a €110 billion of financial support to the country (known also as Troika, or later on, as the Institutions). In exchange for this loan, the Greek government would have to undertake a series of reforms to restore confidence and maintain financial stability, improve competitiveness and alter the economy's structure, as well as restoring the country's credibility for private investors (European Commission, 2010a).

The Programme included measures aiming at reducing public spending, mainly through the reduction of the pension expenditure and the decline of wages and premiums of public sector employees, increasing revenues, with changes at the tax system and the introduction of new taxes such as the ownership of real estate tax (ENFIA) and creating a more investor-friendly environment, with the implementation of an extensive set of labour market reforms mainly on the collective bargaining framework and the facilitation of firing.

The reforms implemented were not enough to restore the Greek economy, with unemployment exceeding 20 per cent in late 2012and an unstable political scene –the government has resigned in late 2011 and a transitional government took office until

the elections that took place on June 2012. In March 2012, the country and her creditors proceeded with a new Economic Adjustment Programme, with additional lending of €144.7 billion from the eurozone Member states and €28 billion from the IMF. The new programme was linked with a private sector involvement (PSI) aiming at the improvement of the country's debt sustainability (European Commission, 2019).[1] The second programme included further privatization measures, expenditure control, changes in the healthcare and the pension system, as well as growth-enhancing structural measures including the opening of regulated professions and product and labour market reforms (European Commission, 2012a). Following social unrest and a polarised political climate, the second programme was not concluded but resulted in a new round of elections at the beginning of 2015, leading to a new government.

In 2015, the newly elected government requested an extension of the programme and tried to re-negotiate the austerity measures and the terms of the lending agreement. The negotiations were unsuccessful, leading to rapid course of action from the government with the imposition of capital controls in June 2015 and the carrying out of a referendum concerning the reform proposals of the Eurogroup. With the majority of the voters standing against the proposal, the government negotiated again concluding to the Third Economic Adjustment Programme for the country. This programme was linked with a €86 billion loan only from Europe, as the IMF decided not to sign the agreement –continuing nevertheless to oversee the negotiations between Greece and the European Commission, the ECB and the European Stability Mechanism (ESM) (European Commission, 2018f).

The latest memorandum included further reforms in all areas, with the radical pension system reform and the introduction of new social security rules being some of the most significant ones. The government successfully concluded the programme, followed by the activation of the Enhanced Surveillance Framework.[2]

[1]PSI was the haircut on Greek government bonds held by the private sector in 2012. Private investors were asked to accept to write off 53.5 per cent of the face value of their bonds, equivalent to an overall loss of around 75 per cent (Eurogroup statement, 2012).

[2]Enhance surveillance is a post-programme procedure for countries-creditors of the European Commission and the ESM, responsible for the continuation, completion, and delivery of reforms remaining combined with a close monitor of the country's economic, fiscal and financial situation (European Commission, 2019).

Both the European Commission and the IMF consider the labour market reforms that took place (mainly under the first two economic adjustment programmes) as outstanding. The interventions regarding the private sector employees included reforms in six broad policy areas: the collective bargaining framework, employment protection legislation, ALMPs & supporting the unemployed, the minimum wage framework, industrial action, and undeclared work. Policy framework for public sector employees was also reformed, mainly concerning wages and allowances, to reduce public spending.

We will proceed with an overview of the reforms implemented at the labour market under the three Economic Adjustment Programmes, providing for a significant overview of the policy area that the Institutions marked as one the greatest successes of the Programmes. We should note that labour market reforms were frontloaded, with most of them implemented by late 2012.

1.2 Labour market reforms under the First Economic Adjustment Programme

The First Economic Adjustment Programme for Greece was introduced due to the country's unsustainable debt, resulting from the combination of high levels of budget deficit (-11.2 per cent of GDP in 2010) and high levels public debt (146.2 per cent of GDP the same year). One of the main objectives of the Programme was to ensure fiscal sustainability. For the country to achieve this, severe fiscal consolidation was introduced, with each Programme setting specific goals on the primary deficit (the first Programme aimed at a 5.9% primary surplus in 2014).

Labour market reforms, beginning with those introduced with the First Economic Adjustment Programme, aimed to remove and prevent rigidities in the labour market for the country's competitiveness to be restored. Revising the wages-setting mechanism, making hiring more attractive, opening the way for more flexible working time conditions and improving active labour market policies to help the attachment of the unemployed to the labour market and boost their employability, where the first steps towards achieving this goal (European Commission, 2010a). The

Programme introduced radical labour market reforms, mainly at the collective bargaining framework and employment protection legislation.

The Memorandum declared that the programme would not include conditionality on the private sector's wages, as the reduction of wages would be through the abolition of bonuses, changes in overtime remuneration or a cut in minimum wages. Indirect influence on private sector wages would be through the cuts in public sector wages and the reduction of the public sector's personnel (European Commission, 2010a).

A two-step approach was agreed to be followed: firstly, social dialogue concerning upcoming changes would take place and afterward the government would enforce the required changes (European Commission, 2010a).

Law 3845/2010 set the general framework for the policies that would follow. Many of the policies that were included in this bill were re-introduced with more detail later. It should be noted that labour market reforms were imposed way ahead of schedule (European Commission, 2010b).

1.2.1. Collective Bargaining

With regards to the collective bargaining framework, law 1876/1990 defined the general framework of minimum obligatory working conditions, whereas respecting the collective autonomy of the social partners. It is worth mentioning that law 1876/1990 was voted unanimously by all political parties, following a year and a half of preliminary work, including discussions with all parties of interest (Patra, 2012). The collective autonomy is protected by Article 22(2) of the Greek Constitution, which prohibits State intervention both in the bargaining procedure and in the content of collective agreements and arbitration awards.

The collective bargaining regime as set out by law 1876/1990, included six main principles:

1. Favourability principle

   According to the favourability principle, when two labour agreements were in place for one employee, the more favourable term for the employee prevailed. The favourability principle was established as a safety net for the employees and to

promote social dialogue at higher levels of collective bargaining, where the employees could negotiate more effectively. The favourability principle (as well as the extension of collective agreements, described below) is a fundamental part of the European Social Model.

Table 1.1: Use of the favourability principle at EU countries

Most favourable CA prevails	Bulgaria, Cyprus, Czech Republic, Latvia, Luxembourg, Malta, Poland, Romania, Slovakia, Greece (until 2011)
Most favourable CA prevails but opt-out clauses can be included at the agreement	Austria, Belgium, Croatia, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Portugal, Slovenia, Sweden, UK
No use of the favourability principle	France, Greece (after 2011)

Source: Eurofound (2015)

2. Extension

If 51 per cent of the sector's workforce was represented in a sectoral collective agreement, the agreement could be extended to apply to non-signatory firms. The extension principle was set to incentivize firms and employees to participate in collective bargaining and to establish unified competition rules. The firms would have to find other elements in their production chain to become competitive, as wages and working conditions were unified across firms of the same sector.

Table 1.2: Use of collective bargaining agreement extension mechanisms at EU countries

Extension is widespread, and most collective agreements are declared generally binding	Belgium, Finland, France, Greece (until 2011), Luxembourg, Netherlands, Portugal (until 2012), Spain
Extension is widespread due to functional equivalents	Belgium, Finland, France, Greece (until 2011), Luxembourg, Netherlands, Portugal (until 2012), Spain
Extension is possible but used infrequently or never	Croatia, Bulgaria, Czech Republic, Estonia, Germany, Hungary, Ireland, Latvia, Lithuania, Norway, Poland, Slovakia, Slovenia
Extension is not possible	Cyprus, Denmark, Ireland (since 2011), Malta, Sweden, UK

Source: Eurofound (2015)

It should be noted that the two abovementioned principles are interlinked, as individually they do not have any effect on the wage-setting mechanism. The favourability principle is enacted only if more that one agreements are in place for the same employee, and the extension principle can provide higher wages for the employees only if the favourability principle is in place. Most European countries allow for the most favourable for the employee collective agreement to prevail, whereas some of the countries allow for opt-out clauses.[3] Extension mechanisms are also usual in European countries (Tables 1.1 and 1.2).

3. Arbitration

   Arbitration was set as a mechanism that could help collective bargaining in cases that negotiations between parties failed. The arbitration process was not only focused on wages but could include all subjects that a collective agreement can cover. Unilateral resort to arbitration, a unique element of the Greek labour system, could also be applied, as it is incorporated in the Greek Constitution.

4. Duration of the collective agreement

   Respecting the collective autonomy of the social partners, law 1876/1990 did not state for a maximum duration of the collective agreements. Negotiation parties were able to decide freely the extent of the agreement.

5. The after-effect of the collective agreement

   After-effect of an agreement is the time that an expired agreement can remain in effect, giving time to the signatory parties to negotiate appropriately a new one. Law 1876/1990 gave a 6 months window for negotiations before a collective agreement become null. Until a new collective agreement was signed, all terms of the previous agreement continue to apply.

6. Enterprise-level collective agreement

   In enterprises with a small number of employees, the two negotiating parties do not have the same bargaining power. For the party with the lower bargaining

[3] Opt-out clauses can be agreed between the negotiating parties during the bargaining of the collective agreement. Opt-out clauses can allow firms to derogate from the collective agreement in cases of extreme economic need. The cases in which firms are allowed to derogate are listed in detail in the collective agreement.

power to be protected, a threshold of 50 employees workforce was applied. Enterprises with less than 50 employees could not sign an enterprise-level collective agreement. Worth mentioning here is the unique structure of the Greek economy, with 95 per cent of the enterprises employing less than 20 employees, signifying the importance of the existence of sectoral collective agreements.

The minimum wage (MW) was decided, up until 2010, by collective bargaining between the social partners –represented by third-tier organisations of employees and employers (Moutos, 2015). The result of the negotiations was the National General Collective Agreement (EGSSE), which was legally binding for all private-sector employers and employees, representing the floor from which sectoral negotiations can begin. It is worth noting that during the decades of MW negotiations, social partners always managed to reach an agreement. Due to the important role of the MW in the wage-setting mechanism and the significant changes the structure of the MW undergone during the years of fiscal consolidation, the MW framework would be examined separately in the next section.

The intervention in the collective bargaining system targeted at the decentralization of wage bargaining, allowing the local level to opt-out form the wage increases agreed at the sectoral level, and ultimately achieving internal devaluation (European Commission, 2010a).

1.2.1.1. Favourability & Extension principles

The first provision that introduced changes in the collective bargaining framework was paragraph 7, article 2 of law 3845/2010, were it was specified that occupational collective agreements or enterprise-level collective agreements could differentiate from the sectoral ones. The definition was quite general, with later legislation imposed for further specification, but it can be seen as the first act of freezing the favourability principle.

In December 2010, with law 3899/2010, ar. 13, the “special enterprise collective agreement”, a new kind of collective agreement, was introduced. The special enterprise collective agreement could derogate from the wage and the labour

conditions of the respective sectoral collective agreement, respecting though the conditions set by the EGSEE. Special enterprise collective agreements could be signed even if the firm had less than 50 employees, with the workers' side represented either by the enterprise union or, in case an enterprise union does not exist, by the respective sectoral union or federation. For the special collective agreement to be valid, the Social Council of Social Oversight of the Labour Inspectorate (SKEEE) would have to agree, checking the validity of the justification reasons for the existence of such agreement. The justification behind the introduction of these agreements was the reassurance of existing jobs and the needed improvements in productivity & competitiveness.

Although the provision was radical, allowing for firm-level derogation from the sectoral collective agreements, no "special enterprise collective agreement" was signed, mainly due to the needed involvement of the SKEEE (Patra, 2012). To prevent the rigidities of law 3899/2010, law 4024/2011 (article 37, paragraph 1) introduced the Associations of Persons (AoP). The provision stated than when an enterprise employees' union does not exist, enterprise agreements could be signed by an AoP.[4] For the creation of an AoP the only requirement was that the 3/5 of the firm's employees were represented.

To strengthen further the role of enterprise-level collective agreements, law 4024/2011 paragraph 5 and 6 suspended the favourability principle and the extension of collective agreements, until the end of the Medium Term Financial Strategy. The interventions of law 4024/2011 were based on the assumption that two-tier or multi-tier systems do not foster efficient bargaining and increased the rigidity of the labour market, aiming at the better alignment of wages with productivity at firm level (European Commission, 2010c).

The introduction of the AoP coupled with the suspension of the favourability principle and the extension of the sectoral agreements led to a sharp increase in the number of enterprise-level agreements, from 227 in 2010 to 975 in 2012 with a significant number of them signed by AoP (Table 1.3) while sectoral and occupational collective agreements dropped rapidly, from 64 in 2010 to 23 in 2012 (Table 1.4). The shift

[4]The existing requirement for forming an enterprise union was the existence of 50 employees in the firm. Smaller firms, that did not met the criterion, did not have the option of enterprise agreements.

from sectoral/occupational to enterprise-level collective agreements led largely to wage reductions or adjustments to the level of the national agreement (Table 1.5).

Table 1.3: Number of collective agreements, by type and year

YEAR	Sectoral and occupational CA		Firm-levelCA		Local occupational CA	
	CA	Arbitration Award	CA	Arbitration Award	CA	Arbitration Award
2008	160	42	215	15	27	2
2009	62	41	215	12	12	5
2010	64	29	227	11	14	6
2011	38	17	170	9	7	1
2012	23	8	975	0	6	0
2013	13	0	409	0	10	0
2014	14	2	286	0	5	0
2015	11	11	263	1	7	0
2016	9	10	318	4	6	0
2017	14	3	244	2	6	0

Source: OMED

Table 1.4: Number of enterprise level collective agreements by signatory parties

	CAs with Trade Unions	CAs with Associations of Persons
2013	77	61
2014	150	138
2015	138	128
2016	127	80

Source: Ministry of Labour

Table 1.5: Changes in wages due to CA

	2012		2013		2014		2015		2016		2012-2016	
	NUMBER	per cent	NUMBER	per cent	NUMBER	per cent	NUMBER	per cent	NUMBER	per cent	NUMBER	per cent

Wage increases	6	0.6	1	1.9	6	1.9	15	6	9	4.6	37	1.7
Wage reductions	192	19.3	70	15.4	20	7	21	8.4	14	7.2	317	14.9
Wages remained unchanged	46	4.7	67	16.4	62	21.6	30	11.4	48	25.3	253	11.9
Wages according to specific tables	45	4.6	17	4.2	17	5.9	24	9.1	21	11.1	124	5.8
Adjustment to NGCA	516	52.8	162	39.6	100	35	84	31.8	50	26.3	912	42.9
Stipulation of working hours	1	0.1	1	0.2	3	1	1	0.4	2	1.1	8	0.4
Employment regulation	1	0.1	10	2.4	7	2.4	5	1.9	7	3.7	30	1.4
Other	169	17.31	81	19.8	71	24.82	84	31.81	39	20.52	444	20.9
Total	976		409		286		264		190		2,125	

Source: Ministry of Labour

1.2.1.2. Arbitration & Mediation

Targeting at introducing symmetric access and secure independence of arbitration, as well as ensuring that arbitration internalises the objective to improve the economy's cost competitiveness, modifications at arbitration & mediation procedures were introduced (European Commission, 2010c). Law 3845 (paragraph 9a, article 3) gave the freedom to the Ministers of Finance and Labour, after consultation with the social partners, to make changes at the Organisation for Mediation and Arbitration (OMED) by Presidential Decrees. Subsequent law 3863/2010 required the opinion of the International Labour Organisation (ILO) before proceeding with any changes in arbitration, mediation & OMED.

Later the same year (article 51, law 3871/2010), it was decided that all wage increases for private-sector employees were prohibited for the period between July 2011 and the end of 2012, as well as any wage increases that were the product of arbitration procedures concerning 2010 & the first semester of 2011. The only wage increases that were allowed were those mentioned in the latest EGSSE; in July 2011 the minimum wage was agreed to increase in line with the EU average of 2010's inflation and in July 2012 in line with 2011's inflation.

Law 3899/2010 introduced further changes in the arbitration and mediation procedures, as well as the representation & the role of OMED. With the introduced law, arbitration could be used only for the basic wage, with all other issues to be resolved only through collective bargaining. As arbitration is considered an extension of collective bargaining, it was questionable how arbitration could have such limited scope (Patra, 2012). OMED was restructured in order to include only members of the social partners, with no involvement from the state.[5] Additionally, two new bodies for mediators and arbitrators were created. Article 15 of the law provides for a 3-year probationary period for the "new" OMED, after which the social partners could propose changes, based on the evaluation of the effectiveness of the institution.

1.2.2. Minimum Wage

MW legislation was first introduced in Greece in 1953. Up until 2010, MW was determined though collective bargaining with negotiations between the social partners – represented by third-tier organizations of employees and employers. The outcome of the negotiations was included in the EGSEE and set the floor for all wage settlements in the country (independently of regional, sectoral, or firm-level), with the exception of wages in the public sector. The MW was given legal force by the government and it covered all workers independently of age (must be at least 15 years old), sex, or employment status (up until the late 1970s, MWs were differentiated according to gender, with females earning less than males).

The EGSEE negotiations usually took place every two years and included bi-annual wage adjustments in line with inflation. The EGSEE mentioned different levels of

[5] The Ministry of Labour assigned one representative with no voting rights.

MW according to the seniority of the employee and his marital status, as well as different rated for blue and white-collar workers (blue-collar workers are paid by the day whereas white collar workers by the month).

The last EGSEE was signed in July 2010 and provided for increases in the MW, in line with the average EU inflation, that would take place on July 2011 and July 2012.

To combat the high levels of youth unemployment, a lower minimum wage was introduced for registered unemployed under the age of 25, with paragraph 6, article 2 of law 3845/2010. Specifically, unemployed under the age of 25, who were registered at the Public Employment Service (OAED) could be paid 80 per cent of the national MW, as it is defined at the EGSSE, for up to 12 months. At the same time, OAED would subsidy the employee's social security contributions (the total of the social security contributions for each employee, meaning both the employer's and the employee's parts). This is the first time that some kind of sub-minimum wage for the youth was introduced. The sub-minimum did not have immediate, universal application; firms that wanted to make use of the abovementioned policy had to enrol themselves at the respective OAED's programme. According to verbal communication with OAED's officials, the Programme had very limited use, with only 3.690 employees registering as beneficiaries.

Subsequent law 3863/2010, article 74, paragraph 8, introduced a new kind of subsidy for first-time employees under the age of 25. The law provided for compensation equal to 84 per cent of the MW defined by the EGSEE, and OAED would subsidy the total of the social security contributions for each employee. The provision said that the employers that would make use of this subsidy would automatically enter the relevant OAED's subsidy programme. Such subsidy programme was never set into effect, making the provision null and void.

Law 3863/2010, article 74, paragraph 9 introduced apprenticeships for employees between 15 and 18 years old. The contract could be up to 1 year and provided for a MW up to 70 per cent of the MW defined in the EGSEE. Employees with more than 16 years of age could work up to eight hours per day and up to forty hours per week, whereas younger employees had a maximum of six hours of work per day and up to thirty hours per week. The labour law, with the exception of the health and safety rules, did not apply for such employee

1.2.3. Employment Protection Legislation

Widespread reforms were made with law 3845/2010, article 2, paragraph 9 at fundamental elements of employment protection legislation. Changes in the limits for collective dismissals, the determination and payment methods of the severance compensation, the measures for prevention of firing older employees near retirements and the highest duration of temporary contracts could be introduced with Presidential Decrees.

Subsequent law 3846/2010 had a general goal to regulate special forms of employment such as temporary employment, telework, etc, as well as working conditions. The bill was the result of prolonged social dialogue and was not agreed with the Troika, as part of the Memorandum (Patra, 2012). It included protective provisions for the employees, such as the introduction of increased compensation in cases of overtime work for part-time employees, part of which were afterward abolished.

In July 2010, law 3863/2010 was passed, introducing changes in collective dismissals and the overtime premium. Until then, dismissals were determined as collective when more than 4 employees were laid off for enterprises with 20-200 employees in one month, or 2-3 per cent of the workforce and not more than 30 employees for companies with more than 200 employees. The minimum threshold of collective dismissals (article 74 paragraph 1, law 3863/2010) changed to up to 6 employees for companies with 20-150 employees and up to 5 per cent and not more than 30 employees for larger companies, making redundancies per month easier.[6]

The same law provided for a shorter notification period in cases of redundancy (article 74, paragraph 2) and reductions to all types of overtime premiums;[7] the first overtime hour from 25 per cent to 20 per cent, the "regular" overtime from 50 per

[6] When dismissals as marked as collective, there is a "special" procedure to be followed, in order to protect employees. The procedure requires as a first step, the agreement of the employees in order for the firm to proceed with the dismissal. If there is no agreement, then the case is discussed at the Supreme Labour Council and if there is an agreement there, the Minister could approve the collective dismissal. In any case, the dismissal should be accompanied with protective measures for the employees that are dismissed.

[7] Overtime premium has four types in Greece: the first hour of overtime, "regular" overtime –after the 1st hour-, overtime over the annual limit and the not-typically reported overtime.

cent to 40 per cent, the overtime over the annual limit from 75 per cent to 60 per cent and the not-typically reported overtime from 100 per cent to 80 per cent.

Changes were made to the probationary period also.[8] Probationary period was two months (afterward and for the first year of employment the severance was equal with one month wages), whereas with law 3899/2010 it was extended to one year. The extended probationary period targeted at allowing a longer period for the establishment of a longer-term trustful relationship between employers and employees, and reducing effectively hiring costs (European Commission, 2011a).

Additional modifications were implemented regarding shift work –extended from six months to nine– and the maximum work period under temporary working agencies – from one year to three.

1.2.4. Support to the unemployed

During the years of the Economic Adjustment Programmes, the attachment of the unemployed with the labour market was one of the main policy issues that tried to be addressed and re-designed. Targeting the better re-integration of the unemployed to the labour market, changes regarding the use of the unemployment benefit were made. After the introduction of law 3845/2010 (article 2, paragraph 4) the unemployed can use his unemployment benefit as a voucher for his reintegration into the labour market. Making use of this measure, the unemployed will not receive the benefit but the firm that will hire him will have a wage-subsidy for him, equal with the amount of the benefit.

1.2.5. Undeclared work

Initial changes in the field of undeclared work were made with law 3863/2010 which introduced a new type of declaration of the employees: the "ergosimo" (a kind of

[8] Probationary period is the period for which the employer does not have to pay severance if he fires the employee.

service voucher). The ergosimo is a simplified procedure method for employers to pay labour remuneration and insurance contributions relating to labour contracts regarding specific professions and sectors (Kapsalis, 2018). The service voucher is considered to be one of the structural incentives adopted to tackle undeclared work, even though this was not its original purpose (Williams et al., 2016).

Discussions concerning tackling undeclared work started between the government and the Institutions as part of the second review of the Programme. The first commitment of the country in this area was the strengthening of the Labour Inspectorate (SEPE) by June 2011, followed with the introduction of quantitative targets on the number of controls of undeclared work, actions not completed under the First Programme (European Commission, 2010c).

In August 2011 a new law was introduced regarding the reformation of SEPE. Law 3996/2011 set the responsibilities and the administrative procedures of SEPE, as well as the infringements which are under its duties and the respective penalties. Article 26 of the law introduces the labour card, an electronic process used for the social security fund and the labour inspectorate to have information about the working hours of the employees. The companies for which the labour card would be mandatory would be determined on future Ministerial Decision. Such companies would be granted a 10 per cent discount to the social security contributions they have to pay for their employees.The activation of the provision of the labour card was one of the key deliverables that the government did not manage to fulfil under the Programme.[9]

1.2.6. Public sector employment relationships

The public wage premium was a pre-existing situation in Greece, with studies placing at around 32 per cent for 2005 (Christopoulou and Monastiriotis, 2013),[10] with high public wage increases being considered one of the elements causing the disparity between real wage growth and productivity gains (European Commission,

[9] The labour card was re-introduced in 2012, but again it was not set into effect. Part of the problems linked with the labour card was the high administrative cost and the use of the personal data of the employees. These may be part of the reasons that the labour card was not activated.

[10] When adjusting for individual characteristics, Christopoulou and Monastiriotis (2013) find the public wage premium to be 11 per cent.

2010a).[11]Reductions in the public wage bill were introduced not only to decrease public spending but also to signal similar reductions to the private sector, aiming at increasing the country's competitiveness.

One of the first actions implemented by the government was the partial cancelation of the Easter, summer and Christmas allowances (law 3833/2010 and law 3845/2010) of public sector employees, with net reductions accounting to €1.5 billion per year. Supplementary to this were horizontal cuts of wages accounting to 10 per cent and a 12 per cent reduction in supplementary wages (Moutos, 2015). Additionally, the rule of 1 recruitment for 5 exits was enshrined in law in 2011, leading to diminishing hires in the public sector. Towards the end of the Programme, a bill was drafted introducing unified public sector wages, as well as the abolition of non-basic benefits, leading to further reductions for public sector employees (law 4024/2011).

Initial 2010 wage reforms resulted to reduction to the earnings of public sector employees of 12 per cent (NBG, 2010), reaching 30 per cent after the introduction of the unified pay scale (Christopoulou and Monastiriotis, 2013). Public sector's personnel declined by 250,000 employees (Christopoulou and Monastiriotis, 2014).

1.3. Labour market reforms under the Second Economic Adjustment Programme

Most of the reforms on the labour market were introduced under the First Economic Adjustment Programme. Despite the optimistic projections of the Programme, the established reforms did not manage to contain unemployment rates. During the fifth review of the Programme, unemployment was expected to reach 15.7 per centin 2011 (Table 1.6). The actual unemployment reached 17.9 per cent, signalling the severe nature of the crisis. At the same review, it was noted that although a considerable reduction in per capita income had been achieved, downward rigidities in wage-setting systems had prevented the necessary adjustment of private-sector wages, contributing to a sharp increase in unemployment (European Commission, 2011b). It is questionable whether further reforms could have prevented the deepening of the

[11]From 2000 to 2008 the wage bill of the general government increased by almost 100 per cent.

crisis or whether frontloaded labour market reforms, in collaboration with reductions in public spending, resulted in deteriorating the pre-existing crisis.

Table 1.6: Macroeconomic scenario of the 5th review (First Economic Adjustment Programme)

	2009	2010	2011	2012	2013	2014	2015
Real GDP (growth rate)	-3,2	-3,5	-5,5	-2,8	0,7	2,4	2,9
Final domestic demand contribution*	-3,6	-7,0	-9,0	-5,3	-0,8	1,2	1,8
Net trade contribution	3,1	3,1	2,9	2,5	1,5	1,2	1,1
Employment (growth rate)	-0,7	-1,9	-5,7	-2,8	0,4	1,0	1,2
Unemployment rate (percent of labour force)	8,9	11,7	15,7	17,5	17,5	16,9	16,3
Unit labour cost (growth rate)	4,3	-1,6	-3,1	-2,9	-1,5	-1,0	-0,6
HICP inflation	1,3	4,7	3,0	0,7	0,8	1,0	1,1
HICP inflation at constant taxes	1,1	1,4	1,0	-0,3	0,4	1,0	1,1
Current account balance (percent of GDP)	-14,3	-12,3	-9,9	-7,9	-6,9	-5,9	-4,5
Net borrowing vis-à-vis RoW (percent of GDP)	-13,3	-10,6	-7,8	-5,4	-4,4	-3,4	-2,0
Net external liabilities (percent of GDP)	111,3	124,1	137,3	146,4	149,3	148,7	145,6

** Excluding change in inventories and net acquisition of valuables*

Source: European Commission

In early 2012, and in anticipation of a new Economic Adjustment Programme, the government held a meeting with the social partners and asked their official positions concerning wage and non-wage labour costs. The consultation with the social partners for examining labour market parameters that affect the firms' competitiveness and the economy as a whole was a prior action of the fifth review of the First Economic Adjustment Programme (European Commission, 2011b). The social partners (SEV, ESEE, GSEVEE & GSEE) voiced officially their beliefs in a letter that was sent to the Prime Minister (Koukiadaki and Grimshaw, 2016). In the letter, the social partners expressed their consensus on the preservation of the thirteenth and fourteenth salaries, and the MW levels, as well as the maintenance of the 'after-effect' of collective agreements.[12]

Despite the beliefs of the social partners, the Memorandum (included in full in law 4046/2012) incorporated as prior actions significant changes in the MW and collective bargaining framework, whereas small changes were made concerning the severance compensation and the notification period for the layoffs, ALMPs, and undeclared work. The most crucial policy was the decrease in the MW by 22 per cent and the introduction of the subminimum wage (law 4046 and 4093/2012,

[12]Letter from the social partners to the Prime Minister, Loukas Papademos.

MCA.6/2012), aiming to restoring competitiveness through lower labour costs and facilitating the re-entry of the unemployed into the labour market.

1.3.1. Collective Bargaining

Modifications in existing laws, generally mentioned in law 4046/2012, were specified with Ministerial Council Act 6/2012. One of the objectives of the Act was to ease contract renegotiation (European Commission, 2012a). The MCA introduced minimum and maximum duration for the collective agreements (1 and 3 years respectively)[13] and limited the period of the time effect of the collective agreements from 6 to 3 months (article 2 of the Act). At the same time, the Act limited the allowances that continue to be in effect even after the end of the time effect to only four.[14,15] With the same Act (article 4), all automatic wage increases (provided for in the law or in collective agreements) based on work experience (seniority allowances) were suspended until unemployment falls below 10 per cent.[16]

The decentralization of wage bargaining and the reduction of the MW resulted to a 7.4 per cent decline in compensation per employee from 2010 to 2012,[17] aiming at accelerating employment growth. The decline of labour costs did not manage to be reflected in prices, with the Troika claiming that the reason of this discrepancy was the delayed product market reforms (European Commission, 2013a).

Another crucial aspect of the Greek collective bargaining framework, which was abolished with MCA 6/2012, was the unilateral resort to arbitration. Basedon article 3 of the Act, only if both parties consent recourse to arbitration was allowed.

Changes in arbitration and mediation did not last long, as in July 2014 the full plenary of the Council of State with ruling 2307/2014 judged the abolishment of the unilateral recourse to arbitration as unconstitutional. Specifically, the Council of State ruled that the establishment of an arbitration system and the unilateral recourse to arbitration are

[13] The Institutions believed that longer-term agreements become inflexible when an economy is going through a period of deflation and do not help at restoring competitiveness (European Commission, 2012a).
[14] Seniority allowance, children allowance, education allowance, and allowance for the exposure to workplace hazards
[15] Under previous regime, all allowances included in the collective agreement continue to be in effect until a new collective agreement was concluded.
[16] The employees continue to receive seniority allowances corresponding to the work experience they had on February 2012.
[17] Compensation per employee was expected to decline by 17.4 per cent in 2014, relatively to 2009.

constitutional obligations and the scope of arbitral decisions should cover all issues negotiated during collective bargaining and cannot be limited only to the determination of wages. Following the CoS ruling, the Ministry of Labour reverted (with article 4 of law 4303/2014) to the previous regime concerning arbitration and unilateral recourse to arbitration.

1.3.2. Minimum Wage

With a view of restoring competitiveness through lower labour costs and facilitating the re-entry of the unemployed into the labour market, the MW was reduced by 22 per cent and a sub-minimum wage (13 per cent below the minimum) for youth under the age of 25 was introduced with MCA 6/2012. Act 6/2012 (paragraph 1, article 1), stipulates that changes in the MW could be made only after the end of the economic adjustment programmes. The employee's consent in cases of wage decreases in cases of MW workers was no required. The aim of these provisions was to reduce labour costs in the business economy by 15 per cent in three years, accelerating already observed wage reductions. The reduction was expected to have a strong signaling role to other sectoral and firm-level wages. Additional goals of reducing MW levels were increasing formal employment and supporting the employment of low-skilled workers ((European Commission, 2012a). It should be noted that this is the first time that the State intervened in the decision for the minimum wage levels, disturbing achieved consensus between the social partners.

Regarding the introduction of a generally applicable subminimum wage for the youth, it is worth noting that a small number of European countries have similar rates (Tables 1.7 and 1.8). Belgium does not have a subminimum wage per se, but the youth MW rate for employees up to 20 years old is linked with their work experience. A similar regime is followed in Ireland, with the subminimum rates applying to workers up to 18 years of age. Latvia, Luxembourg and Malta have subminimum rates, more closely linked with the Greek apprenticeships regime. The Netherland and

the UK have subminimum wages (for workers up to 22 and 24[18] years old respectively), but the MW replacement rate increases with age.

Table 1. 7: Subminimum wage for the youth at EU countries

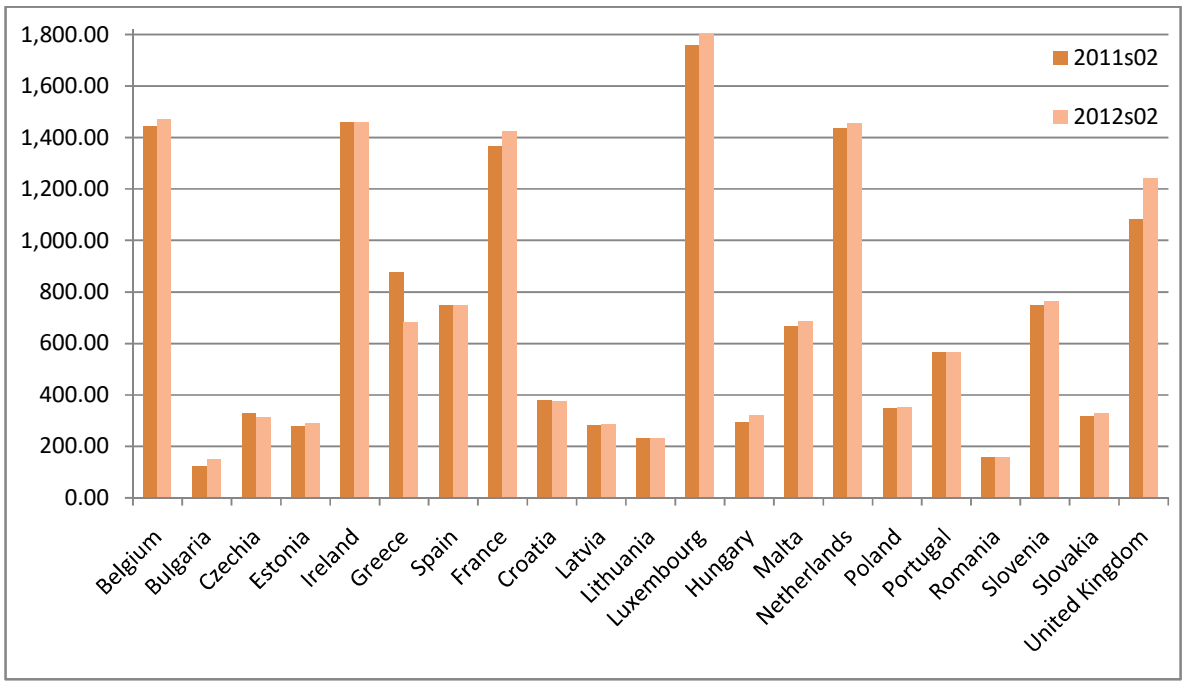
Countries with subminimum wages for the youth	Belgium, France, Ireland, Greece, Latvia, Luxembourg, Malty, Netherlands, United Kingdom
Countries with no subminimum wage for the youth	Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Germany, Hungary, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia, Spain

Source: Intenrational Labour Organisation (I.L.O) (2016 data

Following the Act, a circular was issued by the Ministry of Labour in order to clarify possible misconceptions. The circular set the new MW rates as follows: 26.18€ per day for blue-collar workers and 586.08€ per month for white-collar workers for employees above 25 years old and 22.83€ per day for blue-collar workers and 510.95€ per month for white-collar workers for below the age of 25.

[18]UK has announced at the end of September 2019, that will lower the threshold for the National Living Wage to 23 year olds and over from 2021, and to those aged 21 and over within five years, following the recommendations of the Low Pay Commission.

Figure 1.1: Minimum wages in EU countries



Source: Eurostat

The reductions in wage costs were to be followed by a 5 per cent decrease in social contribution rates for private-sector employees, a reform not implemented until 2014 mainly due to the lack of fiscal resources (European Commission, 2012a).

At November 2012, law 4093/2012 introduced further changes to the MW framework. A new MW setting mechanism was introduced, providing for the determination of the minimum wage by the government instead of the social partners, whereas the marital allowance, a top-off MW benefit, was abolished.

Table 1.8: MW rates for blue-collar workers above 24 years old

	Before 14.2.2012		**After 14.2.2012**		**After 12.11.2012**	
Seniority	**Single**	**Married**	**Single**	**Married**	**Single**	**Married**
0-3 years	33.57	36.92	26.18	28.80	26.18	26.18
3-6 years	34.80	38.16	27.49	30.11	27.49	27.49
6-9 years	36.46	39.83	28.80	31.42	28.80	28.80
9-12 years	38.11	41.47	30.11	32.73	30.11	30.11

12-15 years	38.78	43.13	31.42	34.04	31.42	31.42
15-18 years	41.43	44.80	32.73	35.35	32.73	32.73
More than 18 years	43.11	46.47	34.03	36.65	34.03	34.03

Source: Ministry of Labour & KEPEA (EGSEE 2010)

Table 1.9: MW rates for white-collar workers above 24 years old

	Before 14.2.2012		**After 14.2.2012**		**After 12.11.2012**	
Seniority	**Single**	**Married**	**Single**	**Married**	**Single**	**Married**
0-3 years	751.39	826.54	586.08	644.49	586.08	586.08
3-6 years	813.99	889.13	644.69	703.30	644.69	644.69
6-9 years	887.99	963.13	703.30	761.91	703.30	703.30
More than 9 years	961.99	1037.13	761.90	820.51	761.90	761.90

Source: Ministry of Labour & KEPEA (EGSEE 2010)

Table 1.10: MW rates for blue collar workers up to 24 years old

	Before 14.2.2012		**After 14.2.2012**		**After 12.112012**	
Seniority	**Single**	**Married**	**Single**	**Married**	**Single**	**Single**
0-3 years	33.57	36.92	22.83	25.11	22.83	22.83
3-6 years	34.80	38.16	23.97	26.25	23.97	23.97
6-9 years	36.46	39.83	25.11	27.39	25.11	25.11
9-12 years	38.11	41.47	25.11	27.39	25.11	25.11
12-15 years	38.78	43.13	25.11	27.39	25.11	25.11
15-18 years	41.43	44.80	25.11	27.39	25.11	25.11
More than 18 years	43.11	46.47	25.11	27.39	25.11	25.11

Source: Ministry of Labour & KEPEA (EGSEE 2010)

Table 1.11: MW rates for white-collar workers up to 24 years old

	Before 14.2.2012		After 14.2.2012		After 12.11.2012	
Seniority	**Single**	**Married**	**Single**	**Married**	**Single**	**Married**
0-3 years	751.39	826.54	510.95	562.05	510.95	510.95
3-6 years	813.99	889.13	562.05	613.15	562.05	562.05
6-9 years	887.99	963.13	562.05	613.15	562.05	562.05
More than 9 years	961.99	1037.13	562.05	613.15	562.05	562.05

Source: Ministry of Labour & KEPEA (EGSEE 2010)

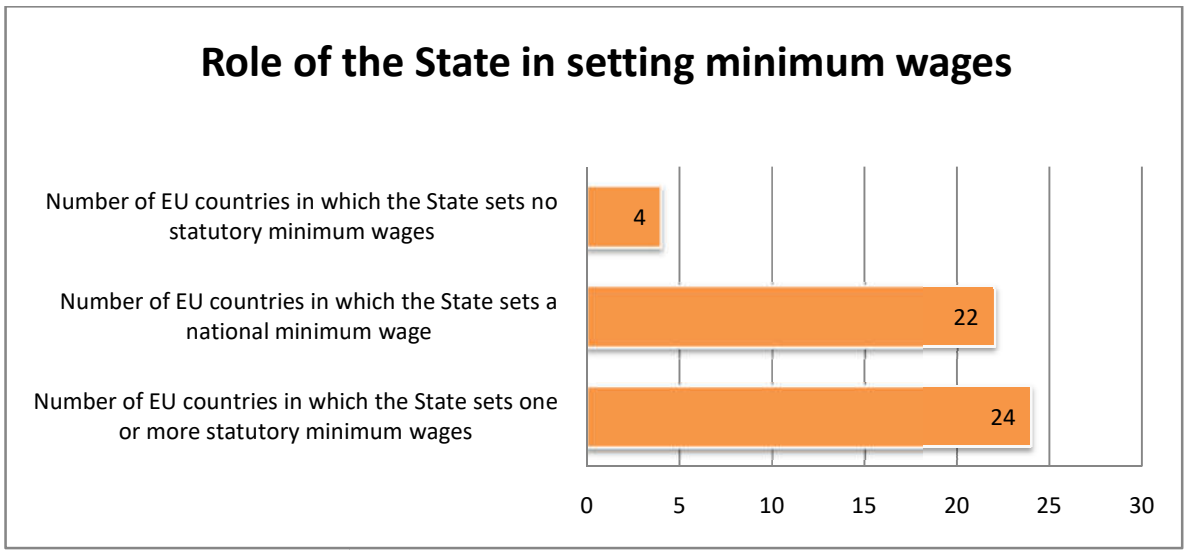
The Troika was sceptical towards the social partners due to the MW increases agreed in 2010's EGSEE. Troika believed that social partners were not capable of deciding oobjectively the MW but that politics played the main part in such decisions. It was due to these reasons that the creditors insisted to changing the MW setting mechanism, from being the result of free collective bargaining to being decided by the government.

The detailed procedure for the new MW setting mechanism was described at law 4172, article 103. The decision-making mechanism requested the creation of a committee of independent experts, which in co-operation with the Centre of Planning & Economic Research (KEPE), would be responsible for submitting a proposal of the MW level to the Ministers of Finance & Labour. The committee's report should enclose a summary of the proposals of the social partners and other relevant institutions (OMED, OAED, EL.STAT, Bank of Greece, KEPE). The report of the experts should also include an overview of the labour market and the economy and for proposing the MW level should take into account growth, prices, competitiveness, unemployment, and wages.[19] The final decision for the minimum wage would be taken by the Minister of Labour, after consultation with the Cabinet of Ministers, ensuring that decisions on the level of the MW achieve a balance between income protection at the bottom of the wage distribution and the promotion of high levels of employment (European Commission, 2012b). The procedure would be repeated annually, starting in February and concluding at the end of June each year. The new

[19]Similar procedures for the determination of the MW are followed in UK and Ireland.

MW setting mechanism would come into effect after the end of the Economic Adjustment Programmes and not earlier than the beginning of 2017.[20]

Table 1.12: Minimum wage setting mechanisms in EU



Source: ILO (2016 data)

1.3.3. Employment Protection Legislation

Law 4093/2012 introduced further changes concerning the severance compensation and the notification period for the layoffs were made, mainly affecting workers with more than 16 years of service. The justification behind this provision was that excessively expensive severance pay slowed down labour market adjustment and hampered jobs creation, restraining at the same time labour mobility to dynamic sectors and firms -as acquired severance payment entitlements will be lost in case of changing jobs. This reform was expected to be complemented by the product market reforms of the Programme, giving rise to more dynamic market entries and exits of firms (European Commission, 2012b).

[20] The process was set into effect for the first time in September 2018, with an accelerated timeline (starting in September instead of February and finishing the process in January instead of June).

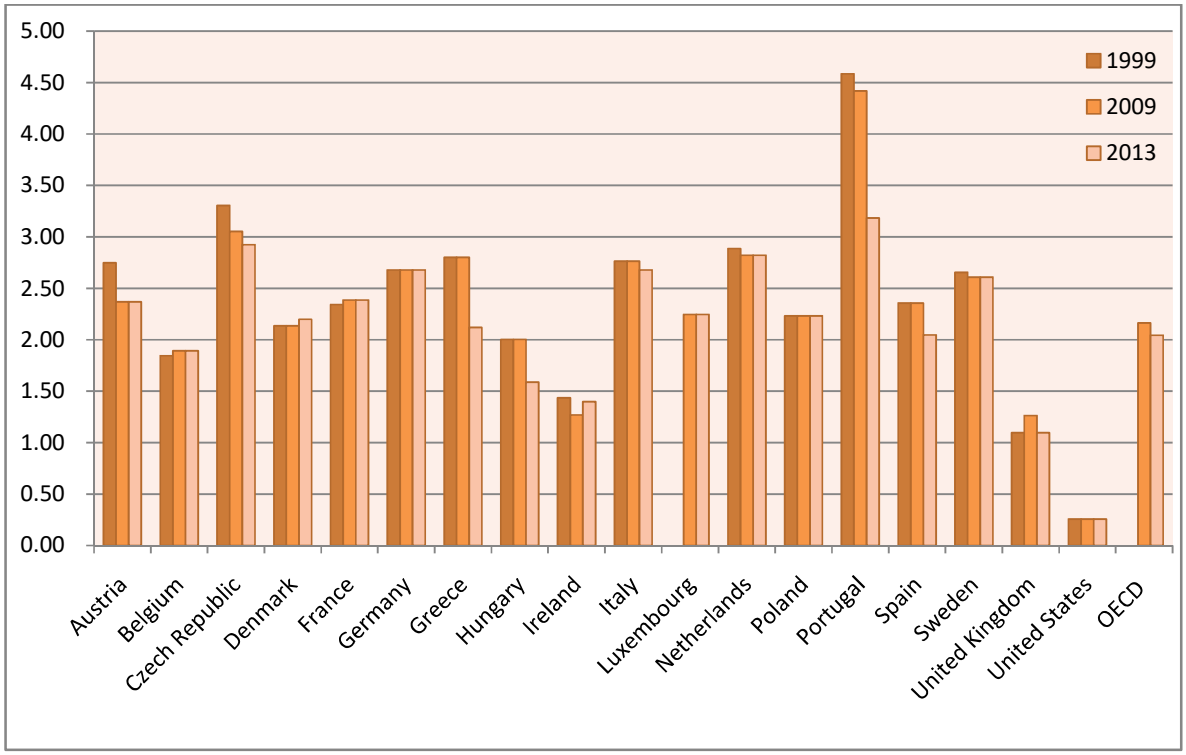
Another part of the bill set new rules at the documentation required by SEPE, in order to reduce administrative burden, and on employment time-limits –less hours of mandatory rest between work and more flexible distribution of annual leave, aiming at facilitating efficiency and productivity gains (European Commission, 2012b).

In the established mechanism for collective dismissals, as set with law 1387/1983, the first step is the consultation between employers and employees. If the two parties reach a consensus, regarding the concerning collective dismissal and relevant dismissal plan, then the firm can move forward with the dismissals.[21] If discussions between parties fail, then the Supreme Labour Council, which includes participants from the government and the employers' and employees' organizations, is responsible for approving or not the dismissal, taking into account a set of criteria. In 2014, the Supreme Labour Council had specified unanimously the criteria that should be taken into account when examining a proposal of collective dismissal. If the criteria are met, then the Minister of Labour adopts the relevant decision which approves the collective dismissal. Introduced changes in the collective dismissals' framework aimed at reducing uncertainty on the conditions and the process which apply in cases of requests by companies in distress (European Commission, 2014).

As part of the first two Programmes a number of reforms were introduced, aiming at easing the employment protection legislation, increasing the adjustment capacity of firms and ultimately boosting employment ((European Commission, 2010b). As we can see in Figure 2, after the implementation of such reforms the EPL indicator decreased from 2.8 in 2009 to 2.12 in 2013.

[21] From 2011 to 2016, 10 cases of collective dismissals had been agreed between the parties.

Figure 1.2: Strictness of employment protection legislation (OECD indicator)



Source: OECD

1.3.4. Support to the unemployed

Rising long-term unemployment was a threatening reality for the Greek economy, with an estimation of 400,000 families without a breadwinner (European Commission, 2013a), requesting drastic policy changes. As a response, the government created an Employment Action Plan, with a number of Active Labour Market Policies (ALMPs). Four main actions were included in the plan:[22]

1. Introduction of public works programmes

   Public work programmes were legislated with law 4152/2013 (subparagraph ID.1, article 1), but the initial provision did not include long-term unemployed at the potential beneficiaries. Subsequent law 4254/2014 (subparagraph IA.7, article 2) added long-term unemployment at the potential applicants.

[22] For a detailed analysis of ALMPs introduced the period 2008-2013 see Moutos, 2016.

At August 2013, a public works programme had been launched for 50,000 beneficiaries, with a budget of €213 million. The programme targeted jobless households, long-term unemployed and young people not in education, employment or training (NEETs). Public work programmes lasted five months for each beneficiary and the monthly wage of the beneficiaries was equal with the gross minimum wage.

2. Promote internships for 45,000 young unemployed in the private sector
    a. Voucher for the Young Unemployed for 35,000 beneficiaries, with a budget of €130 million
    b. Voucher for Young Unemployed in the Tourism sector for 10,000 beneficiaries, with a budget of €39 million
3. Reform of the Public Employment Service (OAED)
   OAED's reform aimed at improving job matching and promoting changes in the apprenticeship schemes. For the re-engineering of OAED a close collaboration had been established between OAED, the Ministry of Labour, the Ministry of Education, the German Ministry of Labour and the Greek-German Chamber.
4. Improve & expand opportunities for apprenticeships and vocational training

In addition to the above, institutional changes were made for addressing long term unemployed needs. Specifically, law 4093/2012 (subparagraph i1.1, paragraph III, article 1) introduced a long-term unemployment benefit, effective from the beginning of 2014. The benefit accounted for €200 per month for up to 12 months, subject to annual household income. Additionally, law 4254/2014 (subparagraph IA.7, article 1) declared that for the long term unemployed the (established) seniority premium would be 5 per cent for every 3-years work experience, up to 15 per cent in total (half of what other employees received).

1.3.5. Undeclared work

The fight against undeclared work was one of the policy areas which undergone significant changes under the Second Economic Adjustment Programme. Initial milestone of the Programme in this area was the assessment of law 3996/2011 and SEPE in general by an independent external actor, the ILO. ILO's assessment should cover the Body's mandate, activities, structure and the enforcement and penalty structure for labour infringements (European Commission, 2012b). After the assessment, ILO composed an action plan for the strengthening and overall improvement of SEPE (European Commission, 2014).

The labour card was also marked as a crucial reform concerning tackling undeclared work. Although its use was legislated with law 3996/2011, it was re-instituted with law 4046/2012 wherein was declared that there would be a gradual introduction of the firms to the new system, starting from March 2012.

A new element introduced with the institution's incitement was the transition from the hard-copy submissions of the documents concerning SEPE to an electronic one. MD 5072/2013 stated the declarations that were to be submitted electronically, whereas the previous regime set that such declarations were submitted in hard-copy at the local Labour Inspectorate Department.

In May 2013, the IT application in which the declarations should be submitted was defined. Subparagraph IA.3 of l 4152/2013 introduced the IT system ERGANI, to which all private-sector employees (their employment contracts, working hours, wages and all changes concerning the above) were to be declared. ERGANI was valuable to the inspectors, keeping better records of relevant documents, but also to firms, removing parts of the bureaucracy.[23]

The penalty for undeclared work was legislated for the first time with MD 27393/122 (resulting from articles 23 & 80 of law 4144/2013) and was set to €10,549.44 for

[23] The introduction of this IT system was followed with monthly publications of the ERGANI reports. The monthly reports include the number of inflows and outflows in the labour markets, as well as the proportion of full time and part-time employment contracts. The annual report of ERGANI, published at the end of each year, reports the labour market's "inventory", including also data for the wages of the employees.

employees over 25 years old and €9,197.10 for employees under 25 years old.[24]In cases of repeated infringements of undeclared work, temporary or permanent closure of a specific production process ora section or sections or the whole of the undertaking or operation in which the infringementwas committed, can be imposed, in addition to the above fines, as set out in law 3996/11 (Williams et al, 2016). The same MD reformulated all fines imposed by SEPE concerning violation of the labour code.

In order to monitor and assess undeclared work, an operational plan for tacking uninsured and undeclared work (ARTEMIS) was introduced in October 2013. The reports of ARTEMIS include qualitative and quantitative statistics, resulting from the inspections of SEPE and the special inspection unit of the social security fund (EYPEA). The report is published annually by the Ministry of Labour.

1.3.6. Non-wage labour costs &wages at the public sector

Part of the Programme's milestones was the reduction of the non-wage labour cost. The proposal was for a 5 per cent reduction in the social contributions of private-sector employees, implemented in a budget-neutral way. The measure would be implemented in two steps: firstly, with closing small earmarked funds engaged in non-priority social expenditures (OEK, OEE) and then by adjusting the base for contribution collection. Law 4046/2012 closed OEC and OEE, whereas law 4093/2012, subparagraph IA.6 article 1 reduced the social contribution rates by 1.1 per cent by abolishing relevant revenues from the social contributions for private-sector employees paid by the employer.

The second reduction of the social security rates was introduced with law 4254/2014, subparagraph IA.3, article 1, which decreased the rates by 3.9 per cent. The reductions were mainly to the employer-paid contribution, with only 1 per cent reduction corresponding to the employee-paid contributions. The reform's objective was to reduce labour costs, increase net wages and encourage labour supply (European Commission, 2014).

[24]Previously there was not a fine for undeclared work. In cases of undeclared personnel the relevant infringement was marked as "missing the personnel table" and had a penalty of €500.

The wages of the public sector employees continued to be a matter of negotiations between the government and the Troika. Although public sector employees had already reduction in their monthly wages through the unified public sector pay scale (introduced with law 4024/2011) and had been receiving reduced allowances (Easter, summer and Christmas allowances), the public sector wage bill continued to be above the expected wage drift. Law 4093/2012 (paragraph C, article 1) introduced further decreases in the earning of public sector employees, with the abolition of the 13thand 14th wages and the integration in the unified pay scale of employees in the wider public sector (Moutos, 2015). Introduced reforms accounted for reductions in public sector earning of 22-40 per cent (Tzannatos and Monogios, 2013), but the unadjusted public wage premium remained almost unaffected, from 28.2 per cent in 2009 to 27.5 in 2013 (Christopoulou and Monastiriotis, 2014).[25]

[25]Christopoulou and Monastiriots (2014) calculated also the adjusted (for individual characteristics) public wage premium which rose from 8.8 per cent in 2009 to 9.3 per cent in 2013.

Table 1.13: Examples of major labour reform measures since 2010

Wagesetting

2011

Suspension of the extension of occupational and sector collective agreements

Suspension of the favourability clause

Allowing for workers' representatives other than trade unions to negotiate firm-level collective agreements, as far they represent at least three-fifths of the undertaking workforce

2012

Reducing and subsequently freezing minimum wages

Introducing a generally applicable subminimum wage for the youth

Making the marital allowance optional for minimum wage employees

Allowing recourse to arbitration to set negotiation disputes only if by mutual agreement (2010 and 2012)

Setting the maximum duration of collective agreements at 3 years

Revising the regime of 'after effects' of expired collective agreements to a maximum period of 3 months after expiration

Creating apprenticeships contracts sub-minima wages for the youth (2010, 2011 and 2012)

2013

Reforming the minimum wage framework to make it statutory and set by the government after consultation with social partners

Job protection

2010

Extending the probation period for new hires to 12 months

Relaxing the thresholds for collective dismissal

Raising the maximum work period under temporary working agencies to 3 years

2011

Expanding the possibilities for the use of fixed-term contracts

2012

Reducing the period for dismissal notice (2010 and 2012)

Reducing the levels of severance pay (2010 and 2012)

Aligning labour conditions in former state-owned enterprises with those in the rest of the private sector

Working time

2010

Reducing overtime premia

Extending part-time shift work (or partial lay-off) to nine months

2011

Increasing opportunities for working time arrangements by increasing the possible maximum duration of their application within a reference period of 12 consecutive months; and, eliminating the wage top-up for work in excess of the reduced hours over the period of reduced hours (2010 and 2011)

Allowing for workers' representatives other than trade unions to negotiate firm-level collective agreements, as far they represent at least three-fifths of the undertaking workforce

Source: European Commission

1.4. Labour market reforms under the Third Economic Adjustment Programme (ESM Programme)

The Institutions marked the labour market reforms implemented under the first two Programmes as successful, as they managed to eliminate a significant part of stifling rigidities that had led to oversized sectors and wages disconnected from productivity dynamics. Adjustments in the legal framework of the labour market helped to realign wages with productivity, recover the country's competitiveness in terms of unit labour costs, that was lost the last decade, and making hiring more dynamic (European Commission, 2014). Nevertheless, the unemployment continued to rise, wages were decreasing and growth was not accelerated.

Despite the glowing remarks by the Institutions, the new government was elected with a mandate to restore the previous labour market regime. During the first four months of 2015, the Ministry of Labour drafted a bill regarding restoring the previous collective bargaining framework. The proposing bill was met with disapproval from the creditors, and only a part of the proposal passed through the Parliament (law 4331/2015) –a provision that set the after effect of the collective agreements to six months, as it was under the previous regime.

In the new Programme, agreed on August 2015, labour market reforms continued to be part of the agenda, with the emphasis being on the need to ensure the right balance between flexibility and fairness (IMF, 2017). As a prior action, the provision regarding the after effect of the collective agreements (article 72, law 4331/2015) had to be abolished (reinstating the three months duration of the after effect). The government committed to review existing labour market institutions, especially collective dismissals, industrial action, and collective bargaining, taking into account best EU practices. It was noted that the government should not return to past policies if such policies do not promote sustainable and inclusive growth. The Memorandum included also changes on the undeclared work field, in order to strengthen the competitiveness of legal enterprises and protect workers.[26]

[26]Memorandum of Understanding between the European Commission, acting on behalf of ESM and the Hellenic Republic and the Bank of Greece, August 2015.

The first review of the Programme did not include any reforms on the labour market. First changes were introduced as prior actions for the second review, in the spring of 2017. Before the end of the negotiations of the second review, the IMF issued its article IV consultation staff report.[27] The report emphasized "the need to preserve and not reverse existing labour market reforms and complement them with additional efforts to bring Greece's collective-dismissal and industrial-action frameworks in line with best practices, open up remaining closed professions, foster competition, and facilitate investment and privatization" (IMF, 2017). The report stated the view of the Fund on reforms that should be implemented, insisted on reserving the framework of collective bargaining and introducing changes on collective dismissals (repealing the requirement for administrative approvals and raising the threshold for collective dismissals) and industrial action (revising the quorum requirements for trade unions calling a strike and allowing defensive lockouts by employers) (IMF, 2017).

IMF's report presents the government's wished reform agenda concerning the labour market, giving light to the different views between the negotiating parties. The Ministry of Labour stated that implemented collective bargaining reforms were not helpful and should be unwound in order to bring the country in line with the European Social Model. Concerning industrial action and collective dismissals, the Ministry referred to the labour market's review from the team of independent experts and the views of the social partners and argued that no changes are needed in this area (IMF, 2017).

1.4.1. Collective Bargaining & Industrial Action

For the review of the existing labour market institutions, a committee of independent experts was appointed. The members were selected jointly by the Greek authorities and the Institutions (European Commission, 2017). The goal of the committee was to review existing policies in the country and compare them with EU best practices. Taking into account the results of the comparison between EU countries and Greece, the committee would propose changes.

[27]Discussions under the review were conducted in September 2016.

The committee concluded its report in September 2016. The report included the review of existing institutions and recommendations in four areas: collective action, collective dismissals, MW and collective bargaining. Due to differences between the members of the committee, the report included majority and minority proposals. Regarding collective dismissals and collective action, no recommendations were made.[28] On MW, the committee had split opinions: members of the committee recommended the return to previous regime (the MW to be decided through collective bargaining) whereas another part of the committee believed that the MW should be decided by the government. Furthermore, the committee was divided on the issue of the subminimum wage for the youth, with one part proposing its replacement with an experience-based subminimum wage and the other part suggested maintaining the existing framework.

With respect to collective bargaining, two distinct views were raised. One part of the committee recommended the restoration of the favourability principle and the extension of collective agreements, the introduction of opt-out clauses in the collective agreements and that other issues, such as the time extension, the after-effect and the duration of collective agreements, should the byproduct of social dialogue. The other part of the committee defended existing provisions concerning the above, proclaiming micro wage flexibility. On the issue of the unilateral resort to arbitration, the committee recommended the evaluation of the existing framework at the end of 2018.

The first relevant changes were made in 2017 with law 4472/2017. Article 17 of the law introduced an updated procedure for collective dismissals, abolishing the requirement of an administrative approval from the Minister of Labour. The new process required the submission of a "social plan" from the employer, outlining the possible accompanying measures to limit the consequences of the redundancies, as well as the establishment of a new department of the Supreme Labour Councilwhich will be responsible for collective redundancies. The new department would have

[28]Regarding the procedures for calling on strike, the Expert Group concluded that it is up to the legislators to define the conditions of a legal strike. Regarding the prohibition of lock-outs, the Group found that existing legislation established a balance of power between employers and unions. Nevertheless, the legislator should clarify the employer's right no to pay non-striking workers if the firm is now working due to a strike (van Ours et al., 2016).

equal representation from employees' and employers' organisations and the state (European Commission, 2017).[29]

Concerning lock-outs,[30] although existing framework (law 1264/1982) was reviewed under the Programme, no legislative changes were made, mainly because the social partners did not considered it to be an element that needed alterations (European Commission, 2017). It should be noted that lockouts under the Greek legislation are prohibited, making the country an outlier in the EU (Moutos, 2015).

Modifications concerning industrial relations were introduced. Article 18 of law 4472/2017 included two additional justified reasons for the dismissal of employees protected as trade union members: embezzlement against the employer or his representative; and, unjustified absence of more than three days (European Commission, 2017). Art 19 of the same law introduced small changes regarding leave benefits related to union activity.

Law 4472/2017 (article 16) and law 4475/2017 (article 5) declared unambiguously that the favourability and the extension principles would be re-instated after the end of the Third Memorandum. At the same time, it was agreed that the administrative process measuring the level of representativeness of sectoral agreements would be updated.[31] The new mechanism for measuring representativeness was adopted with circular 32921/2175 which stated that all relevant data will be analysed through PS ERGANI.[32]

Amendments on the procedure of calling a strike at the firm level were made with law 4512/2018, article 211: the quorum required for the vote by first-level trade unions to call a strike has been increased from one third to one-half of trade union members current on their membership fees (European Commission, 2018d).

[29] The department has in total 15 members; 5 members appointed from the government, 5 members from the employees' organisation and 5 members from the employers' organisations.
[30] A defensive lockout imposed by an employer to protect materials, property, or operations, or in response to a partial or selective strike. An offensive lockout is where the employer initiates the industrial action. Lock-outs are used as defensive method for employers during labour negotiations (Moutos, 2015).
[31] Under previous regime, the representativeness was measured though the calls the local departments of SEPE made to firms.
[32]The new mechanism for measuring representativeness had been approved by all social partners at a common letter to the Minister of Labour. The letter included the agreement of the social partners for all changes introduced under the third review of the Third Programme.

The final review of the Programme included negotiations concerning the role of arbitration in collective bargaining. The government had agreed that an independent legal report would be drafted and the report would be used as a basis for discussions with the social partners for future changes in the system (European Commission, 2018b). The report showed that arbitral decisions represent only a small part of collective agreements, with the average rate of arbitral decisions being 12 per cent the last 28 years. Specifically, since 2014 only a small number of collective disputes requested mediation and arbitration (7.66 per cent of collective disputes were led to mediation and 2.27 per cent to arbitration). Finally, 55 per cent of mediation and arbitration cases are resolved consensually by the parties, without the need of the arbitral decision (Goulas, 2018).

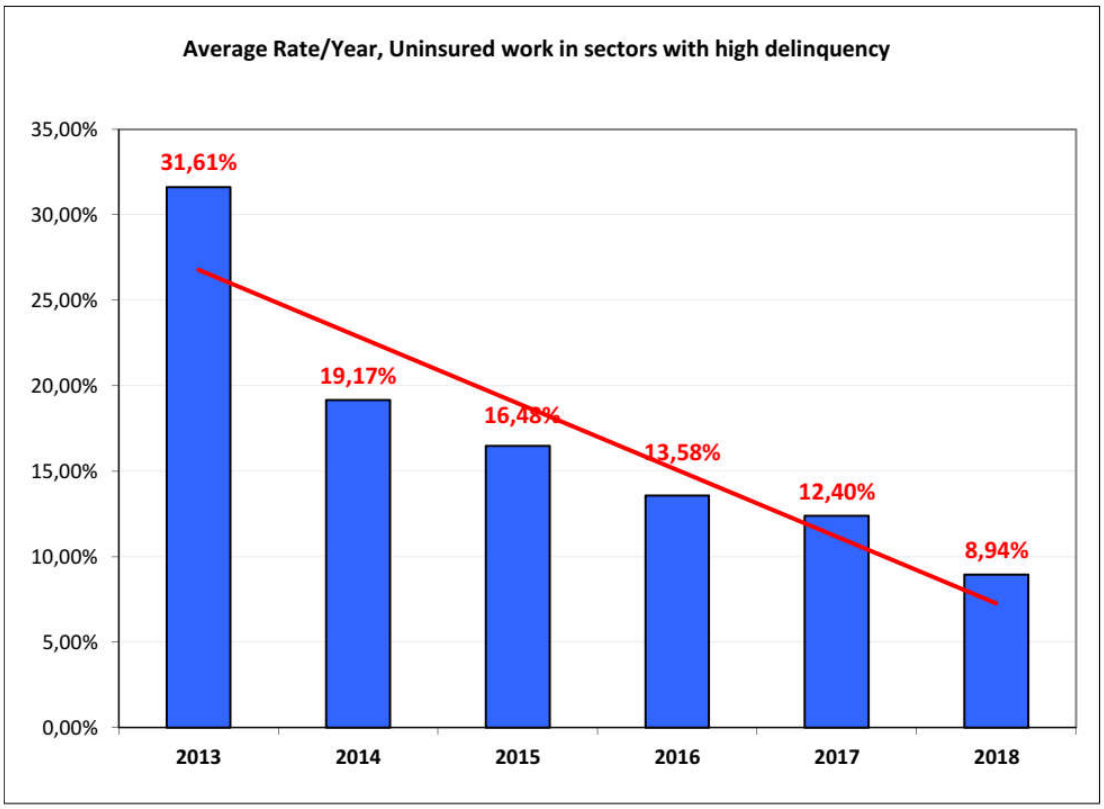
Negotiations between social partners, the government and the Institutions resulted at the provisions of law 4549/2018 (article 15 and 16). This legislation introduced changes in mediation (the mediator could submit a proposal allowing parties to resume bilateral negotiations), arbitration (the purchasing power of wages was added as a criterion in the decision of the arbitrator), unilateral recourse to arbitration (it was made possible only for the party that has accepted the mediator's proposal while the other refused it or if the other party had refused to enter in mediation) and the duration of the term of OMED board member (increased from three years to five) ((European Commission, 2018e).

1.4.2. Undeclared Work

The fight against undeclared work continued to be a key objective of the ESM programme, as addressing the issue was essential in order to strengthen the competitiveness of legal companies, protect workers and improve tax and social security revenues (European Commission, 2017). For the purpose of the above, a technical assistance project with ILO was launched in early 2016. ILO produced a diagnostic report, identifying the key drivers of informality, resulting in a 3-year roadmap for tackling undeclared work (starting from 2017), which was endorsed by the government and the social partners.

One of the actions of the roadmap was the revision of the existing system of fines of undeclared work, which resulted in new legislation (articles 5 to 7, law 4554/2018). The new architecture of the fine for undeclared work, approved also by the social partners, provided incentives for compliance (discount if the employers formally declared the undeclared employee) and discouraged fraudulent behaviour (if the same company was inspected again and found with undeclared personnel, the fine was doubled) (European Commission, 2018d). Other actions included in the roadmap was the development of risk-analysis rules for targeted inspections and the creation of interoperability mechanisms between the Ministry of Labour, the Ministry of Finance, SEPE, IAPR, OAED, EFKA and the Greek police (European Commission, 2018d).

Figure 1.3: Undeclared work in sectors with high deliquency



Source: ARTEMIS 2018 report, Ministry of Labour

1.4.3. Support to the unemployed

During the Memorandums, OAED had undergone a deep re-organization. Despite this upgrade at OAED services, the organization continues to face a very difficult task, as more than 900,000 people were registered as unemployed in 2015. As part of the third

review of the ESM programme, a new ALMPs strategy had been agreed, incorporating the following elements:

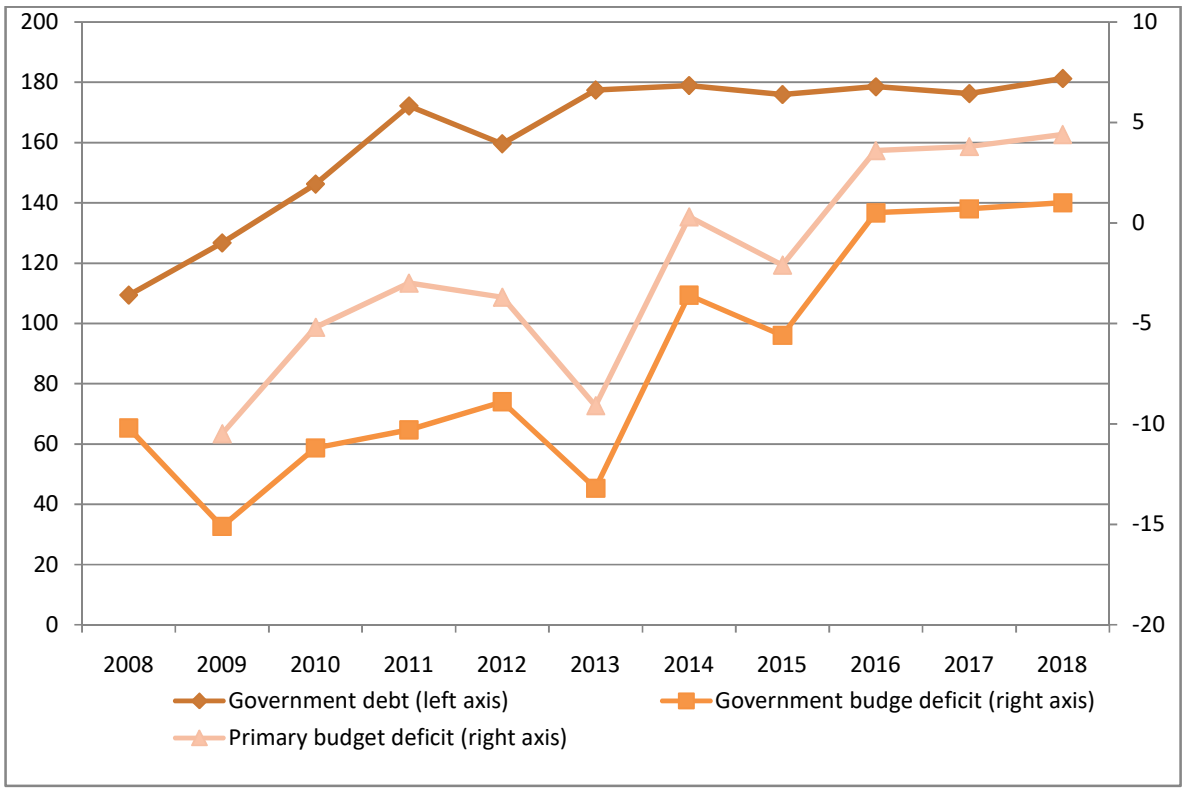
1. The enhancement of the role of the employment counsellors with the introduction of individual profiling
2. The implementation of the mutual obligations' framework
3. An updated framework of quality specifications for ALMP training providers
4. The establishment of a monitor and evaluation system, for the design and assessment of ALMPs
5. A new model of integration of the unemployed, with the introduction of open framework programmes, aiming to continuous availability of actions and services

1.5. The macroeconomic environment during the Economic Adjustment Programmes

In this section, we will present the evolution of different macroeconomic indicators from the beginning of the crisis until 2018.

Figure 1.4 displays the evolution of public debt, budget deficit and primary deficit as percentages of GDP. The country achieved for the first time surplus in 2016 (primary surplus of 3.6 per cent), and sustain it the following years, leading to a 4.4 per cent primary surplus in 2018. Public debt continued to increase, reaching its highest in 2018 (181.2 per cent of GDP), 35 percentage points higher of what it was in 2010 (146.2 per cent).

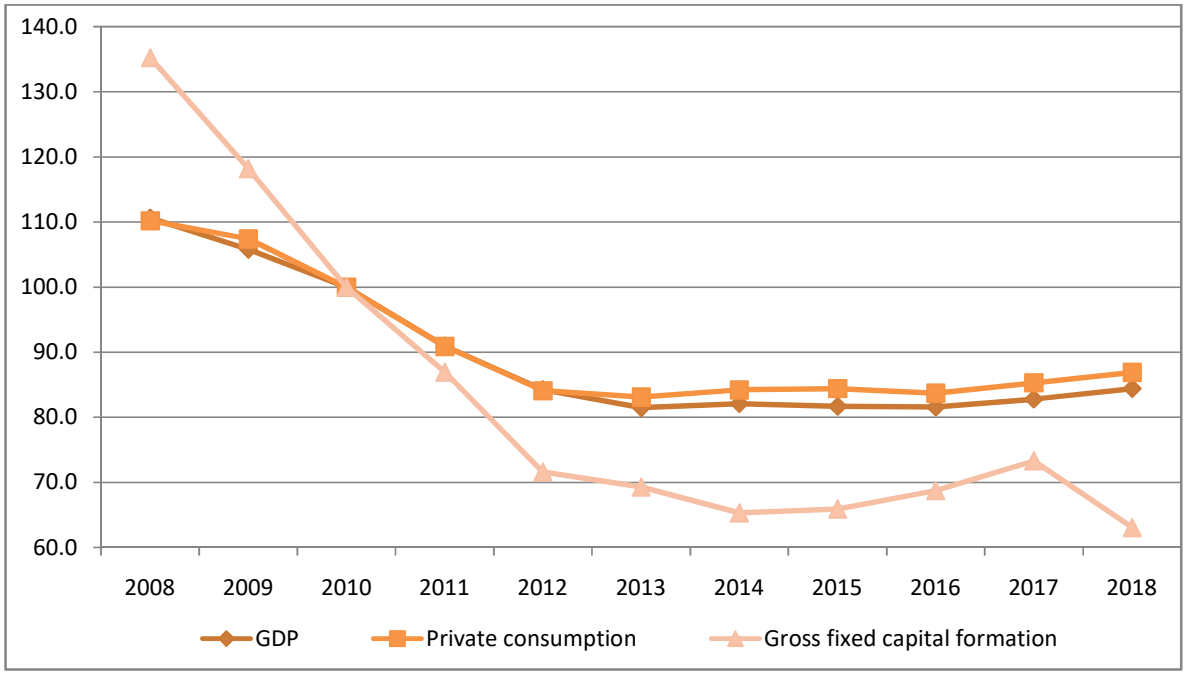
Figure 1.4: Government budget deficit, primary deficit and debt (per cent GDP)



Source: Eurostat

The deep nature of the Greek Crisis is captured at the evolution of investment in the country, presented in Figure 1.5. In 2013 investments was almost 50 per cent down from 2008. Even after 2014, the year most indicators start to show signs of recovery, investments recovered only slightly, being in 2018 37 per cent lower from when the country entered the Economic Adjustment Programmes in 2010. GDP and private consumption had similar evolution throughout the years, both being in 2018 a little higher from 2012 (GDP +0.2 per cent and consumption +2.8 per cent) but still significantly lower than in 2010.

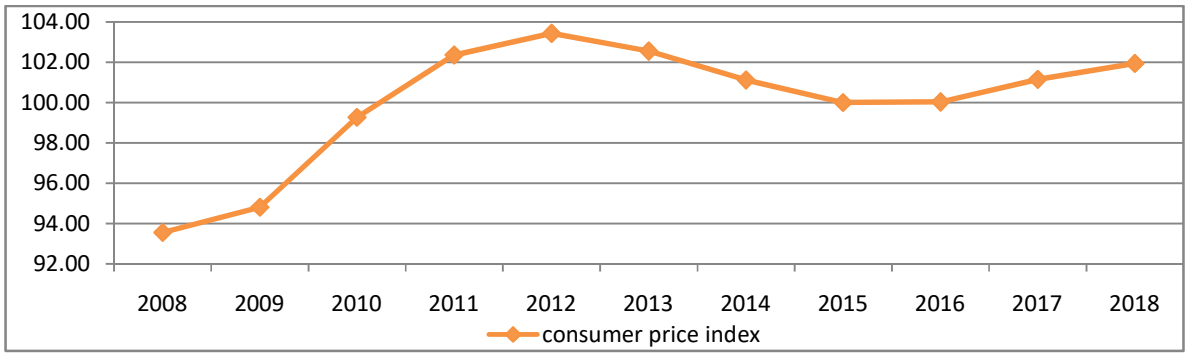
Figure 1.5: GDP, Investments and Consumption (2010=100)



Source: Eurostat

Signs of recovery are captured also at the evolution of the consumer price index, presented in Figure 1.6. The index increased substantially from 2008 to 2012 and declined for the period of 2012 to 2016. The index had 1 per cent growth after 2016, with similar rates of growth projected up to 2021 (European Commission, 2019b).

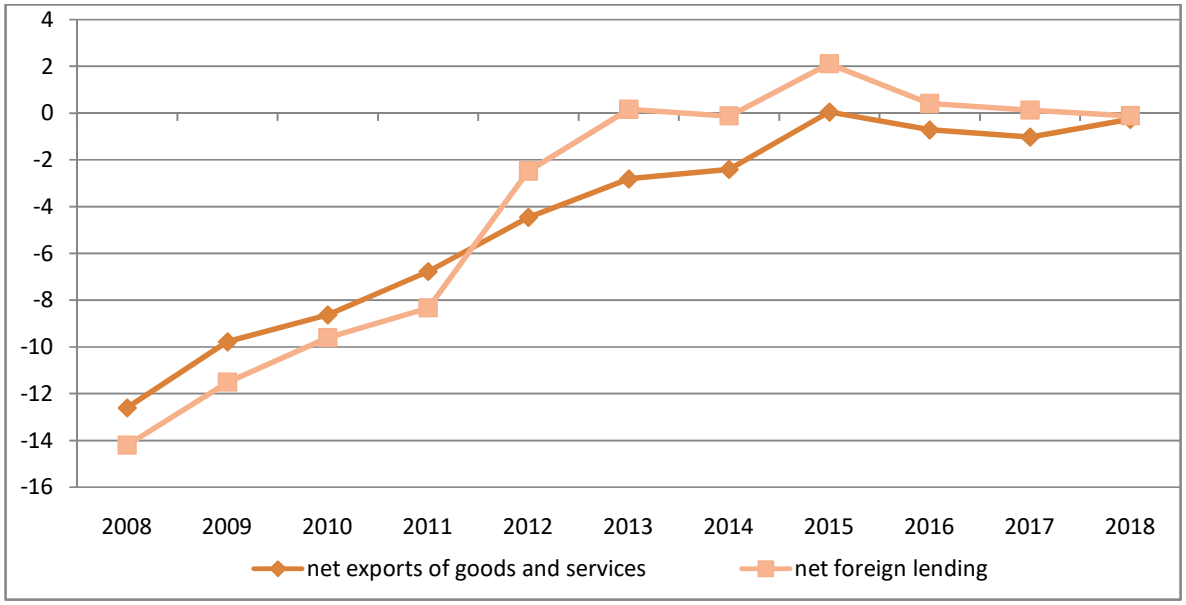
Figure 1.6: Consumer Price Index (2015=100)



Source: Eurostat

The deficit in trade in goods and services, as well as the net foreign lending (Figure 1.7), had been continuously improving from 2008 to 2015, both being positive in 2015 (net exports were 0.05 per cent of GDP and net foreign lending was 2.11 per cent of GDP). For the years up to 2018, both percentages declined but remained close to zero (with net exports being -0.26 per cent of GDP and net foreign lending -0.12 per cent of GDP in 2018).

Figure 1.7: Net exports of goods and services and net foreign lending (per cent GDP)

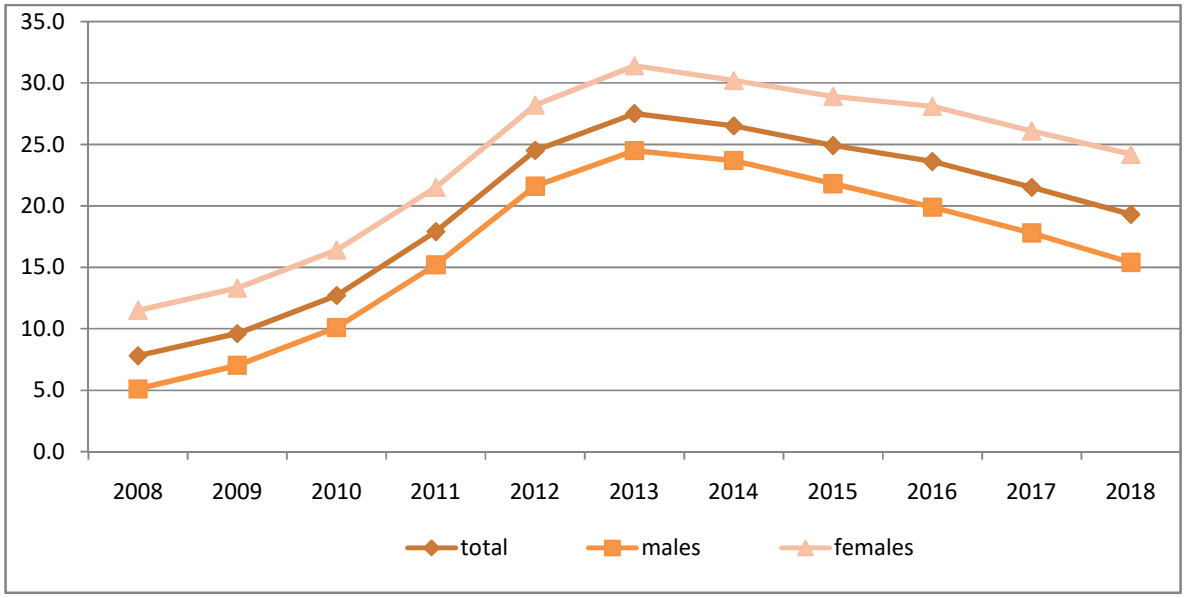


Source: AMECO

Figure 1.8 displays the evolution of the unemployment rate from 2008 to 2018 for the total of the population as well as for males and females. For both genders, unemployment increased noticeably up to 2013, when and it peaked, with total unemployment reaching 27.5 per cent, more than double of what it was at 2010, at the beginning of the Economic Adjustments Programmes. Recovery started slowly at 2014, leading to an 8.2 per cent decline from 2013 to 2018. At 2018 unemployment rate was 19.3 per cent, an improvement from the 2013's levels, but still significantly high. It is worth noting that the gender unemployment gap closed the first years of the crisis and widened again after 2013. The female unemployment rate was 2.3 times the male rate in 2008 (female unemployment was 11.5 per cent whereas male was 5.1 per

cent), declining to 1.3 times in 2013 (31.4 per cent versus 24.5 per cent) and rising again afterwards, leading female unemployment rate being 1.6 times the male rate in 2018 (24.2 per cent versus 15. 4 per cent). This variance in the unemployment gap between the two sexes may reflect higher job-searching among females during the first years of the crisis due to the added-worker effect, i.e. the decision of the females to participate at the labour market as a response to job or wage losses suffered from the male primary earner, aiming at maintaining the family income (Moutos, 2015).

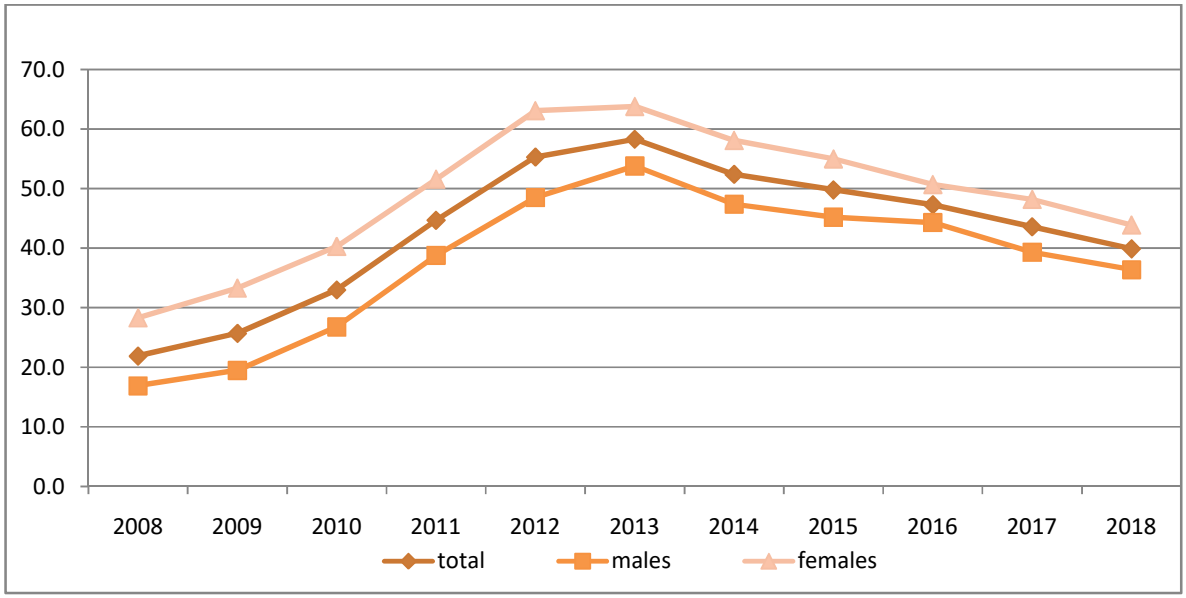
Figure 1.8: Unemployment rates



Source: Eurostat

The youth unemployment rate (concerning workers between 15 and 24 years of age), displayed at Figure 1.9, was almost 3 times higher than total unemployment in 2008 (21.6 per cent for the youth and 7.8 per cent for the entire workforce), a gap that closed through the years. The youth unemployment rate peaked in 2013, reaching 58.3 per cent, and declined ever since, leading to being at 39.9 per cent in 2018. The gap between the sexes is lower in younger employees and closed even more during the years examined. In 2008 the female unemployment rate was 1.7 times higher than the male rate (28.3 per cent versus 16.9 per cent) whereas in 2018 the female rate was 1.2 times higher than the male rate (43.9 per cent versus 36.4 per cent).

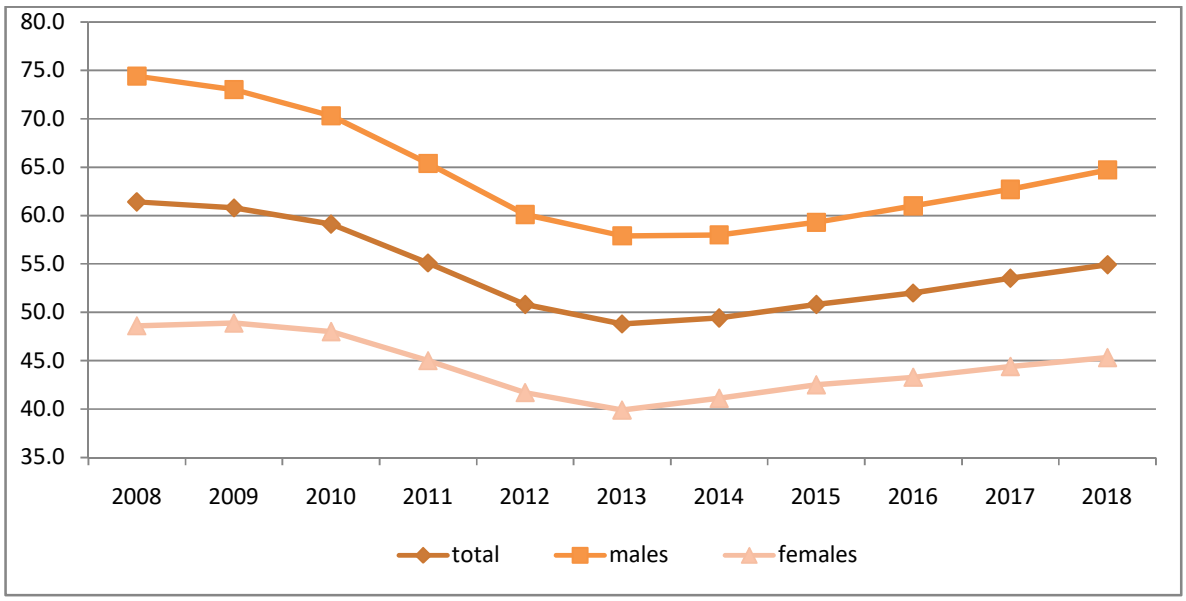
Figure 1.9: Youth unemployment (15-24 years old)



Source: Eurostat

The employment rate, displayed in Figure 1.10, evolved similarly. Employment rate was 61.4 per cent in 2008, reached its lower level in 2013 (48.8 per cent) and increased afterwards, reaching 54.9 per cent in 2018. Female employment rate showed better signs of recovery, being only 3.3 per cent lower in 2018 compared to 2008 levels (45.3 per cent in 2018, when it was 48.6 per cent in 2008), with the same deviation for males being 9.7 percentage points (64.7 per cent versus 74.4 per cent). This convergence in employment rates between the sexes may reflect the fact that the crisis affected most male-dominated sectors (Moutos, 2015).

Figure 1.10: Employment rate



Source: Eurostat

1.6. Main research questions and thesis' structure

The present thesis studies the effect of the minimum wage reforms introduced under the Second Economic Adjustment Programme on employment. It examines the effects of the following reforms: the introduction of the subminimum wage for the youth, the abolition of the marital allowance as a top-up MW benefit and the effect the decrease of the minimum wage had on the employment behaviour of export firms.

The thesis is developed as a collection of papers and consists of five chapters including the introduction and the conclusions. In Chapter 2, the effect of the introduction of a subminimum wage for the youth on employment probabilities is estimated. Chapter 3 discusses the effect of the abolition of the marital allowance. Finally, in Chapter 4, a descriptive analysis is presented concerning the effect of the 2012 minimum wage reduction on employment behaviour of export companies. The general conclusions of the thesis are presented in Chapter 5.

Chapter 2: The Subminimum Wage Reform in Greece and the Labour-Labour Substitution Hypothesis

2.1. Introduction

A widespread concern regarding the minimum wage institution is that it may end up harming the younger and less-skilled workers, i.e. a significant part of those that it intended to help (see, e.g. Stigler, 1946). This long-standing concern received some empirical support, which was crystallized as the "consensus" view by Brown et al. (1982, p. 524) who, on the basis of a six-volume report summarizing evidence for the United States and Canada, concluded that: for teenagers (ages 16-19), a 10 percent increase in the minimum wage reduced teen employment, most plausibly, between 1 and 3 percent; for young adults (ages 20-24), the employment impact is "negative and smaller than that for teenagers"; for adults, the "direction of the effect...is uncertain in the empirical work as it is in the theory."

The purpose of this paper is to examine the effects of the age-differentiated decreases in the minimum wage which Greece implemented in 2012 as part of its economic adjustment programme(s) agreed with the European Union (EU), the International Monetary Fund (IMF), and the European Central Bank (ECB) – aka *Troika.* Until March 2012, all workers, independent of age, were entitled to the same monthly minimum wage (€751), as determined by the last National General Collective Agreement (signed in 2009). In March 2012, this wage was reduced by government decree to €586 for workers aged 25 and above (a decline by 22 %), and to €511 for those aged less than 25 (a decline by 32%). Moreover, it was stipulated that the new minimum wage rates would remain fixed until the end of the economic adjustment programmes, which are still (March 2018) in operation.

The avowed aim of the legislated reduction in the minimum wage and the introduction of a sub-minimum wage in Greece was to "permit a decline in the gap in the level of the minimum wage relative to peers (Portugal, Central and South-East

Europe)" and to "help address high youth unemployment and employment of individuals on the margin of the labour market" (Law 4093/2012, Appendix V_1). The second concern was motivated by the extremely high unemployment rates for youth and young adults – which, in the first quarter of 2012, stood at 63.3% for the 15-19 age group, and 51.0% for the 20-24 group, and by the presumption that "labour-labour" substitution (see, e.g. Fairris and Bujanda, 2008; Neumark and Wascher, 2011), would ensure an improvement in the *relative* employment prospects of those aged under 25.

To examine whether the expected outcomes did indeed materialize, we use the "quasi-experimental" nature of this wage reform in order to enquire whether there were any differential employment dynamics in favour of individuals aged less than 25. More specifically, we focus on differential employment dynamics for individuals around the age of 25, i.e. for individuals aged 22-24 and 25-27 (but also for one-, and four-year bands around the age of 25). In this way, we are able to isolate the impact of the introduction of the sub-minimum wage from the operation of the wider macroeconomic environment, and to examine the impact of the reform on groups of workers which are likely to be close substitutes – thus allowing for a relevant examination of the labour-labour substitution hypothesis.

The large size and permanence of the above reform enables us to avoid an issue faced by many empirical studies, namely the fact that many of the minimum wage increases that have been analyzed in the literature are either small, or, their real value has been eroded by the underlying price inflation. In such circumstances, the expected changes in employment or other variables will be minimal, since the presence of even small adjustment costs implies that labour demand today is a forward-looking decision and depends critically on the expected path of minimum wages. To the extent that minimum wages (as, e.g., in the US) are set in nominal terms (and infrequently), a given increase in the nominal value of the minimum wage does not imply persistence in the real value of the minimum wage. As a result, labour demand would never fully adjust to a given minimum wage increase and the long-run consequences of a given minimum wage increase for employment might be quite small (Sorkin, 2015). In contrast, for large and permanent changes, firms have strong incentives to alter their input mix (or exit the market as soon as possible), because the loss in profit from sub-optimal behavior would be significant.

The data used for our analysis come from the Greek Labour Force Survey (LFS), which is a household survey of about 32,600 households each quarter, corresponding to a sampling rate of 0.85%.We estimate probit models to examine whether the introduction of a subminimum wage had differential impact on workers aged around the age threshold for the subminimum wage. Contrary to policymakers' expectations, we find that after the reform there was no statistically significant change in the differential employment probability advantage for private sector employees aged 25-27 over those aged 22-24. (The same holds true when we increase the size of the groups to those aged 25-29, and 20-24, respectively, or whether we restrict the size to just those aged 24, and 25.)We also find that the probability of labour force participation for individuals in the 25-27 group becomes significantly higher (relative to the 22-24 group), indicating that the further reduction in the minimum wage for the younger group had the expected labour supply effects (i.e.in response to a relative wage cut it reduced the group's relative labour supply).The (relative to the younger group) increase in labour force participation of the 25-27 group is reflected in a (statistically) significant improvement in the relative job finding rate for non-agricultural, private-sector employees of this group after the reform. Moreover, we find that the reform had no significant differential impact on employment terminations, i.e. it had no differential impact on either dismissals or quits.

These findings are in contrast with the labour-labour substitution hypothesis, according to which any legislation-generated labour cost differential among similar workers that are close substitutes in production is expected to induce differential hiring/retention in favour of workers whose relative labour costs have decreased. However, the extent to which this is reflected in *market* outcomes depends not only on the relevant labour demand elasticity, but on the labour supply elasticity as well (see, e.g. Fullerton and Metcalf, 2002).For example, if in order to attract the extra number of workers below the age of 25 firms would have to offer significantly higher wages (due to a steeply rising labour supply curve), the market outcome will be muted and the employment response will be minimal (Saez et al., 2017). Nevertheless, given the state of the Greek economy in the period under study (with the relevant unemployment rates being in excess of 30%), it would be difficult to justify the assumption of a steep labour supply curve for young workers. However, other forces may have been operating which could nullify the change in the legislated relative

wage minima. This could be due to the existence of union bargaining agreements which entailed wages above the legislated minima and the presence of within-firm fairness norms which do not permit employers to discriminate pay reductions by age. Our data do indeed reveal that the average wage cut was equi proportional for both age groups, thus negating the legislated change in relative labour costs.

In addition to examining the employment effects of the subminimum wage reform, we also enquire as to whether the reform affected labour market reallocations.[33] We find that the direct effect of the reduction in the minimum wage is positive and statistically significant, i.e. the reform increases the probability of transition from one sector to another. This is consistent with the expected reallocation of economic activity from the non-traded to the traded sector since the latter is expected to expand (in both relative and absolute terms) in response to "internal devaluation". However, we find no differential effect on individuals in the 25-27 group relative to the 22-24 group. These findings indicate that the introduction of a subminimum wage was not an important driver of inter-sectoral adjustment.

Given that labour market reforms have been undertaken from the outset of the Greek crisis, we have also examined whether the previous waves of labour market reforms had a delayed effect, which could blur our findings. In particular, we control for the May 2010 decision by the Greek government to reduce the minimum wage for newly hired, and previously unemployed, workers that were up to 24 years old. According to this decision the minimum wage for these workers would be reduced by 20 per cent (from €751 to €601), while their social security contributions would be financed by public funds; moreover, the maximum duration of such contracts was set to 12 months. We find that our previous findings remain intact.

The rest of the paper is organized as follows. In Section 2 we provide a review of the relevant literature. Section 3 presents the main features of the Greek minimum wage system. Section 4 discusses the data, explains the empirical methodology, presents the main results of our analysis, and various robustness tests. Section 5 examines the effects of the reform on labour reallocation, whereas Section 6 controls for the effects of previous reforms. Concluding remarks are offered in the final section.

[33] Labour market reallocation was expected to be an integral part of the Economic Adjustment Programmes for Greece, as the latter envisaged a reallocation of economic activity from the non-traded to the traded sectors.

2.2. Related Literature

The consensus view regarding the employment effects of minimum wages as established by Brown et al. (1982) turned out to be short-lived. The dent in the consensus view, sometimes termed the "new minimum wage research," came with research relying on quasi-experimental evaluations of cross-sectional and longitudinal data, in particular Card (1992a, 1992b) and Card and Krueger (1994), who failed to find negative employment effects for young or low-wage workers in the United States. These findings caused a stir among economists and released a flurry of theoretical and empirical research (see e.g. Card and Krueger, 1995 and 2000; Machin and Manning, 1997; Neumark and Wascher, 2000 and 2008; Manning, 2003; Dickens and Manning, 2004; Portugal and Cardoso, 2006; Hyslop and Stillman, 2007; Dube et al., 2010; Allegretto et al., 2011; Neumark et al., 2014; Totty, 2017) which, to say the least, has not managed to re-establish the previous consensus.

The key focus of the new minimum wage research has been the realization that the identification of minimum wage effects requires both a sufficiently sharp focus on potentially affected workers and the construction of a valid counterfactual "control group" for what would have happened absent changes in the minimum wage. In what follows we first review studies which feature cases similar to the quasi-experimental nature of the minimum wage reform undertaken in Greece, and which have examined whether minimum wage hikes could result in labour-labour substitution.

Pereira (2003) has examined the labour market impacts of the change in Portugal's minimum wage law in 1987, which extended the "full" minimum wage entitlement to 18- and 19-year-old employees; before 1987 this group's minimum wage was set at 75% of the "adult" value. which featured (i) an increase by 50% in the minimum wage for workers aged 17 (since it was raised from 50% to 75% of the full minimum wage), and (ii) an increase by 33% for workers aged 18 or 19 (since it was raised from 75% to the full minimum wage). Using information from employer-based national surveys, she looked at annual changes in age-specific employment levels and wages from 1985 to 1989. The age groups examined were: (i) 18- and 19-year-olds; (ii) 20 to 25-year-olds; and (iii) 30- to 35-year-olds. Using the employment and wage experiences of the 30- to 35-year-old group over the period as a control, she estimated the impact of the large minimum wage change on wages and employment of the

younger groups relative to the control. The substantial increase in the minimum wage for the youngest workers was found to result in the average wage growth of the youngest workers being 7 percent higher than in the control group. The minimum wage increase brought a substantial decline in the employment of 18- to 19-year-olds, with an estimated elasticity of employment with respect to the minimum wage in the range −0.2 to −0.4 for this group. There was also substantial substitution toward the presumably close substitutes in the 20- to 25-year-old group.

The same Portuguese reform has also been studied by Portugal and Cardoso (2006). Unlike Pereira (2003), who used a non-random sample from the Ministry of Labour, they based their analysis on a panel of linked employer–employee data that covers, for each year, nearly all of the wage earners in the private sector. They found that two years after the rise in the minimum wage for teenagers (17-19 years old), there was a decrease in the share of teenagers among newly hired workers, both in continuing firms and in new firms. They also found that the share of teenagers in job separations in continuing firms decreased *sharply* following the rise in their minimum wage. The authors concluded that the main short-term impact of the 1987 minimum wage change in Portugal was the reduction of separations from the employer, which compensated for the reduction of job accessions, and resulted in an overall rise in teenage employment. Moreover, from a worker perspective, they found that teenagers subject to a high wage increase resulting from the change in the minimum wage were more prone to keep their job than comparable groups of workers. This result points to the relevance of supply-side factors, as job attachment for low-wage youngsters may rise following an increase in their minimum wage, reducing the high job turnover that is characteristic of low-wage workers.

Hyslop and Stillman (2007) examined the effects of large changes in the minimum wages affecting youth workers in New Zealand which took place in 2001. The reform entailed (i) a lowering of the eligible age for the adult minimum wage from 20 to 18 years – which resulted in a 69% increase in the minimum wage for persons 18 and 19 years old, and (ii) a rise in the minimum wage applying to 16 and 17 years old from 60% to 80% of the adult minimum- resulting in a 41% increase in their minimum wage. They found: no evidence of adverse effects on youth employment immediately following the reform, but some weak evidence of employment loss by 2003, (ii); evidence of a 10–20% increase in hours worked following the reform for employed

16–17 years old, and up to a 10% increase for employed 18–19 years old; the combined, wage, hours, and employment changes lead to significant increases in labour earnings and total income of teenagers relative to young adults (20-25 years old); and evidence of a decline in educational enrolment, and an increase in unemployment, inactivity, and benefit receipt rates, suggesting that while the minimum wage reform increased the labour supply of teenagers, this increase was not matched by as large an increase in employment. Hyslop et al. (2012) have further examined the 2001 New Zealand reform, by using a linked employer-employee database. They found that firms that had high levels of teen employment at the beginning of the period reduced their shares of teen employment. Moreover, these firms had lower survival rates, on the order of about 5 per cent for firms in the main teen-employing industries and 10–20 per cent for firms in other industries. In contrast, firms that entered the main teen-employing industries during the period had about 2 per cent higher teen employment shares than continuing firms.[34]

The effects of policy-engineered changes in the relative cost of employing younger workers have been examined by Saez et al. (2017) in their analysis of a Swedish payroll tax cut targeted to young workers. The payroll tax cut was large (16 percentage points in total) and was implemented in two steps: first, on July 1st, 2007, the payroll tax rate was cut to 21.3% for workers turning 19-25 during the calendar year, and second, on January 1st, 2009, the payroll tax rate was further cut to 15.5% and eligibility was raised to age 26. Using administrative data, the authors found a zero effect on net-of-tax wages of young treated workers relative to slightly older untreated workers, even six years after the reform. Moreover, their graphical cohort analysis provides evidence in favour of labour-labour substitution by uncovering positive effects on the employment rate of the treated young workers, of about 2-3 percentage points, which arise primarily from fewer separations (rather than more hiring). They have also analyzed the firm-level effects of the tax cut, by sorting firms according to their share of treated young workers and tracing out graphically the time

[34]The authors' preferred explanation for these findings is that start-up and surviving firms are able to adapt their technology to the greater availability of higher-priced teen workers over the period (e.g. Lewis, 2011). The change in relative teen wages may have been sufficiently large and discrete to have induced entering firms to adopt production techniques that used teen workers differently. Firms that were less able to adapt were less likely to survive.

series of firms' outcomes. Heavily treated firms were found to expand after the reform: employment, capital, sales, value added, and profits all increased.

The first study to take an early look at the effects of the introduction of a subminimum wage rate in Greece is by Yannelis (2014). His data spans 2009Q1 to 2013Q3 (i.e. three years before the reform and one year after). He estimated linear probability models and found that the relative increase in the minimum wage for workers in the 25-27 age group resulted in relative employment losses in comparison to workers in the 22-24 age group, who had a larger minimum wage cut. In addition to differences in the time period covered by his data (our data cover the period from 2008Q1 to 2016Q1), the difference in results may also be due to the fact that Yannelis' estimates might be biased.[35] We do not face such a problem, as we estimate probit models and obtain the relevant marginal effects.[36]We should highlight that estimating probit models with random effects or LPMs, does not change our findings qualitatively or quantitatively. Karakitsios (2016), in a study covering a similar time span as the present study, has also studied the effects of the subminimum wage reform, and found evidence in favour of the labour-labour substitution hypothesis. However, while he estimates models for employment only, we also provide estimates for labour force participation, job losses as well as the sectoral reallocation effects. In addition, we focus on employed vs. unemployed individuals, whereas he reports results for full-time employment only. Finally, he only reports coefficients and the odds ratio for the interaction between the reform and the age group, whereas we estimate the "marginal effects" of the reform, i.e. the difference in the change in employment probability for the two age groups caused by the reform.

We now turn to studies which have assessed the impact of minimum wages on labour-labour substitution without relying on data involving policy changes in the relative size of age-differentiated minimum wages.[37]

[35]Horrace and Oaxaca (2006) discuss why OLS estimates of the LPM model could be inconsistent.
[36] In addition, the LPMs that Yannelis (2004) employs, provide estimates of the marginal effects at the mean of the distribution of covariates (marginal effects at the mean), whereas we calculate average marginal effects, which we feel are more appropriate here.
[37] A separate, but related, literature has examined the impact of "Living Wage Laws", i.e. the decisions by many cities in the United States and around the world to enact living wage ordinances which cover specific groups of workers often within narrow geographic boundaries. These *livingwages*are usually defined as the wage necessary to provide a full-time, year-round worker and his or her family with the sufficient income to ensure an adequate standard of living, and are in many cases significantly above (often by more than 30%) the minimum wage. Studies from both the UK (Wills and Lineker, 2012) and

Giuliano (2013), using personnel data from a large US retail firm with more than 700 stores nationwide, has exploited geographic variation in initial wage levels to estimate the effects of the 1996 federal minimum wage increase. In particular, this study focused on the differences between teenagers and adults in wage and employment effects. Unlike previous studies of specific groups of low-wage workers which have relied on household survey data and have been unable to examine changes within firms in relative wages, overall employment, and the composition of employment, her data are detailed enough and have allowed her to derive precise measures of wage and employment changes both for a store's workforce as a whole and for different groups of workers within a store. Contrary to the standard competitive model, she found that in response to minimum wage hikes the required increases in the relative wage of teenagers led to small, but statistically significant, increases in (i) their relative employment, (ii) their labour market participation (especially of the younger and the more affluent of them), and (iii) in their share of new hires. Moreover, she found that at some stores the teenagers that were hired were of higher quality than teenagers already employed at the stores, and of higher quality than the young adults at the stores.[38]

Harazstosi and Lindner (2017) have analysed a very large (about 60% in real terms) and persistent increase in the minimum wage which took place in Hungary in 2001. They found that despite the large increase in the minimum wage, and the large increases in the compensation of low wage workers, there were only limited effects on employment even four years after the reform. Moreover, by grouping workers according to observable characteristics (age, education, gender, region) they concluded that the "type" of workers employed at the bottom of the wage distribution did not change as a result of the minimum wage hike, indicating that there was no labour-labour substitution between different types of labour (e.g. low- and high-skilled workers).

Cengiz et al. (2018) have used hourly wage data from the US 1979-2016 Current Population Survey to estimate the impact of state-level minimum wage increases.

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the US (Fairris and Bujanda, 2007) indicate the existence of labour-labour substitution following the implementation of a living wage policy, with new hires (i) being better educated, (ii) receiving higher wages in their previous jobs, and (iii) more likely to be male.

[38]Lang and Kahn (1998) have also presented evidence that is consistent with substitution from low-skilled adults to possibly higher-skilled teenage students in food-service occupations.

Pooling 138 such policy changes, they have implemented an event study analysis covering three years prior to and five years following each change. Their baseline specification shows that in the five years following the minimum wage increase, employment for affected workers rose by a statistically insignificant 2.8% (s.e. 2.9%). They also test for the possibility of labour-labour substitution by partitioning workers into groups based on four education and six age categories. They found no evidence that low-skilled workers are replaced with high-skilled workers following a minimum wage increase. They also analysed separately those without a high school degree, those with high school or less schooling, women, black or Hispanic individuals, and teens. Despite the considerable variation in the bite of the policy, the employment effects in these sub-groups were mostly close to zero and not statistically significant.

2.3. Minimum Wages and Collective Bargaining in Greece

Minimum wage (MW) legislation was first introduced in Greece in 1953. The MW in Greece is (still) determined at the national level and sets the floor for all wage settlements in the country (independently of regional, sectoral, or firm level), with the exception of wages in the public sector.

During the pre-crisis regime and until May 2010, the "starting point" of the wage-setting mechanism in Greece was the National General Collective Agreement (EGSSE). The process leading to the EGSSE involved negotiation between the social partners – represented by third-tier organizations of employees and employers – and its outcomes included a "freely bargained" MW level (as well as the settlement of various non-wage issues). This MW outcome acted as a legal floor and created a strong signal for the lower-tier collective bargaining that followed, and which was implemented at different levels.

The EGSSE was given legal force by the government and it covered all workers independently of age (must be at least 15 years old), sex, or employment status, and it is legally binding for all workers in the private sector, in state-owned enterprises, as well as for non-permanent civil servants. (Until the late 1970s, MWs were differentiated according to gender, with females earning less than males.) The negotiations usually took place every two years and allowed for bi-annual wage

adjustments in line with inflation. It must, however, be mentioned that the value of the MW varied according to the employee's length of service and marital status; there were also different rates applied to blue- and white-collar workers. (The normal averaging period for complying with the MW legislation is the (6:40h) day for blue-collar workers and the month for white-collar workers). For example, the EGSSE for 2008-2009 provided for staggered increases in minimum levels of pay: 3.45% beginning on 01.01.2008, 3.0% beginning on 01.09.2008, and 5.5% beginning on 01.05.2009.[39]

The statutory level of pay is compulsory even in cases where the employee is paid by piecework, on a percentage basis or in the form of tips. Regarding part-time work, although the position of part-time workers is not covered by collective agreements, they are in effect protected by the extension to them of a pro rata equivalent of the pay levels established for full-time workers. For workers that are less than 18 years old, Law 1837/89 specifies that those that are less than 16 years old, as well as those that are studying, their maximum hours of work must be less than 6 hours per day and 30 hours per week. (This implies that the maximum monthly income for workers that are studying and are less than 18-years old will be 75% of the stipulated MW for a person working 40 hours per week.). Enforcement of the MW legislation is carried by the Inspectorate for Labour, and the employer can be sued for non-compliance by either the Inspectorate or by the employee. Anecdotal evidence suggests that the strictness with which these procedures are enforced is very idiosyncratic.

The pre-crisis collective bargaining framework is reflected in the number of agreements reached, which for the period from 1990until 2009 were:

- about 190 sectoral or occupational agreements at the national or local level (involving bargaining between either second-tier employer and employee organizations, or between first-tier employer and employee organizations);
- about 150 enterprise agreements covering workers in a single enterprise, which were conducted between employers and company trade union organizations covering workers in the specific enterprise.

[39] It should also be noted that (private sector) workers in Greece still receive 14 monthly wages during a calendar year, thus the equivalent of receiving fourteen payments of, e.g. €586 each, during a twelve-month period, is equal to twelve monthly payments of €684 each.

The large number of collective agreements signed each year was considered by trade union officials as the clearest manifestation of the fragmentation of trade union power (Fotoniata and Moutos, 2010). However, the deregulation of the wage-setting mechanism induced by the first Memorandum of Understanding (MoU), and enforced by legislation and government decrees, moved in the opposite direction. It initially targeted the "decentralized" part of the collective bargaining process (i.e. the framework or sectoral and occupational agreements) and ended with the abolition of the EGSSE. There was no substantial involvement of social partners in the design of structural reforms, or any form of public consultation prior to the imposition of the measures. In this context, any subsequent social intervention achieved only small amendments of secondary importance (Moutos, 2015).

The widespread deregulation of the collective bargaining mechanism was part of the first MoU (Law 3845/10) and took effect one year later through Law 4024/2011. This law was instrumental in opening the way for enterprise agreements to differentiate the conditions regarding employment and pay from those stipulated under pre-existing sectoral collective agreements. One of its main provisions was the authorization of "Associations of Persons" as a negotiating and signing party in the collective bargaining process. According to the new legislation an association can be created and negotiate for the conclusion of an enterprise level agreement if at least 60 per cent of the firm's employees participate, regardless of the firm's size. The outcome of this negotiation (agreement) has the following characteristics: (a)precedence over sectoral and occupational agreements, even if it involves less favourable terms, thus abolishing the principle of the most favourable arrangement, (b) compliance with the wage and non-wage settlements of the EGSSE; and (c) no time limit with regard to its coverage.

Under this legislative regime there was a sea change in the collective bargaining process compared with the pre-crisis dynamic in terms of number and types of agreements signed. More specifically, in 2012 the number of agreements reported to the Labour Ministry had altered as follows:

- 29 sectoral or occupational agreements at the national or local level;
- 976 enterprise agreements covering workers in a single enterprise (up from 238 in 2010, and 179 in 2011).

We note that 73 per cent of all enterprise agreements were signed by Associations of Persons, while only 17 per cent were signed by enterprise unions, and 10 per cent were due to local or sectoral collective agreements. The wage bargains concluded under the new regime suggest that, in effect, Associations of Persons worked like a Trojan horse in facilitating wage reductions. It bears noting that among the enterprise agreements signed in 2012, there was wide disparity in outcomes, depending on whether the bargaining unit from the labour side was the newly formed Associations of Persons or the pre-existing enterprise unions. Thus, while only 4% of agreements signed with an enterprise union involve wage reductions, the corresponding measure rises to 65% in the case of Associations of Persons.

Under the first MoU (Law 3845/2010, Annex IV) the Greek government adopted legislation introducing a subminimum MW in order to "promote employment creation for groups at risk such as the young and long term unemployed". The new provisions were targeted at the entry-level workers in the labour market and at apprenticeships, by determining the terms of employment, compensation and social security contribution for employees aged below 25. In this context the following reforms were implemented:(i) for unemployed persons up to 24 years old a minimum rate was introduced at 80% of the full rate (determined by the EGSSE), while the social security contributions were paid by the public Manpower Employment Organization (OAED), and the maximum duration of such contracts was set at12 months (Law 3845/2010; (ii) for workers entering the labour market for the first time and aged below 25 years old a minimum rate was introduced at 84 per cent of the full rate, and provision for an automatic admission of the participating enterprises to the OAED's Programme regarding the subsidy of the employer's social security contributions (Law 3863/2010); and(iii) for 15–18-year-olds who are on apprenticeships(up to one year) a minimum rate was introduced at70 per cent of the full rate (Law 3863/2010). At the same time, there was a provision (Law 3845/2010) that the full minimum rate (€751, paid in 14 monthly instalments during a 12-month period) would remain fixed in nominal terms for three years. The take-up of these programmes was very small; according to data from the Ministry of Labour and Social Insurance, only 3.690 persons benefited from them from the start of the programme in October 2010 to its end in October 2014.

The subsequent institutional framework adopted in 2012 (Law 4046/2012, Ministerial Cabinet Act 6/28.2.2012, law 4093/2012) provided (i) a decrease of the (then) current MW level (€751)by 22% at all levels (i.e., irrespective of tenure or marital status) until the end of the programme period; (ii) an additional 10% reduction for workers under the age of 25 (with no exemptions); (iii) an abolition of the 10% surcharge on the MW that employers had to pay to married workers (iv) a freeze of wage increases based on length of service (tenure) until the unemployment rate falls below 10%. These reforms, according to the government's expectations, would "permit a decline in the gap in the level of the MW relative to peers (Portugal, Central and South-East Europe)" and would "help address high youth unemployment and employment of individuals on the margin of the labour market" (Law 4093/2012, Appendix V_1).

Until February 2012, the 12-month equivalent of the basic[40] MW in Greece stood at €877, which was higher than the equivalent rates in Spain (€768) and Portugal (€566), and considerably higher than the MW in Eastern European countries of comparable economic development (e.g., €310 in the Czech Republic, €296 in Hungary, €336 in Poland, €763 in Slovenia). In 2013, the (12-month equivalent) MW in Greece was €684, which was lower than the MW in Slovenia and Spain, but still considerably higher than in Portugal and the rest of the countries (see Table 2.1). However, according to OECD,[41] in 2013, MWs as a proportion of median earnings were 46% in Greece, which was lower than the equivalent proportion in Slovenia (64%), Hungary (54%), Portugal (52%), and Poland (50%), but higher than in the Czech Republic (37%) and in Spain (38%).

Table 2.1: Minimum Wages Levels (12-month equivalent, €)

	2012	2013	2014	2015	2016	2017
Gzech Republic	310	318	310	332	366	407
Greece	877	684	684	684	684	684
Hungary	296	335	342	333	351	412
Poland	336	393	404	410	434	453
Portugal	566	566	566	589	618	650
Slovenia	763	784	789	791	791	805
Spain	748	753	753	757	764	826

Source: Eurostat

[40] By "basic" we mean the MW which an unmarried person with no tenure with the current employee is entitled to. Since the MW in Greece is paid in 14 monthly instalments during a 12 month period, a basic MW of €751 paid 14 times a year is equivalent to 12 monthly payments of €877 each.

[41] See, https://www.oecd-ilibrary.org/employment/data/earnings/minimum-wages-relative-to-median-wages_data-00313-en .

Since March 2012, the level of the MW is set by administrative act, where the role of the social partners is reduced to basic non-binding consultation, and it remains fixed at €586 (rounded to the nearest integer) for workers aged 25 and above, and at €511 for those aged below 25. However, as shown in Table 2.2, the basic minimum wage used to apply to unmarried workers with less than 3 years of employment with the current employer. Thus, in 2011, the MW stood at €751(paid 14 times within a 12-month period) for an unmarried worker (independently of age) with less than 3 years of service with the current employer, and it reached up to €1037 for a married person with 9 years of service – a gap of €286 between the two minima. From March 2012 the gap between the two minima was reduced significantly to €234, and it has stood since November 2012 at €176, for workers above the age of 25.

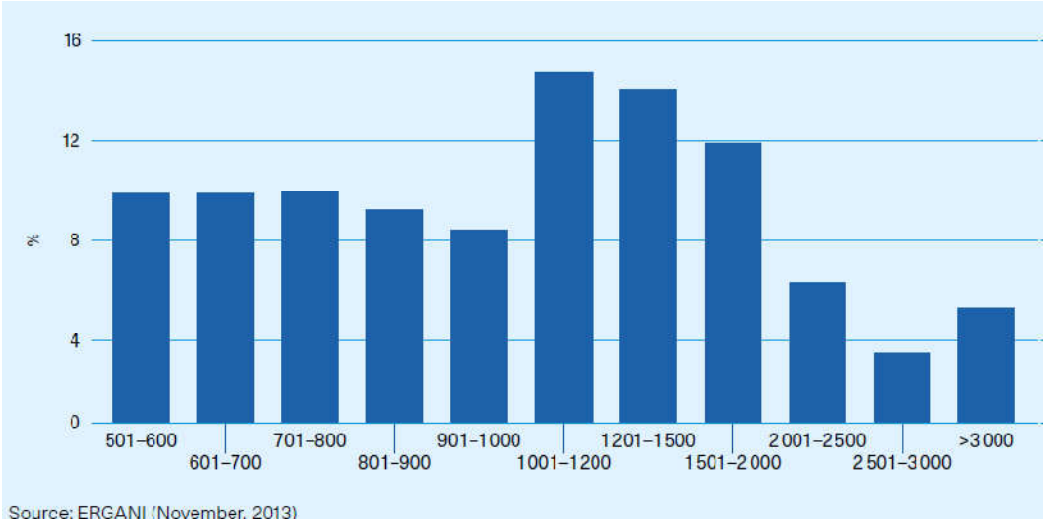
Table 2.2: Monthly Minimum Wages in Greece (in €)

DATE		SINGLE				MARRIED			
		BASIC	1 TRIENNIUM	2 TRIENNIA	3 TRIENNIA	BASIC	1 TRIENNIUM	2 TRIENNIA	3 TRIENNIA
2008	1/1/2008	680.59	737.20	804.31	871.34	748.65	805.35	872.37	939.40
	1/9/2008	701.00	759.41	828.44	897.48	771.11	829.51	898.54	967.58
2009	1/5/2009	739.56	801.17	874.01	946.84	813.52	875.13	947.96	1020.80
2010	1/1/2010	739.56	801.17	874.01	946.84	813.52	875.13	947.96	1020.80
2011	1/7/2011	751.39	813.99	887.99	961.99	826.54	889.13	963.13	1037.13
2012	14/2/2012	586.08	644.69	703.30	761.91	644.69	703.30	761.91	820.51
	12/11/2012	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2013	1/1/2013	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2014	1/1/2014	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2015	1/1/2015	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2016	1/1/2016	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2017	1/1/2017	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2018	1/1/2018	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91

Source: Ministry of Labour & KEPEA

The incidence of MW workers used to be large in total dependent employment in Greece. Dolado et al. (1996) and Fotoniata and Moutos (2010) estimate the pre-crisis proportion of employees remunerated at, or near, the MW to be about 20%. An update of this share can be found by consulting the data provided by the Information System ERGANI (in force since March 2013, under the responsibility of the Ministry of Labour and Social Insurance). More specifically, according to the data for November 2013, the number of employees in the private sector earning up to the MW was recorded at 1.37 million, of which about 1.1 million were full time and about 270 thousand were part time or in job rotation. Data on the wage distribution are only available for full-time workers and are presented in Figure 2.1. Given that the range of MWs in 2013 was from €511 (for those under 25) to €762 (for workers with 3 triennia of service), it appears that the proportion of workers remunerated at, or near, the MW remained very large (i.e. about 30%). By 2017, according to the same source of data, about 34% of workers were earning up to €600 per month, of which about one-third were workers with monthly earnings of €501–€600, and two-thirds were part-time workers, shift workers or workers on short-time contracts.

Figure 2.1: Distribution of Monthly Wage Earnings in November 2013 (€)



2.4. Data and Empirical Methodology

2.4.1. Data

The data employed in our work come from the Greek Labour Force Survey (LFS), made available to us by the Hellenic Statistical Authority. The LFS data are the main administrative source for the Greek Labour market.[42] LFS is a large household survey, consisting of about 32,600 households each quarter, corresponding to a sampling rate of 0.85%. Households are selected randomly and stay in the sample for six quarters. Each period, one-sixth of the sample is replaced. The survey collects information on demographic characteristics, main job characteristics, the existence and characteristics of a second job, educational attainment, participation in education as well as previous working experience and search for a job. The participation in the survey is compulsory.

Two of the dependent variables of interest are indicators of whether a person is *employed* or *economically active* (i.e. a person *participates* in the labour force). A person is considered to be *employed* if during the week it was surveyed, it worked even for just one hour for pay or profit; or if it was working in the family business; or it was not at work but had a job or business from which it was temporarily absent. *Unemployed* are persons, who were without work in the week surveyed; were currently available for work; and were either actively seeking work in the past four weeks or had already found a job to start within the next three months. Finally, a person is classified as *economically active* if it is either employed or unemployed.

The two aforementioned variables (employed and economically active) are constructed from the variable *katap*, available with the LFS survey.[43] In some experiments, we employ actual hours worked, which are the total number of hours actually worked during the reference week in the main job (given by variable *e27_orR* in the LFS survey). Other variables that are being used are gender (*A07*), marital status (*a11_r*) and education level (*E80_2*).

[42] LFS has produced quarterly estimates since 1981. Since 1998, LFS has been a continuous quarterly survey.
[43] We do not focus on whether an individual is employed *full time* in what follows, but rather on the employment's status.

Here we mostly focus on individuals between the ages of 22 and 27 for two reasons. First, there are few younger individuals in the LFS. Second, individuals aged28 and above probably have different characteristics and career paths, hence including them in the sample would probably violate the "common trends" assumption. The sample we end up working with is an unbalanced panel of individuals. For each quarter *t*, an individual's *i* response is included. We should also stress here that the change in the minimum wage took place on 1st March of 2012. The period before the reform includes the periods 2008:Q1–2011:Q4, whereas the post-reform period is 2012:Q1–2016:Q1.

2.4.2. Baseline Empirical Model

The main purpose of this paper is to assess the impact the 2012 MW reform had on employment, focusing on individuals aged 22 to 27. The main assumption underlying our work is that if a subminimum wage for workers aged below 25 had not been introduced, the employment trend would have been the same for all individuals, as they faced the same type of reforms, economic environment and had (roughly) similar characteristics (common trends assumption). Both age groups were expected to be mainly new entrants to the labour market, and no other differential treatment was in effect, except the legislated difference in the MW.

In Tables 2.3 and 2.4, summary statistics before and after the reform for the two age groups are presented. The incidence of the MW in our sample appears to be, before the reform, similar to the data presented in the previous Section. Nevertheless, it is worth noting the huge rise in the incidence of the MW after the reform, despite the considerable reduction in its level; this is due to the deep recession that was still evolving in Greece. The deep recession was reflected in a 36% drop of the average monthly wage for the group aged 25-27 in our sample; the 22-24 age group suffered a drop in their average monthly wage by 36% as well. The significantly larger decline in the monthly wage for the 25-27 group than the decline in their MW may be due to fairness or worker morale considerations, as firms may be reluctant to subject workers who were previously paid the same wage to significantly different pay cuts (see, e.g. Bewley, 2002; Saez et al., 2017). The in-sample, equi-proportional changes in the average wages of the two groups are also observed for the unemployment rates, which

both increased by 22 percentage points. Similar developments are also observed for the rest of the variables.

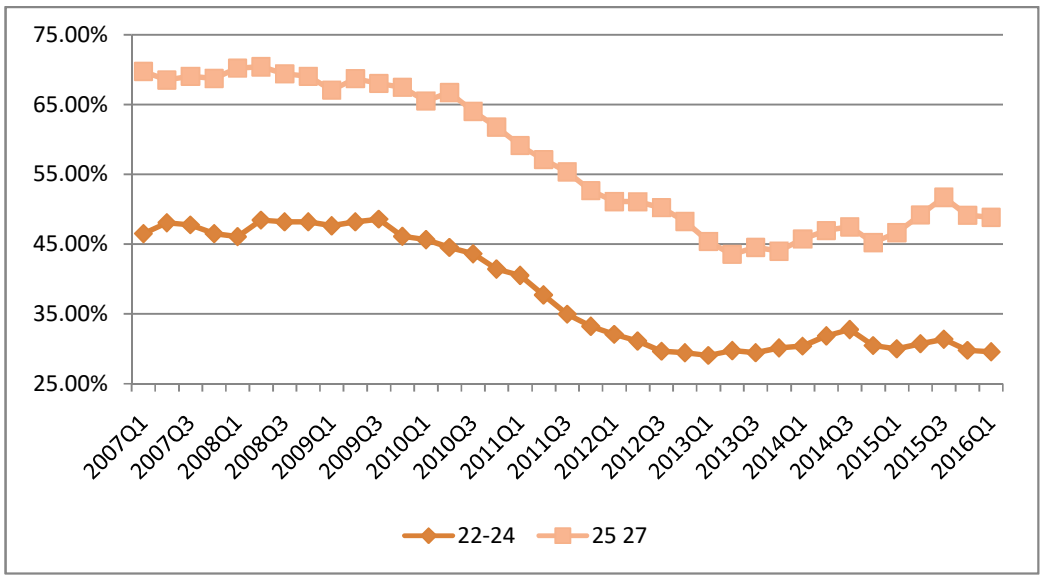
Table 2.3: Percentage of the sample that are paid up to the minimum wage

TimePeriods\AgeGroups	Age: 22-24	Age: 25-27
2008q1-2011q4	38.80%	27.81%
20121q1-2016q1	55.91%	49.09%

Table 2.4: Summary Statistics

	Pre-Reform		Post-Reform	
Variable \ Age Group	22-24	25-27	22-24	25-27
Age	22.99	26.03	23.01	26.00
	(0.82)	(0.82)	(0.82)	(0.82)
Unemployment Rate	0.28	0.21	0.50	0.43
	(0.45)	(0.41)	(0.50)	(0.50)
Actual Hours Worked	39.10	39.11	38.44	38.58
	(12.73)	(12.87)	(14.09)	(14.04)
Monthly Wage	760.30	834.21	484.50	530.07
	(264.07)	(269.57)	(292.56)	(314.81)
Job Finding Rate	0.02	0.01	0.02	0.01
	(0.13)	(0.12)	(0.12)	(0.12)
Separation Rate	0.02	0.02	0.02	0.03
	(0.14)	(0.15)	(0.14)	(0.17)
Transition Rate	0.18	0.12	0.23	0.15
	(0.38)	(0.32)	(0.42)	(0.36)
Quits	0.08	0.07	0.03	0.04
	(0.27)	(0.25)	(0.16)	(0.20)
Dismissals	0.28	0.33	0.31	0.34
	(0.45)	(0.47)	(0.46)	(0.47)
Female (%)	0.49	0.48	0.48	0.48
	(0.50)	(0.50)	(0.50)	(0.50)
Married (%)	0.10	0.20	0.07	0.16
	(0.30)	(0.40)	(0.25)	(0.36)
Non-Greek (%)	0.12	0.12	0.08	0.09
	(0.32)	(0.32)	(0.27)	(0.29)
Publicsector (%)	0.12	0.15	0.11	0.14
	(0.32)	(0.36)	(0.31)	(0.34)
Agriculture (%)	0.08	0.07	0.12	0.09
	(0.27)	(0.25)	(0.32)	(0.29)
Observations	35,595	38,709	27,762	29,165

Figure 2.2: Employment Rates



Source: Greek LFS

In order to examine the potentially differential impact the reform had on individuals above and below the age of 25, we examine different outcome variables, which in most cases are binary. We posit that the latent variable of interest can be expressed as

$$y_{it}^{*} = \alpha_0 + \alpha_1 \mathbf{1}(\text{age}_{it} \geq 25) \times \mathbf{1}(t > 2012Q1) + \alpha_2 \mathbf{1}(t > 2012Q1) + \alpha_3 \mathbf{1}(\text{age}_{it} \geq 25) + \mathbf{x}_{it}^{'}\boldsymbol{\beta} + \lambda_t + \epsilon_{it} \quad (1)$$

where y_{it}^{*} is the outcome variable of interest for individual worker *i* at time *t*.[44] Note that the observed binary outcome is

$$y_{it} = \begin{cases} 1 & \text{if } y_{it}^{*} \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

where in our application y_{it} is an indicator capturing the employment status, labour force participation status, whether an individual has entered a new job or lost her job during the last quarter, etc.

The variable $\mathbf{1}(t > 2012Q1)$is an indicator of whether the time period is after the reform; and $\mathbf{1}(\text{age}_{it} \geq 25)$is an indicator of whether the individual's age in a particular quarter is 25 years and above, implying that she is subject to the standard

[44] We should highlight here that our data does not have a full panel structure for the whole time period of our analysis. In what follows we treat our data as a set of repeated cross-sections. In our robustness analysis below we explicitly account for the (unbalanced) panel data structure of our data.

minimum wage and not the subminimum – applicable only to those below the 25 year threshold. The vector $\mathbf{x}_{it}$ contains individual level controls including gender, marital status and educational attainment, as well as controls capturing the overall state of the economy (explained below), and λ_t denotes time effects. The probit models we estimate below are akin to difference-in-difference regressions, so the coefficient of interest $\alpha_1$as it represents the difference in the outcome variable between the two age groups (above and below 25) stemming from the minimum wage reform (relatively larger minimum wage for older individuals). The main assumption for the comparison is that workers slightly above or below the age of 25 would follow the same time trend in the absence of the reform (common trends assumption).

Note that the coefficient α_1 does hot have the usual direct interpretation one finds in linear regression models: its sign and significance convey some information, but in most cases what is more straightforward to interpret is the "marginal effect" of $\mathbf{1}(\mathrm{t} > 2012Q1)$ via its interaction with $\mathbf{1}(\mathrm{age}_{it} \geq 25)$.[45] In particular, we compute the change in the predicted probability caused by a change of $\mathbf{1}(\mathrm{age}_{it} \geq 25)$ from zero (individual is under 25) to one (individual is above 25), when $\mathbf{1}(\mathrm{t} > 2012Q1) = 0$ and when $\mathbf{1}(\mathrm{t} > 2012Q1) = 1$ and compare the two. Note that in this way, we calculate

$$\Pr\left(y_{it} = 1 \middle| \mathbf{1}(\mathrm{age}_{it} \geq 25) = 0, \mathbf{x}_{it}, \mathbf{1}(\mathrm{t} > 2012Q1) = 0\right) -$$
$$\Pr\left(y_{it} = 1 \middle| \mathbf{1}(\mathrm{age}_{it} \geq 25) = 1, \mathbf{x}_{it}, \mathbf{1}(\mathrm{t} > 2012Q1) = 0\right), \qquad (3a)$$

and,

$$\Pr\left(y_{it} = 1 \middle| \mathbf{1}(\mathrm{age}_{it} \geq 25) = 0, \mathbf{x}_{it}, \mathbf{1}(\mathrm{t} > 2012Q1) = 1\right) -$$
$$\Pr\left(y_{it} = 1 \middle| \mathbf{1}(\mathrm{age}_{it} \geq 25) = 1, \mathbf{x}_{it}, \mathbf{1}(\mathrm{t} > 2012Q1) = 1\right), \qquad (3b)$$

and then compare these two differences in predicted probabilities.[46]

[45] The "direct" marginal effect of $\mathbf{1}(t > 2012Q1)$ would capture the effect of the reform on trend employment (the probability of being employed in fact) for both age groups. While of interest in its own right, the "interaction" term is what matters for our interpretation below.

[46] Equation (3a) gives the change in predicted probability for an individual above 25 years before the labour market reforms, and equation (3b) is the marginal effect of an individual above 25 years after the labour market reforms. In what follows we report average marginal effects (i.e. we average across all individuals in the sample).

2.4.3. Empirical Findings

In this section we discuss the main results, namely how the relative decrease in the minimum wage for individuals aged less than 25 has affected labour market outcomes.

2.4.3.1. Employment Rate Estimates

Before we start discussing the results, let us first explain how the results are presented in Tables 2.5a – 2.5c, since some of the tables that follow have a similar structure. In the top panel of Table 2.5a, we report the marginal effects of all covariates employed in the model on the probability of being employed for individuals between 22 and 27 years of age, including the marginal effects of $\mathbf{1}(\text{age}_{it} \geq 25)$ and $\mathbf{1}(\text{t} > 2012Q1)$. Comparing the marginal effects of the latter (i.e. when $\mathbf{1}(\text{t} > 2012Q1)$ takes the value 1 relative to what happens when it is zero),we get an estimate of the effect of the subminimum wage reform on the (overall) probability of being employed.[47]Note that strictly speaking, this effect could also capture the overall turmoil in the labour market as a result of the demand, and credit constraints that most firms experienced during the entire period. To control for the influence of these variables we include (the log of real) GDP and *Loans* among the explanatory variables.[48] The addition of these variables may be important for another reason as well: the existence of firing and hiring costs implies that firms may be willing to engage in labour-labour substitution only if there is an improvement in the prospects of firm survival, and if financing for these upfront expenses is available.

By comparing the marginal effects of $\mathbf{1}(\text{age}_{it} \geq 25)$under two instances i.e. when $\mathbf{1}(\text{t} > 2012Q1) = 0$ (before the reform was implemented) and when$\mathbf{1}(\text{t} > 2012Q1) = 1)$ (after the reform was implemented), we are able to see the estimates of the probability of being employed, when the individual is above 25 years of age under the two regimes. In the lower panel of Table 2.5a, we report the difference in

[47] Note that strictly speaking, this effect could also capture the overall turmoil in the labour market as a result of (i) the generalized reduction in the minimum wage, (ii) the fiscal adjustment Greece has been undertaking, and (iii) the demand, and credit constraints that most firms experienced.

[48] Loans are the total amount of outstanding loans towards firms with maturity between one and five years, deflated by CPI. Data for loans were obtained from the Bank of Greece (Table 2a, https://www.bankofgreece.gr/pages/el/statistics/rates_markets/deposits.aspx) and for CPI from ELSTAT. GDP is measured as (seasonally adjusted figures) of Chain-linked volumes, with reference year 2010 (GDP_SA_CLV10), also obtained from ELSTAT.

the marginal effects of $\mathbf{1}(\text{age}_{it} \geq 25)$under the two regimes, which is an estimate of the (differential) effect of the reform on the probability of being employed for those aged above 25.

In columns (1)-(2) we present results for all individuals in our sample. In columns (3)-(4) we exclude self-employed individuals as well as family workers, and in columns (5)-(6), we additionally exclude public-sector employees and individuals that are employed in the agricultural sector.

Table 2.5a: Employment Effects (22-24 and 25-27 age groups)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Above 25 years	0.0747***	0.0601***	0.0726***	0.0645***	0.0734***	0.0685***
	(0.0041)	(0.0046)	(0.0045)	(0.0051)	(0.0049)	(0.0056)
Post Reform	0.0005		-0.0015		-0.0103	
	(0.0108)		(0.0122)		(0.0134)	
Gross Domestic	0.7728***	0.7738***	0.8734***	0.8752***	0.9144***	0.9175***
Product	(0.1228)	(0.1208)	(0.1374)	(0.1361)	(0.1487)	(0.1484)
Loans	0.0763**	0.0764**	0.0774**	0.0776**	0.0840**	0.0843**
	(0.0304)	(0.0301)	(0.0340)	(0.0339)	(0.0368)	(0.0368)
Male	0.1052***	0.1053***	0.0851***	0.0853***	0.0674***	0.0676***
	(0.0032)	(0.0034)	(0.0035)	(0.0036)	(0.0038)	(0.0039)
Marital Status	0.0584***	0.0585***	0.0713***	0.0714***	0.0591***	0.0594***
	(0.0046)	(0.0046)	(0.0051)	(0.0052)	(0.0058)	(0.0058)
Low secondary	0.0102	0.0102	0.0046	0.0046	0.0225**	0.0226**
education	(0.0075)	(0.0075)	(0.0086)	(0.0086)	(0.0091)	(0.0091)
Upper secondary	0.0310***	0.0311***	0.0405***	0.0405***	0.0516***	0.0518***
education	(0.0062)	(0.0062)	(0.0071)	(0.0071)	(0.0075)	(0.0076)
Post-secondary	-0.0055	-0.0055	0.0123	0.0123	0.0208**	0.0209**
non-tertiary	(0.0072)	(0.0072)	(0.0081)	(0.0081)	(0.0086)	(0.0086)
education						
Undergraduate	0.0065	0.0065	0.0354***	0.0355***	-0.0191**	-0.0192**
education	(0.0066)	(0.0066)	(0.0075)	(0.0075)	(0.0081)	(0.0081)
Post-graduate	-0.0258*	-0.0258*	0.0027	0.0027	-0.0132	-0.0132
education	(0.0152)	(0.0152)	(0.0163)	(0.0163)	(0.0174)	(0.0174)
N	95,290		80,658		71,010	
Pseudo R^2	0.0711		0.0719		0.0732	
Wald $\chi^2(23)$	8305.40		7436.91		6847.02	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	-0.0146**		-0.0080		-0.0049	
	(0.0061)		(0.0068)		(0.0073)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. People who are considered out of the labour force are excluded from the sample. Columns (1)-(2) report results for the full sample. Columns (3)-(4) report results for a sample excluding self-employed and family workers. Columns (5)-(6) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

We start by noting that the reform, *per se*, does not appear to have influenced the probability of being employed. Moreover, upper secondary education, being married, and being male increase the probability of being employed, regardless of the specification used. The evolution of GDP and the availability of credit, also have a positive effect on the probability of employment. The effect of belonging to the group of individuals aged 25-27 is invariably positive, i.e. (the probability of being employed for the group aged 25-27 is between 6 and 7 percentage points higher than for the group aged 22-24) and this effect is strongly significant. But what is of interest to us is whether the latter effect has changed after the reform which introduced the subminimum wage for those aged less than 25. We find that when all individuals are taken into account (columns (1)-(2) of Table 2.5a), the wage reform has decreased the differential employment probability advantage of those aged 25-27 over the 22-24 group by (about) 1.5 percentage points, i.e. whereas before the reform the employment probability for individuals in the 25-27 group was 7.5 percentage points higher than for the 22-24 group, this differential employment probability advantage became 6.0 percentage points. We note that this effect is statistically significant at the 5% level. In columns (3)-(4), where we restrict the sample by excluding self-employed individuals as well as family workers, we find again that the sub-minimum wage reform decreased the differential employment probability advantage of those aged 25-27by (about)0.7 percentage points, but the effect is now statistically insignificant. The same result obtains in columns (5)-(6), where the sample additionally excludes public-sector employees and individuals that are employed in the agricultural sector, i.e. there is no statistically significant change in the differential probability advantage of the 25-27 group. These findings indicate that that the introduction of a sub-minimum wage did not succeed in boosting the (relative) employment prospects of private-sector, dependent employees, aged 22-24, relative to the 25-27 group.

Even within the confines of the perfectly competitive model, and under the assumption that actual wages are at the legislated minima, it is not difficult to understand why the labour-labour substitution hypothesis may not hold in this case. In the presence of hiring and firing costs, the reduction in wages that employers would gain from hiring a 24-year old may not be larger than the sum of firing and hiring costs if the firm were to fire her -since within 12 months the subminimum wage rate

would no longer apply for this employee (i.e. when she turns 25) - in order to hire another 24-year old. If the firm plans on keeping the employee for many years, the reduction in wage costs by 10% for just one year may represent a very small percentage of the present value of total wage costs that the firm would incur throughout the employee's tenure, and may not provide enough of an incentive to prefer 24- over the 25-year old. This implies that the labour-labour substitution hypothesis is more likely to hold in cases of jobs involving simple tasks and too little on-the-job training. It also implies that employees may be willing to hire persons aged significantly less than the subminimum age threshold, thus possibly inducing labour-labour substitution among subminimum wage workers, i.e. preferring 20 year old to 24 year old.

The arguments above have assumed that employers' labour costs for each age group are equal to the legislated minima, or, that the change in the wages received by employees of each age group are proportional to the legislated changes so that the change in relative labour costs are similar to the legislated change in the relative wage minima. In fact, as shown in Table 2.4 and discussed previously, the two age groups (25-27 and 22-24) faced the same proportional drop (i.e., by 36 per cent) between the pre-reform and the after-reform period; thus, the policymakers' intentions of bringing about a change in relative labour costs did not materialize. This lack of change in *market-determined* relative labour costs may be due to steeply rising labour supply curves; however, this is unlikely given the very high unemployment rates experienced (and still ruling) by the relevant age groups. A more likely explanation is that due to fairness considerations firms try to maintain internal pay structures that entail strict relationships between the relative pay of employees, and which are not affected by changes in legislation (Bewley, 2002).

In Tables 2.5b and 2,5c we repeat the same exercise with different age bands. In Table 5b we present results when we narrow the age bands to just one year around the age threshold at which the sub-minimum wage applies (i.e. for 24- and 25-year old). By narrowing the age bands, we make it more likely that the two groups are close substitutes. Yet, we still find that the introduction of a sub-minimum wage did not succeed in boosting the (relative) employment prospects of private-sector, dependent employees, aged 24, relative to those aged 25. In Table 2.5c, we consider more broadly defined age groups (20-24 and 25-29), which, on the one hand, makes it less

likely that the groups of workers are close substitutes and would have faced a common trend in their employment prospects, but on the other hand makes the potential benefits from employing a 20-year old who shall receive for 5 years the subminimum wage larger. We still find that the introduction of a sub-minimum wage did not succeed in boosting the (relative) employment prospects of private-sector, dependent employees, aged 20-24, relative to those aged 25-29.

Table 2.5b: Employment Effects (24- and 25-year old)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Above25	0.0376***	0.0071	0.0327***	0.0137	0.0291***	0.0151*
	(0.0069)	(0.0074)	(0.0076)	(0.0084)	(0.0082)	(0.0090)
Post Reform	0.0099		0.0010		-0.0013	
	(0.0188)		(0.0212)		(0.0229)	
GDP	0.6381***	0.6327***	0.7194***	0.7196***	0.7988***	0.7993***
	(0.2126)	(0.2080)	(0.2363)	(0.2342)	(0.2536)	(0.2528)
Loans	0.0465	0.0461	0.0327	0.0327	0.0526	0.0526
	(0.0524)	(0.0517)	(0.0584)	(0.0582)	(0.0629)	(0.0629)
Male	0.1120***	0.1110***	0.0920***	0.0920***	0.0716***	0.0717***
	(0.0055)	(0.0058)	(0.0061)	(0.0062)	(0.0066)	(0.0066)
Low secondary education	0.0432***	0.0428***	0.0636***	0.0636***	0.0415***	0.0415***
	(0.0084)	(0.0083)	(0.0092)	(0.0093)	(0.0103)	(0.0103)
Upper secondary education	0.0208	0.0206	0.0148	0.0148	0.0385**	0.0386**
	(0.0131)	(0.0130)	(0.0151)	(0.0151)	(0.0159)	(0.0159)
Post-secondary non-tertiary education	0.0301***	0.0298***	0.0371***	0.0371***	0.0512***	0.0513***
	(0.0108)	(0.0107)	(0.0123)	(0.0123)	(0.0131)	(0.0131)
Undergraduate education	-0.0221*	-0.0220*	-0.0023	-0.0023	0.0075	0.0075
	(0.0125)	(0.0124)	(0.0140)	(0.0140)	(0.0149)	(0.0149)
Post-graduate education	-0.0189*	-0.0188*	0.0071	0.0071	-0.0421***	-0.0422***
	(0.0115)	(0.0114)	(0.0129)	(0.0129)	(0.0139)	(0.0140)
N	32,669		27,933		24,793	
Pseudo R^2	0.0718		0.0698		0.0798	
Wald $\chi^2(23)$	2958.42		2551.28		2343.31	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	-0.0305***		-0.019*		-0.014	
	(0.0101)		(0.0113)		(0.0121)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. People who are considered out of the labour force are excluded from the sample. Columns (1)-(2) report results for the full sample. Columns (3)-(4) report results for a sample excluding self-employed and family workers. Columns (5)-(6) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 24 and 25 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table 2.5c: Employment Effects (20-24 and 25-29 age groups)

COVARIATES	(1) Pre Reform	(2) Post Reform	(3) Pre Reform	(4) Post Reform	(5) Pre Reform	(6) Post Reform
Above25	0.1101***	0.1022***	0.1114***	0.1078***	0.1114***	0.1145***
	(0.0034)	(0.0039)	(0.0037)	(0.0043)	(0.0040)	(0.0046)
Post Reform	-0.0052		-0.0072		-0.0156	
	(0.0085)		(0.0097)		(0.0107)	
GDP	0.7788***	0.7852***	0.8831***	0.8886***	0.9379***	0.9427***
	(0.0961)	(0.0949)	(0.1086)	(0.1078)	(0.1188)	(0.1186)
Loans	0.0746***	0.0752***	0.0810***	0.0815***	0.0866***	0.0870***
	(0.0237)	(0.0236)	(0.0268)	(0.0268)	(0.0294)	(0.0294)
Male	0.1033***	0.1042***	0.0831***	0.0836***	0.0693***	0.0697***
	(0.0025)	(0.0026)	(0.0027)	(0.0028)	(0.0030)	(0.0031)
Low secondary education	0.0707***	0.0713***	0.0860***	0.0867***	0.0758***	0.0764***
	(0.0032)	(0.0033)	(0.0037)	(0.0038)	(0.0042)	(0.0043)
Upper secondary education	0.0127**	0.0128**	0.0139**	0.0140**	0.0335***	0.0336***
	(0.0057)	(0.0058)	(0.0067)	(0.0067)	(0.0070)	(0.0070)
Post-secondary non-tertiary education	0.0371***	0.0374***	0.0506***	0.0509***	0.0633***	0.0635***
	(0.0047)	(0.0047)	(0.0055)	(0.0055)	(0.0058)	(0.0058)
Undergraduate education	0.0025	0.0025	0.0247***	0.0248***	0.0358***	0.0359***
	(0.0055)	(0.0055)	(0.0063)	(0.0063)	(0.0067)	(0.0067)
Post-graduate education	0.0323***	0.0326***	0.0662***	0.0665***	0.0134**	0.0134**
	(0.0050)	(0.0051)	(0.0058)	(0.0058)	(0.0063)	(0.0063)
N	152,618		127,621		111,140	
Pseudo R^2	0.0755		0.0776		0.0763	
Wald $\chi^2(23)$	13740.91		12443.29		11074.56	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	-0.0079		-0.0036		0.0031	
	(0.005)		(0.0056)		(0.006)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. People who are considered out of the labour force are excluded from the sample. Columns (1)-(2) report results for the full sample. Columns (3)-(4) report results for a sample excluding self-employed and family workers. Columns (5)-(6) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 20 and 29 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

2.4.3.2. Participation Rates

We next turn to labour force participation, the results for which are reported in Table 2.6. We note again that higher education and being male result in higher labour force participation, whereas being married results in a lower probability of participating in the labour market, both before and after the minimum wage reform, (possibly because the need and the opportunity for specialization in "home production" are greater for the married –especially in the presence of children). We also note that the reform alone does not seem to have a (statistically) significant impact on the probability of being active in the labour market. However, what we do find is that the

probability of labour force participation for individuals in the 25-27 age group becomes significantly higher (relative to the 20-24 group) in the post-reform period. In particular, the estimated probability is 1.4percentage points higher after the reform. This estimate clearly shows that while the overall labour force participation has not been affected after the reform, individuals in the 25-27 group ended up participating more actively in the labour market, relative to their younger peers. One possible explanation of this finding is that the lower minimum wage for the younger individuals drove some of them out of the labour force (i.e. those whose reservation wage was above the sub-minimum), possibly because younger persons find it more preferable to turn to education possibilities, instead of working for such low wages.

The last four columns of Table 2.6 show the labour force participation effects for the narrower defined age groups (24-and 25- year old), and the broader defined groups (20-24 and 25-29) (respectively). Following the reform, there was no (statistically) significant change in the differential probability of labour market participation of 25-year old relative to the 24-year old. This can again be understood on the basis of the relatively short period for which a 24-year old will be subject to the subminimum wage, thus it is unlikely that she would be willing to let a suitable job opportunity pass by – especially in periods of very high unemployment. In contrast, Table 2.4c reveals that when the age groups are widened there is a significant increase in the differential probability of labour market participation for the 25-29 age group (relative to the 20-24 group) after the reform; this finding matches well with the explanation offered above and strengthens our intuition about the results.

Table 2.6: Labour Force Participation (22-24 and 25-27 age groups/24- and 25-year old/20-24 and 25-29 age groups)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Above 25 years	0.1644***	0.1787***	0.0518***	0.0606***	0.0519***	0.0787***
	(0.0032)	(0.0040)	(0.0052)	(0.0063)	(0.0040)	
Post Reform	0.0068		0.0111		0.0008	
	(0.0088)		(0.0158)		(0.0071)	
Gross Domestic Product	0.1612*	0.1579*	0.1510	0.1471	0.0556	0.0554
	(0.0977)	(0.0951)	(0.1700)	(0.1643)	(0.0772)	(0.0768)
Loans	0.0182	0.0178	0.0022	0.0021	0.0026	0.0026
	(0.0238)	(0.0233)	(0.0415)	(0.0404)	(0.0187)	(0.0186)
Male	0.1080***	0.1058***	0.0832***	0.0811***	0.1503***	0.1499***
	(0.0025)	(0.0026)	(0.0045)	(0.0045)	(0.0019)	(0.0020)
Marital Status	-0.1051***	-0.1031***	-0.1150***	-0.1125***	0.0107***	0.0107***
	(0.0039)	(0.0039)	(0.0071)	(0.0071)	(0.0026)	(0.0026)
Low secondary education	0.0769***	0.0751***	0.1003***	0.0972***	0.0107***	0.0107***
	(0.0058)	(0.0057)	(0.0099)	(0.0098)	(0.0026)	(0.0026)
Upper secondary education	-0.1190***	-0.1168***	-0.0816***	-0.0800***	0.0628***	0.0626***
	(0.0050)	(0.0049)	(0.0085)	(0.0084)	(0.0046)	(0.0046)
Post-secondary non-tertiary education	0.1981***	0.1928***	0.2081***	0.2002***	-0.1726***	-0.1721***
	(0.0056)	(0.0060)	(0.0098)	(0.0106)	(0.0039)	(0.0039)
Undergraduate education	0.1292***	0.1260***	0.1257***	0.1217***	0.2132***	0.2124***
	(0.0053)	(0.0053)	(0.0090)	(0.0091)	(0.0044)	(0.0048)
Post-graduate education	0.1186***	0.1157***	0.0518***	0.0606***	0.1937***	0.1930***
	(0.0121)	(0.0119)	(0.0052)	(0.0063)	(0.0041)	(0.0045)
N	131,168		43,215		220,312	
Pseudo R^2	0.1402		0.0830		0.1394	
Wald $\chi^2(23)$	16594.09		3452.14		29575.04	
Difference: Post-Reform vs. Pre-Reform Marginal Effects	0.0142***		0.0087		0.0268***	
	(0.0055)		(0.0082)		(0.0063)	

Notes: The table reports the marginal effects the covariates listed in the left column on the probability of participating in the labour force for the full sample of persons aged 22-27. Columns (3) and (4) correspond to individuals between 24- and 25-year old. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek labour Force Survey. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

2.4.4. Employment Dynamics

Our findings that the introduction of a sub-minimum wage did not have a differential employment effect may mask considerable differences regarding worker flows, since any employment outcome can be the result of different combinations of worker flows across labour market states (e.g. Blanchard and Diamond, 1990). For example, the absence of a differential employment effect between the two age groups can be the result of simultaneous lower job finding rates and job loss rates for the 25-27 age group relative to the 22-24 group. We note that, as stressed by Davis et al. (1996), employment inflows and outflows should not be confused with job creation and destruction, since, e.g., when a worker quits and becomes unemployed, and the firm responds by hiring another, previously unemployed, worker, we have employment inflows and outflows, but no job creation or destruction.[49]

To delve more into the dynamics of the Greek labour market and the effects the subminimum wage reform had on it, we try to assess how the reform affected job findings, dismissals and quits. The results for these variables are reported in Tables 2.7 and8respectively.

Table 2.7: Job Finding Effects (22-24 and 25-27 age groups)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Above 25 years	-0.0126***	-0.0097***	-0.0129***	-0.0089***	-0.0143***	-0.0077***
	(0.0018)	(0.0019)	(0.0019)	(0.0020)	(0.0023)	(0.0018)
Post Reform	-0.0027		-0.0019		-0.0051	
	(0.0050)		(0.0055)		(0.0053)	
Gross Domestic	0.0134	0.0120	0.0189	0.0176	0.0472	0.0374
Product	(0.0452)	(0.0412)	(0.0487)	(0.0462)	(0.0521)	(0.0435)
Loans	-0.0150	-0.0134	-0.0162	-0.0150	-0.0156	-0.0124
	(0.0128)	(0.0107)	(0.0136)	(0.0117)	(0.0148)	(0.0109)
Male	0.0021**	0.0019**	0.0024**	0.0023**	0.0035***	0.0028***
	(0.0011)	(0.0010)	(0.0011)	(0.0011)	(0.0013)	(0.0011)
Marital Status	-0.0032**	-0.0029**	-0.0033*	-0.0030*	-0.0018	-0.0014
	(0.0016)	(0.0015)	(0.0017)	(0.0016)	(0.0019)	(0.0015)
Low secondary	0.0014	0.0013	0.0004	0.0004	0.0027	0.0021
education	(0.0019)	(0.0017)	(0.0022)	(0.0020)	(0.0024)	(0.0018)
Upper secondary	0.0054***	0.0048***	0.0040**	0.0037**	0.0048**	0.0037**
education	(0.0017)	(0.0015)	(0.0019)	(0.0018)	(0.0020)	(0.0016)
Post-secondary	0.0078***	0.0070***	0.0055**	0.0050**	0.0067***	0.0052***
non-tertiary	(0.0021)	(0.0020)	(0.0022)	(0.0021)	(0.0024)	(0.0019)
education						
Undergraduate	0.0198***	0.0177***	0.0167***	0.0154***	0.0183***	0.0144***
education	(0.0026)	(0.0027)	(0.0027)	(0.0028)	(0.0031)	(0.0027)

[49] The data available in the Greek LFS allows us to study employment inflows and outflows, and not job creation and destruction.

Post-graduate education	0.0249***	0.0224***	0.0253***	0.0235***	0.0266***	0.0212***
	(0.0066)	(0.0063)	(0.0070)	(0.0069)	(0.0078)	(0.0065)
N	93,095		78,742		69,241	
Pseudo R^2	0.0396		0.0381		0.0399	
Wald $\chi^2(22)$	596.89		484.93		423.22	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0029		0.004		0.0066*	
	(0.003)		(0.0032)		(0.0034)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of an unemployed person being hired. Columns (1)-(2) report results for the full sample. Columns (3)-(4) report results for a sample excluding self-employed and family workers. Columns (5)-(6) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek labour Force Survey. Individuals between the ages of 20 and 29 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively

Table 2.7 reports results for job finding. Leaving individual level controls aside,[50] we note again that the reform had no direct effects on the probability of job finding. Being in the 25-27 age group results in a lower probability of finding a job, with the effect being significant both before and after the MW reform. More importantly, however, we find that there is no differential effect of belonging to the group of younger workers after the reform. That is, the probability of finding a job for an individual belonging in the 22-24 group is between 0.3and 0.7 percentage points higher, but this differential does not change significantly between the pre-reform and the post-reform period.

[50] Being married and educated has a positive and significant effect on the probability of job finding. The same holds for male individuals.

Together, the above findings appear to be in contrast with previous work from other countries (e.g. Portugal and Cardoso, 2006, for Portugal; Dube et al., 2012, for the United States; Brochu and Green, 2013, for Canada) who find that in response to minimum wage hikes there is a decline in separation rates which is offset by a decline in hiring. They interpret their findings by appealing to Burdett-Mortensen (1998) type models of the labour market, i.e. separations decline as workers become more

Table 2.8: Effects on Dismissals and Quits (22-24 and 25-27 age groups)

	(1)	(2)	(1)	(2)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform
Above 25 years	0.0117***	0.0101***	-0.0001	0.0009
	(0.0030)	(0.0029)	(0.0016)	(0.0005)
Post Reform	0.0019		-0.0049	-0.0049
	(0.0092)		(0.0042)	(0.0042)
Gross Domestic Product	0.0725	0.0771	-0.0806	-0.0209
	(0.0709)	(0.0785)	(0.0875)	(0.0157)
Loans	0.0027	0.0029	0.0105	0.0027
	(0.0229)	(0.0245)	(0.0179)	(0.0055)
Male	0.0018	0.0019	-0.0016	-0.0004
	(0.0018)	(0.0019)	(0.0014)	(0.0004)
Marital Status	0.0032	0.0034	0.0053	0.0014*
	(0.0031)	(0.0033)	(0.0040)	(0.0008)
Low secondary education	0.0084*	0.0089*	0.0033	0.0009
	(0.0050)	(0.0053)	(0.0035)	(0.0008)
Upper secondary	0.0043	0.0046	0.0030	0.0008
education	(0.0038)	(0.0041)	(0.0026)	(0.0006)
Post-secondary non-	0.0075*	0.0079*	0.0047	0.0012
tertiary education	(0.0045)	(0.0047)	(0.0035)	(0.0008)
Undergraduate education	-0.0130***	-0.0138***	-0.0016	-0.0004
	(0.0043)	(0.0043)	(0.0023)	(0.0005)
Post-graduate education	-0.0138**	-0.0147**	0.0103	0.0028
	(0.0069)	(0.0071)	(0.0090)	(0.0026)
N	32,134		31,170	
Pseudo R^2	0.0637		0.0744	
Wald $\chi^2(23/22)$	376.96		90.77	
Difference: Post-Reform vs. Pre-Reform Marginal Effect				
	-0.0016		0.001	
	(0.0047)		(0.0017)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of a person being fired in columns (1)-(2) and on the probability of a person quitting his/her job in columns (3)-(4). The reported results are based on a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include yearand quarter effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 20 and 29 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

attached to their jobs, while hiring declines as the cost of labour increases. We attribute the absence of a differential impact on job-finding, dismissals, and quits for the younger group in our study to the existence of considerable firing and hiring costs, which in tandem with the briefness of the period for which a worker of the younger

group would be subject to the subminimum wage, make the net benefit of labour-labour substitution too small.

To sum up, the reform did not seem to have any strong effects on employment. Interestingly enough, the lower MW seems to have driven younger employees out of the labour force, while firms also did not show any preferential treatment for the less costly younger employees. As far as the job finding rates are concerned, there is no differential effect on the two groups of workers.

2.5. Employment Reallocation

The results presented thus far, do not consider at all the potential effects of the MW reform on labour market reallocations. In principle, either due to search reasons (e.g. a lower wage is more likely to induce search for a higher paying job), or due to the possibility that the further cut in the MW for younger workers can boost further the sectors using intensively young unskilled workers (e.g. hotels and restaurants), the introduction of a subminimum wage can facilitate job-to-job transitions across sectors. To the extent that this effect has been operating, it may have had beneficial effects on the economy beyond any apparent employment effects since it will have aided in the hoped-for reallocation of economic activity towards the "dynamic" sectors and the "orderly liquidation" of the declining, or of the government-largesse dependent, sectors.

In order to assess this effect, in Table 2.9 we estimate models where the dependent variable is an indicator of whether the person has changed industries during the reference period. There are two things we note here. First, the direct effect of the reform is (statistically) insignificant, i.e. the reform has no effect on the probability of transition from one sector to another. Second, the transition rate is between 8 and 10 percentage points lower for workers in the 25-27 age group relative to the 22-24 group. Third, the introduction of the subminimum wage had no significant impact on the difference in the transition rates between the two groups.

Table 2.9: Results for Transitions Across Sectors

COVARIATES	(1) Pre Reform	(2) Post Reform	(3) Pre Reform	(4) Post Reform	(5) Pre Reform	(6) Post Reform
Above 25 years	-0.0811***	-0.0944***	-0.0903***	-0.1011***	-0.0999***	-0.1009***
	(0.0040)	(0.0062)	(0.0047)	(0.0074)	(0.0053)	(0.0081)
Post Reform	0.0188		0.0237		0.0144	
	(0.0125)		(0.0152)		(0.0164)	
Gross Domestic Product	0.0065	0.0070	-0.0162	-0.0177	-0.0109	-0.0115
	(0.1219)	(0.1317)	(0.1442)	(0.1570)	(0.1604)	(0.1695)
Loans	-0.0185	-0.0200	-0.0392	-0.0427	-0.0648*	-0.0686*
	(0.0286)	(0.0306)	(0.0339)	(0.0363)	(0.0380)	(0.0389)
Male	-0.0147***	-0.0159***	-0.0094***	-0.0103***	0.0057	0.0060
	(0.0030)	(0.0033)	(0.0035)	(0.0038)	(0.0040)	(0.0042)
Marital Status	-0.0312***	-0.0338***	-0.0413***	-0.0453***	-0.0295***	-0.0313***
	(0.0042)	(0.0047)	(0.0048)	(0.0056)	(0.0056)	(0.0061)
Low secondary education	0.0072	0.0080	0.0013	0.0014	0.0065	0.0070
	(0.0055)	(0.0061)	(0.0073)	(0.0082)	(0.0079)	(0.0085)
Upper secondary education	0.0382***	0.0421***	0.0261***	0.0290***	0.0259***	0.0277***
	(0.0047)	(0.0053)	(0.0060)	(0.0068)	(0.0066)	(0.0072)
Post-secondary non-tertiary education	0.0614***	0.0673***	0.0438***	0.0485***	0.0428***	0.0457***
	(0.0059)	(0.0068)	(0.0073)	(0.0082)	(0.0079)	(0.0087)
Undergraduate education	0.1412***	0.1525***	0.1207***	0.1316***	0.1537***	0.1622***
	(0.0060)	(0.0078)	(0.0072)	(0.0089)	(0.0085)	(0.0107)
Post-graduate education	0.1790***	0.1922***	0.1812***	0.1955***	0.1909***	0.2007***
	(0.0173)	(0.0189)	(0.0194)	(0.0211)	(0.0218)	(0.0236)
N	63,156		48,524		38,876	
Pseudo R^2	0.0450		0.0426		0.0536	
Wald $\chi^2(23)$	2242.91		1741.84		1742.76	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	-0.0133*		-0.0108		-0.0010	
	(0.0079)		(0.0093)		(0.0103)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of a person changing industry. Columns (1)-(2) report results for the full sample. Columns (3)-(4) report results for a sample excluding self-employed and family workers. Columns (5)-(6) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 20 and 29 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

2.6. Extensions and Robustness Tests

2.6.1. Controlling for Previous Reforms

Labour market reforms have been one of the cornerstones of the structural adjustment programs in Greece. In order to examine the potential influence of other reforms on our results, we control for the reform that took place in 2010 (see Section 3), and allowed (previously) *unemployed* persons up to 24 years old to be paid at 80% of the

minimum wage (the basic minimum wage was then €740, so the sub-minimum wage was €592).

In order to evaluate these joint effects, we focus on employment and labour participation status and estimate models of the form:

$$y_{it}^{*} = \alpha_0 + \alpha_1 \mathbf{1}(\text{age}_{it} \geq 25) \times \mathbf{1}(t > 2012Q1) + \alpha_2 \mathbf{1}(t > 2012Q1) + \alpha_3 \mathbf{1}(\text{age}_{it} \geq 25) + \delta_1 \mathbf{1}(\text{age}_{it} \geq 25) \times \mathbf{1}(t \geq 2010Q2) + \delta_2 \mathbf{1}(t \geq 2010Q2) + \mathbf{x}_{it}^{'}\boldsymbol{\beta} + \lambda_t + \epsilon_{it} \quad (4)$$

Using (4) we may now estimate three effects of interest: (*i*) the differential effect of the 2010 reform on individuals above 25 years of age; (*ii*) the differential effect of the 2012 reform on individuals above 25 years of age, taking into account that the 2010 reform was already in place; and (*iii*) the 'total' differential effect of both the 2010 and the 2012 reforms. Our estimation results are reported in Tables 2.10 and 2.11.

For both employment and participation rates there is no difference in the conclusions derived in the previous section which did not take into account the 2010 reform. This is understandable given the limited uptake of the 2010 reform.

Table 2.10: Employment Effects Whilst Taking into Account Previous Reforms (22-24 and 25-27 age groups)

Covariates	(1) Pre reform (before 2012)	(2) Between 2010 and reform	(3) Post reform	(4) Pre reform (before 2012)	(5) Between 2010 and reform	(6) Post reform	(7) Pre reform (before 2012)	(8) Between 2010 and reform	(9) Post reform
Above 25 years	0.0714***	0.0792***	0.0605***	0.0691***	0.0780***	0.0652***	0.0690***	0.0802***	0.0690***
	(0.0054)	(0.0062)	(0.0047)	(0.0060)	(0.0070)	(0.0052)	(0.0064)	(0.0075)	(0.0056)
Post Reform	-0.0001	-0.0001		-0.0026	-0.0027		-0.0113	-0.0114	
	(0.0108)	(0.0109)		(0.0123)	(0.0124)		(0.0135)	(0.0135)	
Prev. Reform	-0.0086			-0.0155			-0.0140		
	(0.0112)			(0.0126)			(0.0136)		
Gross Domestic Product	0.7294***	0.7357***	0.7376***	0.7974***	0.8050***	0.8076***	0.8482***	0.8512***	0.8547***
	(0.1352)	(0.1326)	(0.1308)	(0.1509)	(0.1494)	(0.1484)	(0.1628)	(0.1617)	(0.1617)
Loans	0.0852***	0.0860***	0.0862***	0.0936**	0.0945**	0.0948**	0.0990**	0.0994**	0.0998**
	(0.0324)	(0.0331)	(0.0329)	(0.0364)	(0.0370)	(0.0369)	(0.0396)	(0.0399)	(0.0400)
Male	0.1049***	0.1057***	0.1060***	0.0850***	0.0858***	0.0861***	0.0675***	0.0678***	0.0680***
	(0.0032)	(0.0033)	(0.0035)	(0.0035)	(0.0036)	(0.0037)	(0.0038)	(0.0039)	(0.0039)
Marital Status	0.0581***	0.0587***	0.0589***	0.0710***	0.0719***	0.0721***	0.0591***	0.0594***	0.0598***
	(0.0046)	(0.0046)	(0.0047)	(0.0051)	(0.0052)	(0.0053)	(0.0058)	(0.0058)	(0.0059)
Low secondary education	0.0102	0.0102	0.0103	0.0046	0.0047	0.0047	0.0226**	0.0227**	0.0228**
	(0.0075)	(0.0075)	(0.0076)	(0.0086)	(0.0087)	(0.0087)	(0.0091)	(0.0091)	(0.0092)
Upper secondary education	0.0310***	0.0312***	0.0313***	0.0405***	0.0408***	0.0410***	0.0518***	0.0520***	0.0523***
	(0.0062)	(0.0062)	(0.0063)	(0.0071)	(0.0072)	(0.0072)	(0.0076)	(0.0076)	(0.0076)
Post-secondary non-tertiary education	-0.0054	-0.0055	-0.0055	0.0124	0.0125	0.0125	0.0210**	0.0211**	0.0211**
	(0.0071)	(0.0072)	(0.0072)	(0.0081)	(0.0082)	(0.0082)	(0.0086)	(0.0086)	(0.0087)
Undergraduate education	0.0065	0.0066	0.0066	0.0354***	0.0357***	0.0358***	-0.0192**	-0.0193**	-0.0193**
	(0.0066)	(0.0066)	(0.0066)	(0.0075)	(0.0075)	(0.0076)	(0.0081)	(0.0081)	(0.0082)
Post-graduate education	-0.0257*	-0.0259*	-0.0259*	0.0028	0.0028	0.0028	-0.0131	-0.0131	-0.0132
	(0.0151)	(0.0152)	(0.0153)	(0.0163)	(0.0164)	(0.0164)	(0.0175)	(0.0175)	(0.0175)
N / Pseudo R^2 / Wald $\chi^2(25)$	95,290 /0.0712 / 8317.85			80,658 /0.0719 / 7449.41			71,010 / 0.0732 / 6858.81		
Difference: Post-Reform vs. Pre-Reform Marginal Effects									
	(i)	(ii)	(iii)	(i)	(ii)	(iii)	(i)	(ii)	(iii)
	0.0078	-0.0187**	-0.0109	0.0089	-0.0128	-0.0039	0.0112	-0.0116	0.000
	(0.0082)	(0.0077)	(0.0071)	(0.0091)	(0.0086)	(0.0078)	(0.0098)	(0.0092)	(0.0084)

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. Columns (1)-(3) report results for the full sample. Columns (4)-(6) report results for a sample excluding self-employed and family workers. Columns (7)-(9) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Columns (1), (4) and (7) report the marginal effects of all covariates when both reforms are *switched on* jointly. Columns (2), (5) and (8) report the marginal effects of all covariates when only the *Previous Reform* takes place. Columns (3), (6) and (9) report the marginal effects of all covariates when the *Previous Reform* is already active, and the minimum wage reform takes place. In the bottom panels column (i) reports the difference in marginal effects when only the initial reform takes place; column (ii) when the minimum wage reform takes place, given that the initial reform holds; and column (iii) the 'joint' effect of the two reforms Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter

effects. The data source is the Greek labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table 2.11: Effects on Labour Force Participation Whilst Taking into Account Previous Reforms (22-24 and 25-27 age groups)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Covariates	Pre reform (before 2012)	Between 2010 and reform	Post reform	Pre reform (before 2012)	Between 2010 and reform	Post reform	Pre reform (before 2012)	Between 2010 and reform	Post reform
Above 25 years	0.1642***	0.1668***	0.1773***	0.1643***	0.1687***	0.1844***	0.1682***	0.1729***	0.1926***
	(0.0043)	(0.0050)	(0.0042)	(0.0046)	(0.0055)	(0.0044)	(0.0048)	(0.0058)	(0.0045)
Post Reform	0.0079			0.0070			0.0064		
	(0.0089)			(0.0097)			(0.0104)		
Prev. Reform	0.0091		0.0089	0.0078		0.0076	0.0102		0.0100
	(0.0086)		(0.0084)	(0.0094)		(0.0092)	(0.0101)		(0.0099)
Gross Domestic	0.2116*	0.2078*	0.2036**	0.1951	0.1925*	0.1891*	0.1745	0.1722	0.1693
Product	(0.1093)	(0.1061)	(0.1031)	(0.1187)	(0.1162)	(0.1134)	(0.1267)	(0.1242)	(0.1216)
Loans	0.0095	0.0094	0.0092	0.0101	0.0099	0.0098	0.0099	0.0098	0.0096
	(0.0254)	(0.0250)	(0.0245)	(0.0277)	(0.0274)	(0.0269)	(0.0298)	(0.0295)	(0.0289)
Male	0.1091***	0.1072***	0.1051***	0.0943***	0.0931***	0.0914***	0.0889***	0.0877***	0.0862***
	(0.0027)	(0.0026)	(0.0026)	(0.0028)	(0.0027)	(0.0027)	(0.0030)	(0.0029)	(0.0028)
Marital Status	-0.1061***	-0.1044***	-0.1025***	-0.1118***	-0.1106***	-0.1087***	-0.1272***	-0.1258***	-0.1238***
	(0.0040)	(0.0039)	(0.0039)	(0.0043)	(0.0042)	(0.0042)	(0.0046)	(0.0045)	(0.0045)
Low secondary	0.0781***	0.0763***	0.0744***	0.0903***	0.0888***	0.0870***	0.1017***	0.0998***	0.0980***
education	(0.0059)	(0.0057)	(0.0057)	(0.0068)	(0.0066)	(0.0065)	(0.0071)	(0.0070)	(0.0069)
Upper secondary	-0.1201***	-0.1183***	-0.1161***	-0.1173***	-0.1161***	-0.1144***	-0.1186***	-0.1175***	-0.1158***
education	(0.0051)	(0.0050)	(0.0049)	(0.0057)	(0.0056)	(0.0055)	(0.0060)	(0.0059)	(0.0058)
Post-secondary non-	0.2020***	0.1961***	0.1905***	0.2391***	0.2338***	0.2283***	0.2537***	0.2472***	0.2420***
tertiary education	(0.0067)	(0.0058)	(0.0063)	(0.0076)	(0.0066)	(0.0072)	(0.0080)	(0.0070)	(0.0075)
Undergraduate	0.1314***	0.1281***	0.1247***	0.1648***	0.1616***	0.1581***	0.1534***	0.1502***	0.1473***
education	(0.0057)	(0.0053)	(0.0054)	(0.0065)	(0.0061)	(0.0062)	(0.0068)	(0.0065)	(0.0065)
Post-graduate	0.1206***	0.1176***	0.1146***	0.1552***	0.1523***	0.1490***	0.1566***	0.1533***	0.1503***
education	(0.0125)	(0.0120)	(0.0118)	(0.0135)	(0.0131)	(0.0129)	(0.0147)	(0.0142)	(0.0140)
N / Pseudo R^2 / Wald $\chi^2(25)$	131,168 / 0.1402 / 16597.90			116,536 / 0.1431 / 16093.08			106,888 / 0.1354 / 14785.39		
Difference: Post-Reform vs. Pre-Reform Marginal Effects									
	(i)	(ii)	(iii)	(i)	(ii)	(iii)	(i)	(ii)	(iii)
	0.0025	0.0106	0.0131**	0.0044	0.0157**	0.0201***	0.0047	-0.0198***	0.0245***

	(0.0066)	(0.0066)	(0.0066)	(0.007)	(0.007)	(0.0067)	(0.0075)	(0.0074)	(0.0069)

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being active in the labour force. Columns (1)-(3) report results for the full sample. Columns (4)-(6) report results for a sample excluding self-employed and family workers. Columns (7)-(9) report results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. Columns (1), (4) and (7) report the marginal effects of all covariates when both reforms are *switched on* jointly. Columns (2), (5) and (8) report the marginal effects of all covariates when only the *Previous Reform* takes place. Columns (3), (6) and (9) report the marginal effects of all covariates when the *Previous Reform* is already active, and the minimum wage reform takes place. In the bottom panels column (i) reports the difference in marginal effects when only the initial reform takes place; column (ii) when the minimum wage reform takes place, given that the initial reform holds; and column (iii) the 'joint' effect of the two reforms Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

2.6.2. Further Robustness Results

In order to exploit the (unbalanced) panel data structure of our dataset we resorted to two types of experiments. First, for all models above that entail binary dependent variables, we estimated probit models with random effects – rather than simply pooling the data. We find that all our findings above remain largely unaffected. The (point) estimates change slightly, but the qualitative nature of our (previous) conclusions remains intact.

As a second robustness check, we have also estimated LPMs along the lines of Yannelis (2014). The results are presented in Tables A1-A5 in the Appendix. As we have noted before, OLS estimates of LPMs might be inconsistent. With this caveat in mind, we estimated LPMs with individual fixed effects and found no significant difference of our conclusions: for instance we find no significant change in the employment probability differential between individuals belonging in the 25-27 age group relative to the 22-24 group. We also find no significant differential effect on the rate of labour force participation. Along the same lines, we are unable to uncover neither any differential effect regarding job findings and job losses nor any effect on the probability of transition across sectors. Even if we use a specification similar to the one in Yannelis (2014) – see Table A5, where the dependent variable is an indicator of full time employment, we find no effect of the 2012 labour market reform on the employment outcome. These results indicate that the difference in results must be due to the shorter time span used by Yannelis.[51]

2.7. Conclusion

The introduction of a subminimum wage in Greece in February 2012 for persons aged less than 25 was part of the "internal devaluation" policy package. It included a 22% decrease in the basic minimum wage which (until then) was applying to all persons independent of age, and a 32% decrease in it if the person was less than 25 years old. This was motivated as a policy measure to tackle the very high unemployment rate of

[51] However, given that the effects of factor price changes are more likely to become apparent as the time horizon gets longer, thus more likely that the labour-labour substitution effect would be present in our sample than in the (shorter-horizon) sample used by Yannelis, it is hard to explain what drives the difference in our results.

persons below the age of 25 (which was heading north of 50% at the end of 2011 – against an overall unemployment rate which had just surpassed the 20% mark).

Using persons just above the age of 25 as the control group we have relied on administrative data from the Greek LFS over the period 2008Q1-2016Q1 to examine the effects of the introduction of a subminimum wage. We find no evidence in support of the labour-labour substitution hypothesis, i.e. we uncover no differential change in the probability of employment for persons just above or just below the age threshold (of 25) at which the subminimum applies (this holds for both narrower and broader age groups). Moreover, we find that the probability of labour force participation for individuals in group not subject to the subminimum wage becomes significantly higher (relative to the group subject to it), indicating that the further reduction in the minimum wage for the younger group had the expected labour supply effects (i.e. in response to a relative wage cut it reduced the group's relative labour supply). The (relative to the younger group) increase in labour force participation of the 25-27 group is reflected in a (statistically) significant improvement in the relative job finding rate for the non-agricultural, private-sector employees of this group after the reform. Moreover, we find that the reform had no significant differential impact on employment terminations; i.e. it had no differential impact on either dismissals or quits. These results remain robust to changes in the age bands around the age threshold at which the subminimum wage applies.

Appendix of Chapter 2

Table A.1: Employment and labour Participation Effects – Linear Probability Models

VARIABLES	(1)	(2)	(3)	(4)
Above 25 years	0.0065	0.0022	0.0050	-0.0001
	(0.0052)	(0.0056)	(0.0057)	(0.0029)
Post Reform	-0.0005	-0.0028	-0.0076	0.0035
	(0.0070)	(0.0072)	(0.0071)	(0.0036)
Above 25 years × Post Reform	-0.0043	0.0012	-0.0021	0.0028
	(0.0069)	(0.0072)	(0.0072)	(0.0039)
Gross Domestic Product	0.3634***	0.3964***	0.3511***	0.0827**
	(0.0721)	(0.0789)	(0.0795)	(0.0364)
Loans	0.0670***	0.0690***	0.0625***	0.0056
	(0.0152)	(0.0165)	(0.0167)	(0.0075)
Marital Status	0.0701	0.0888	0.1050	-0.1188
	(0.0559)	(0.0677)	(0.0759)	(0.0781)
Low secondary education	-0.0334	0.0035	0.0111	-0.3112**
	(0.0778)	(0.0720)	(0.0681)	(0.1508)
Upper secondary education	0.0291	0.0857	0.0951	0.0502
	(0.1085)	(0.1546)	(0.1524)	(0.1554)
Post-secondary non-tertiary education	0.0240	0.0317	0.0101	0.4836***
	(0.1286)	(0.1611)	(0.1522)	(0.1600)
Undergraduate education	0.0771	0.1564	0.2016	0.5188***
	(0.1118)	(0.1648)	(0.1606)	(0.1572)
Post-graduate education	0.0589	0.1381	0.2172	0.8427***
	(0.1166)	(0.1681)	(0.1636)	(0.1756)
Constant	-4.1969***	-4.6750***	-4.1929***	-0.4604
	(0.8954)	(0.9826)	(0.9900)	(0.4646)
N	95,290	80,658	71,010	131,168
R^2	0.0057	0.0049	0.0069	0.0940
Number of individuals	23,725	20,283	18,066	32,340

Notes: The table reports estimates of the effects of the covariates listed in the left column on the probability of being employed in Columns (1)-(3) and on the probability of being participating in the labour force in Column (4) employing Linear Probability Models (LPMs). Columns (1) reports results for the full sample. Column (2) report results for a sample excluding self-employed and family workers. Column (3) reports results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. The dummy variable for males was excluded from the estimation being collinear with other fixed effects included in the estimation. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include individual fixed effects, as well as year and quarter fixed effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table A.2: Job Finding and Job Loss Effects – Linear Probability Models

	(1)	(2)	(3)	(4)
VARIABLES				
Above 25 years	0.0003	0.0002	-0.0002	0.0028
	(0.0028)	(0.0030)	(0.0030)	(0.0055)
Post Reform	-0.0061*	-0.0069*	-0.0080**	0.0013
	(0.0037)	(0.0039)	(0.0039)	(0.0056)
Above 25 years × Post Reform	0.0015	0.0031	0.0029	0.0031
	(0.0037)	(0.0038)	(0.0038)	(0.0062)
Gross Domestic Product	-0.0165	-0.0230	-0.0132	0.0107
	(0.0436)	(0.0470)	(0.0476)	(0.0972)
Loans	-0.0041	-0.0052	-0.0084	0.0089
	(0.0092)	(0.0102)	(0.0103)	(0.0199)
Marital Status	0.0341*	0.0399*	0.0436*	-0.0632
	(0.0185)	(0.0223)	(0.0249)	(0.1074)
Low secondary education	0.0345	0.0108	0.0053	0.0135*
	(0.0373)	(0.0096)	(0.0084)	(0.0072)
Upper secondary education	-0.0456	0.0217*	0.0132	0.0252***
	(0.0512)	(0.0124)	(0.0105)	(0.0088)
Post-secondary non-tertiary education	-0.0318	0.0199	0.0258	0.0585**
	(0.0563)	(0.0213)	(0.0173)	(0.0263)
Undergraduate education	-0.0317	0.0539**	0.0623**	0.0256*
	(0.0521)	(0.0242)	(0.0262)	(0.0140)
Post-graduate education	-0.0327	0.0517	0.0413	0.0363**
	(0.0589)	(0.0373)	(0.0393)	(0.0151)
Constant	0.3307	0.3606	0.2760	-0.1423
	(0.5570)	(0.5997)	(0.6059)	(1.2310)
N	95,290	80,658	71,010	131,168
R^2	0.0057	0.0049	0.0069	0.0940
Number of individuals	23,725	20,283	18,066	32,340

Notes: The table reports estimates of the effects of the covariates listed in the left column on the probability of being hired in Columns (1)-(3) and on the probability of a person losing its job in Column (4) employing Linear Probability Models (LPMs). Columns (1) reports results for the full sample. Column (2) report results for a sample excluding self-employed and family workers. Column (3) reports results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. The dummy variable for males was excluded from the estimation being collinear with other fixed effects included in the estimation. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include individual fixed effects, as well as year and quarter fixed effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table A.3: Transitions Across Sectors – Linear Probability Models

VARIABLES	(1)	(2)	(3)
Above 25 years	-0.0090	-0.0101	-0.0052
	(0.0075)	(0.0088)	(0.0095)
Post Reform	-0.0134	-0.0180	-0.0179
	(0.0125)	(0.0149)	(0.0171)
Above 25 years × Post Reform	0.0074	0.0108	0.0046
	(0.0119)	(0.0143)	(0.0162)
Gross Domestic Product	-0.3034***	-0.3243***	-0.3504***
	(0.0957)	(0.1145)	(0.1262)
Loans	-0.0632***	-0.0754***	-0.0860***
	(0.0202)	(0.0239)	(0.0266)
Marital Status	0.0123	0.0020	-0.0317
	(0.0548)	(0.0729)	(0.0860)
Low secondary education	-0.0423	-0.0562	-0.0673
	(0.1381)	(0.2418)	(0.2629)
Upper secondary education	0.1183	0.2389*	0.2282
	(0.1118)	(0.1410)	(0.1743)
Post-secondary non-tertiary education	0.0827	0.1178***	0.1175***
	(0.1275)	(0.0095)	(0.0107)
Undergraduate education	0.0399	0.1586	0.1593
	(0.1091)	(0.1379)	(0.1729)
Post-graduate education	0.0181	0.2083	0.1874
	(0.1253)	(0.1406)	(0.1818)
Constant	4.6373***	4.9840***	5.3880***
	(1.1751)	(1.4072)	(1.5475)
N	63,156	48,524	38,876
R^2	0.0967	0.1116	0.1117
Number of individuals	16,781	13,105	10,476

Notes: The table reports estimates of the effects of the covariates listed in the left column on the probability of a person changing industry employing Linear Probability Models (LPMs). Columns (1) reports results for the full sample. Column (2) report results for a sample excluding self-employed and family workers. Column (3) reports results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. The dummy variable for males was excluded from the estimation being colinear with other fixed effects included in the estimation. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include individual fixed effects, as well as year and quarter fixed effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table A.4: Employment Effects Controlling for Previous Reforms – Linear Probability Models

VARIABLES	(1)	(2)	(3)
Above 25 years	0.0116*	0.0082	0.0126*
	(0.0061)	(0.0066)	(0.0067)
Post Reform	-0.0023	-0.0051	-0.0105
	(0.0072)	(0.0074)	(0.0073)
Above 25 years × Post Reform	0.0003	0.0064	0.0042
	(0.0074)	(0.0078)	(0.0077)
Previous Reform	0.0159**	0.0143*	0.0158**
	(0.0069)	(0.0077)	(0.0077)
Above 25 years × Previous Reform	0.0049	0.0016	0.0002
	(0.0057)	(0.0063)	(0.0061)
Gross Domestic Product	0.4080***	0.4255***	0.3772***
	(0.0833)	(0.0908)	(0.0913)
Loans	0.0590***	0.0625***	0.0555***
	(0.0144)	(0.0156)	(0.0158)
Marital Status	0.0696	0.0885	0.1046
	(0.0560)	(0.0677)	(0.0759)
Low secondary education	-0.0323	0.0034	0.0109
	(0.0779)	(0.0721)	(0.0682)
Upper secondary education	0.0288	0.0839	0.0929
	(0.1085)	(0.1548)	(0.1527)
Post-secondary non-tertiary education	0.0235	0.0299	0.0078
	(0.1286)	(0.1613)	(0.1524)
Undergraduate education	0.0767	0.1547	0.1994
	(0.1118)	(0.1651)	(0.1608)
Post-graduate education	0.0591	0.1372	0.2161
	(0.1167)	(0.1683)	(0.1638)
Constant	-4.6042***	-4.9259***	-4.4070***
	(1.0070)	(1.1018)	(1.1057)
N	95,290	80,658	71,010
R^2	0.0058	0.0050	0.0070
Number of individuals	23,725	20,283	18,066

Notes: The table reports estimates of the effects of the covariates listed in the left column on the probability of being employed accounting for the effects of *Previous Reforms*, employing Linear Probability Models (LPMs). Columns (1) reports results for the full sample. Column (2) report results for a sample excluding self-employed and family workers. Column (3) reports results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. The dummy variable for males was excluded from the estimation being collinear with other fixed effects included in the estimation. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include individual fixed effects, as well as year and quarter fixed effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table A.5: Employment (Full Time Employees Only) Effects – Linear Probability Models

VARIABLES	(1)	(2)	(3)
Above 25 years	0.0039	0.0006	0.0019
	(0.0050)	(0.0054)	(0.0054)
Post Reform	-0.0052	-0.0077	-0.0111*
	(0.0064)	(0.0068)	(0.0067)
Above 25 years × Post Reform	0.0014	0.0019	0.0014
	(0.0063)	(0.0068)	(0.0067)
Gross Domestic Product	0.3313***	0.4218***	0.3913***
	(0.0682)	(0.0759)	(0.0766)
Loans	0.0510***	0.0594***	0.0608***
	(0.0146)	(0.0163)	(0.0166)
Marital Status	0.0783	0.0995	0.1173
	(0.0602)	(0.0731)	(0.0823)
Low secondary education	-0.0106	0.0431	0.0482
	(0.0450)	(0.0559)	(0.0551)
Upper secondary education	-0.0854	-0.0273	-0.0212
	(0.0630)	(0.0965)	(0.0957)
Post-secondary non-tertiary education	0.0053	-0.0481	-0.0637
	(0.1049)	(0.1136)	(0.1060)
Undergraduate education	0.0357	0.0826	0.1477
	(0.0702)	(0.1141)	(0.1100)
Post-graduate education	0.0402	0.0911	0.1650
	(0.0735)	(0.1155)	(0.1143)
Constant	-3.6739***	-4.8433***	-4.6139***
	(0.8432)	(0.9391)	(0.9479)
N	95,290	80,658	71,010
R^2	0.0061	0.0063	0.0088
Number of individuals	23,725	20,283	18,066

Notes: The table reports estimates of the effects of the covariates listed in the left column on the probability of being employed employing Linear Probability Models (LPMs). In all specifications the dependent variable is a qualitative variable indicating whether the individual is employed full time or not. Columns (1) reports results for the full sample. Column (2) report results for a sample excluding self-employed and family workers. Column (3) reports results from a sample that excludes self-employed, family workers, public servants and persons working in the agricultural sector. The dummy variable for males was excluded from the estimation being collinear with other fixed effects included in the estimation. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include individual fixed effects, as well as year and quarter fixed effects. The data source is the Greek Labour Force Survey. Individuals between the ages of 22 and 27 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Chapter 3: The Marital Allowance Reform

3.1 Introduction

One of the changes in labour law introduced in Greece in 2012 was the abolition of the marital allowance, a binding 10 per cent top-up on the minimum wage (MW, thereafter) that married individuals were entitled to till then. The present study aims at identifying the differential effect that the abolition of the marital allowance in Greece had on two basic indicators of the labour market: employment and labour force participation. In other words, we use the "quasi-experimental" nature of this wage reform in order to enquire whether there were any differential employment dynamics among married and single individuals, i.e. we test the presumption that "labour-labour" substitution (see, e.g. Fairris and Bujanda, 2008; Neumark, Salas and Wascher, 2014) would ensure an improvement in the *relative* employment prospects of married individuals.[52]

The abolition of the marital allowance was part of a labour reform package introduced in Greece as part of the Economic Adjustment Programs (EAPs) that the Greek government(s) agreed with its official lenders (i.e., the so-called Troika of European Union, European Central Bank, and International Monetary Fund).[53] An important part of this reform package was reshaping the Greek MW legislation.[54] Up until March 2012, the MW was agreed between the social parties through collective bargaining and the state declared it legally binding for all private-sector

[52] It bears noting that our investigation is only partially related to the literature that has questioned the earlier consensus among economists (e.g. Stigler, 1946) that binding minimum wages result in employment losses. The first dent in the consensus came with Card and Krueger's (1994) study of the impact on fast-food employment of the 1992 increase in the New Jersey state minimum wage. Their finding of "no evidence that the rise in New Jersey's minimum wage reduced employment at fast-food restaurants in the state (p. 796), caused a stir among economists and released a flurry of theoretical and empirical research (see e.g. Card and Krueger, 1995 and 2000; Machin and Manning, 1997; Neumark and Wascher, 2000 and 2008; Manning, 2003; Dube et al., 2010; Allegretto et al., 2011; Neumark et al., 2014) which, to say the least, has not managed to re-establish the previous consensus.

[53] The first of these EAPs was signed in May 2010, and it provided the necessary funding needed to prevent the Greek government's outright default on its debt obligations.

[54] The avowed aim of this reform was to reduce unit labour costs and to simplify the MW framework. Regarding the latter, it bears noting that until 2012 there were in Greece about 20 different levels of the minimum wage set according to family and professional status as well as work experience (see for more details, Moutos (2015).

employees. In March 2012 the MW was decreased with a Ministerial Cabinet Act by 22 per cent and a subminimum wage for the youth was introduced, 32 per cent lower from the previously existing MW. In November of the same year, the before-mentioned abolition of the marital allowance as a binding MW benefit was legislated, together with the transition to a new way of setting the MW (from a collective bargaining procedure to a statutory MW).

Marital allowance was introduced for the first time in Greece in 1976, and it reflected lawmakers' belief that married workers (typically men) are in need of a higher income - especially in the case of a non-employed spouse, which was also typical at the time. Initially the marriage wage premium was equal to a 5 percent top-up on the MW (codified in the National General Collective Bargaining Agreement, EGSEE), and was granted if the spouse did not work or was not receiving a pension. In 1984, both working spouses became eligible of the marital allowance of 5 percent, which increased to 10 percent if the worker had more than 3 children. The EGSEE that was agreed in 1989 introduced the marital allowance in the form that continued to exist until its abolishment in 2012, i.e. a 10 per cent increase for a working spouse, regardless of whether his/her spouse works or receives a pension.

To be sure, the existence of a marital allowance in the MW structure may not interfere substantially with the way that the market compensates individuals of different marital status. Indeed, there is a substantial literature on the so-called *male marriage wage premium*, i.e. the fact that married males tend to earn substantially more than their single counterparts, even after controlling for various characteristics such as work experience, training, and labour force attachment (see, e.g. Hill, 1979; Korenman and Neumark, 1991; Gray, 1997 ; Antonovics, K., & Town, R., 2004; Datta Gupta, Smith, and Stratton, 2007; Bardasi and Taylor, 2008; Rodgers and Stratton, 2010).[55] de Linde Leonard and Stanley (2015) conclude from their meta-analysis of 59 studies that there exists a marriage premium for US men of between 9% and 13% after misspecification and selection biases are filtered. Nevertheless, as noted by Hoon, Keizer, and

[55]Becker's (1981, 1985) explanation for the male marriage wage premium (also known as the specialization hypothesis) is that that it is rational for men to maximize on their comparative advantage for market work and for women to maximize on their comparative advantage for household production. Still, it is possible that there is no causal relationship between marriage and men's wages, instead married men differ from single men on factors that predict both men's wages and marriage. An alternative explanation is that employers interpret and reward men's marital status as a signal of stability and commitment to employment, drawing from cultural images of married men as breadwinners.

Dykstra (2015) there exist substantial variations across countries, as there are countries where married men make as much as 25 percent more than unmarried men, while in other countries there is no evidence of a marital status difference in men's earnings. Regarding Greece, their estimate of the male marriage wage premium is equal to their estimate of the cross-country average of 8 percent. In contrast to men, for women, the evidence is much less conclusive, with various researchers reporting positive but small, or zero or even negative effects of marriage on women's remuneration (see, e.g. Van der Klaauw, 1996; Budig and England, 2001; Loughran and Zissimopoulos, 2009;Killewald and Gough, 2013). The above imply that, to the extent that the male marriage wage premium is larger than the corresponding premium for females, the abolishment of the marital allowance in Greece may impact more on females than on males, since market outcomes appear to have reflected the legislators' (or social partners') preferences more in the case of males than females.

Using administrative data from the Greek LFS, we examine whether the abolition of the marital allowance had differential impacts on employment and labour force participation for the total of our sample (private-sector employees between the ages of 25 to 64). We additionally examine the differential effect the reform had on a variety of subgroups: males, females, different age groups and groups with different educational attainment. We find that the reform had no statistically significant change in the differential employment probability for married individuals when compared with singles for the whole of our sample. This result survives when we split our sample into females and males. However, this result does not survive when we extract from our sample individuals of ages 50 to 64 and individuals with second stage tertiary education. These two groups are removed from our sample as the MW may not be relevant for them; workers with experience and workers with high education usually receive wages way above the MW (see, e.g. Duncan and Hoffman, 1981; Even and Macpherson, 2003). In this context, we find that the reduction in the relative cost of employing married workers had a positive, and statistically significant result; married individuals in the 25-50 age group and with less than upper tertiary education are found to be 1.26 percentage points more likely to find employment compared to singles.

When labour force participation is examined, we find that married individuals are 1.42 percentage points more likely to participate compared to the singles group. The result is mainly

driven from a higher probability of participation of married females, whereas the opposite result is reported for married males.

One possible explanation of our results concerning labour force participation is the added worker hypothesis: during periods of recession husbands (typically the main breadwinner of a household) lose employment or experience a decrease in their income, which may induce opposite labour force responses by the wives (Mincer, 1962).On the other hand, the negative result that we report for male married individuals may be linked with the discouraged worker hypothesis. The discouraged worker effect assumes that after repeated failed job searches or when facing a gloomy labour market, individuals may give up looking for jobs and withdraw from the labour market altogether. The discouraged worker effect presumes the opposite implication on labour market participation than the added worker effect (Gong, 2010).

Early studies had examined the aggregate movement of the labour force over the business cycle, finding that the added worker effect was mainly dominated by the discouraged worker effect or failed to find any evidence of the added worker effect in general (see, e.g. Humprey, 1940; Hansen, 1961;Layard et al.. 1980; Maloney, 1987; Evans, 2001; and Prieto-Rodriguez and Rodriguez-Gutierrez, 2003). Our results are more similar with another strand of the literature (Mincer, 1962; Bowen and Finegan, 1965; Heckman and MaCurdy, 1980;Stephens, 2002; Gong, 2011) were the added worker effect is observable and predominates the negative labour force participation results linked with the discouraged worker effect.

The rest of the paper is organized as follows. In section 2, some details regarding the institutional environment are presented. Section 3 presents the data used, as well as the empirical methodology. In section 4 the main results of our analysis are presented, whereas in section 5 the results of various robustness tests are reported. In the final section, concluding remarks are offered.

3.2. The Minimum Wage and the Marital Allowance Reform

The MW, up until the beginning of the Economic Adjustment Programmes in 2010, was determined through collective bargaining between the third-tier organizations of employees and employers.[56] The agreed between the parties MW had a universal application in the Greek labour market and was the floor for all wage agreements in the country, except for wages in the public sector.

The collective agreement that defined the MW level(EGSEE) included different rates for blue and white-collar workers (with the main distinction being that blue-collar workers have a daily MW rate, whereas white-collar workers have monthly MW rate), maturity allowances depending on years of experience, as well as a 10 per cent premium for married workers. The maturity allowance for white-collar workers was a 5 to 10 per cent top-up for every three years of experience, for up to nine years of experience; and for blue-collar works it was a 3 to 5 per cent top-up for every three years of experience, for up to six triennia (see Table 3.1).[57]

Table 3.1: Monthly Minimum Wages in Greece (in €)

DATE		SINGLE				MARRIED			
		BASIC	TRIENNIA			BASIC	TRIENNIA		
			1	2	3		1	2	3
2008	1/1/2008	680.59	737.20	804.31	871.34	748.65	805.35	872.37	939.40
	1/9/2008	701.00	759.41	828.44	897.48	771.11	829.51	898.54	967.58
2009	1/5/2009	739.56	801.17	874.01	946.84	813.52	875.13	947.96	1020.80
2010	1/1/2010	739.56	801.17	874.01	946.84	813.52	875.13	947.96	1020.80
2011	1/7/2011	751.39	813.99	887.99	961.99	826.54	889.13	963.13	1037.13
2012	14/2/2012	586.08	644.69	703.30	761.91	644.69	703.30	761.91	820.51
	12/11/2012	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2013	1/1/2013	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2014	1/1/2014	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2015	1/1/2015	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2016	1/1/2016	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91

[56]We should highlight here that the marital allowance was included for the first time in the EGSEE in 1976, defined as a 5 per cent increase for MW workers whose spouse did not work or was not retired. For a detailed analysis of the minimum wage and collective bargaining framework in Greece see Fotoniata and Moutos (2010), and Moutos (2015).

[57]The years of experience for blue collar workers were increased with the EGSEE of 2008 from five to six triennia.

2017	1/1/2017	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91
2018	1/1/2018	586.08	644.69	703.30	761.91	586.08	644.69	703.30	761.91

Notes: The table reports nominal values (in euro) of the basic minimum wage for married and non-married individuals along with the minimum wage top-up due to triennia of experience and how this has evolved over the years.

The EGSEE was usually negotiated every two years and included bi-annual wage adjustments, with the main criterion being the rate of inflation. The last EGSEE that included MW negotiations was signed in July 2010 and provided for increases in the MW that were scheduled to take place on July 2011 and on July 2012 in line with the average EU inflation; the agreed increase of July 2012 did not materialize.

Lowering unit labour costs in order to improve the country's competitiveness was at the epicenter of the policies introduced under the EAPs. In February 2012, and in the eve of signing the second EAP for the country, a reduction in the MW was legislated by the government. The reduction in the MW by 22 per cent was accompanied by the introduction of a universal subminimum wage rate for employees under 25, 10 percentage points lower than the MW rate for older employees. The MW rate for single, white-collar workers, with no work experience and above 25 years old, was set at €586.08, whereas the rate for the younger employees with the same criteria was €510.95. For married MW workers with no experience, the MW rate was determined at €644.69 if they were above 25 years old and at €562.05 if they were below the age limit.

Additional changes in the MW framework were adopted in November 2012. Law 4093/2012 introduced a new MW setting mechanism, stating that the MW would not be the by-product of collective bargaining but will be determined by the state. Additionally, it was stipulated that the 10 per cent premium for married MW workers was abolished and that all wage increases based on tenure were frozen until the unemployment rate falls below 10 per cent. The law introduced also a freeze on the MW levels until the end of the EAPs and not before 2017. This reform package aimed, according to the Greek government and the Troika, at reducing the MW gap between Greece and her peers, as well as helping youth unemployment and employment of the individuals on the margin of the labour market.

MW reforms aimed not only at reducing unit labour costs but also at simplifying the MW framework. As described above and presented in Table 3.1, the MW had different rates applied based on seniority, marital status and the type of worker (blue or white-collar). The disparity between the "basic" MW and other MW rates could be up to €286 in 2011, with 26 different rates being applied. The gap between the highest applied MW and the lowest (basic) MW remained even after the reduction in the MW level in February 2012 (but it declined to a difference of €234). The abolition of the marital allowance, as a mandatory top-up benefit further diminished the differential between the highest and the lowest applied MW to €176, but the high number of different MW rates applied continued to exist (mainly due to the continuation of the maturity allowances and the introduction of the subminimum wage for the youth).

3.3 Data and Empirical Methodology

3.3.1 Data

The data used in our research are from the Greek Labour Force Survey (LFS), made available to us by the Hellenic Statistical Authority. The LFS data are the main administrative source for the Greek labour market.[58] LFS is a large household survey, consisting of about 32,600 households each quarter, corresponding to a sampling rate of 0.85%. Households are selected randomly and stay in the sample for six quarters. Each period, one-sixth of the sample is replaced. The survey collects information on demographic characteristics, main job characteristics, the existence and characteristics of a second job, educational attainment, participation in education as well as previous working experience and search for a job. The participation in the survey is compulsory.

Two of the dependent variables of interest are indicators of whether a person is employed or economically active (i.e. a person participates in the labour force). A person is considered to be employed if during the week it was surveyed, it worked even for just one hour for pay or profit; or if it was working in the family business; or it was not at work but had a job or business from which it was temporarily absent. Unemployed are persons, who were without work in the week surveyed; were currently available for work; and were either actively seeking work in the past

[58] LFS has produced quarterly estimates since 1981. Since 1998, LFS has been a continuous quarterly survey.

four weeks or had already found a job to start within the next three months. Finally, a person is classified as economically active if it is either employed or unemployed.

The two aforementioned variables (employed and economically active) are constructed from the variable *katap*, available with the LFS survey.[59] In some experiments, we employ actual hours worked, which are the total number of hours actually worked during the reference week in the main job (given by variable *e27_orR* in the LFS survey). Other variables that are being used are gender (*A07*), marital status (*a11_r*) and education level (*E80_2*).

In the present study, we focus on individuals between 25 to 64 years old and exclude younger individuals. We do so for two reasons. First, most persons younger than 25 are single, which would lead to an uneven size of control and treatment groups for such individuals (only 1.54 per cent of individuals below the age of 25 are married). Second, a lower subminimum wage was also introduced earlier during 2012, affecting only employees younger than 25 years old; so results based on samples including these individuals may be affected by the introduction of the subminimum wage. Moreover, our sample includes only private-sector employees, since the minimum wage legislation applies only to them.[60] The dataset we work with is an unbalanced panel of individuals; for each quarter$t$, anindividual'si response is included.As theabolition of the marital allowance took place on November of 2012, the *pre*-reform period is between 2008:Q1 and 2012:Q3, whereas the *post*-reform period is 2012:Q4–2016:Q1.

In this paper we aim at assessing the impact of the abolition of the marital allowance as a mandatory top-up to the MW. Up until the abolishment of the allowance, MW workers were differentiated in their wages based only on their marital status, even though married and single individuals were similar in all other characteristics. The marital benefit did not reflect difference of any kind in productivity, but rather was arbitrarily applied to married employees. In order to proceed, our main assumption is that the employment trend for married and non-married workers would have been the same for all individuals, as they face the same type of reforms, economic environment and had similar characteristics (common trends assumption).

[59]We do not focus on whether an individual is employed *full time* in what follows, but rather on the employment status.

[60]We exclude from our sample self-employed, family workers, public servants and persons working in the agricultural sector, as the minimum wage does not apply to them.

Summary statistics, for the whole of our sample, before and after the reform for the two groups are presented in Table 3.2.Panel A presents the percentage of full-time employees that are paid around the minimum wage.[61]Before the reform, the percentage of single workers that were low-paid was about 3 percentage points higher than the corresponding percentage for married workers. After the reform, the incidence of low-pay among single workers increased by 9 percentage points, whereas for married workers it increased by just 1 percentage point, thus bringing the difference in the incidence of low-pay between the two groups to 11 percentage points.

Table 3.2: Summary Statistics

Panel A: Percentage of the sample paid up to the minimum wage				
Periods\ Marital Status	**Single**		**Married**	
2008:Q1-2012:Q3 (*pre*-reform)	15.22%		12.48%	
2012:Q4-2016:Q1 (*post*-reform)	24.52%		13.55%	
Panel B: Full Sample Summary Statistics				
	Pre-Reform		**Post-Reform**	
Variable \ Marital Status	Single	Married	Single	Married
Age	39.04	47.40	39.95	48.27
	(11.68)	(10.08)	(11.63)	(9.80)
Unemployment Rate	0.17	0.09	0.32	0.19
	(0.38)	(0.29)	(0.47)	(0.39)
Actual Hours Worked	39.52	39.19	39.47	39.25
	(13.90)	(15.48)	(14.69)	(15.81)
Monthly Wage	928.80	1057.81	771.79	897.69
	(312.43)	(320.60)	(315.86)	(335.68)
Job Finding Rate	0.006	0.002	0.009	0.004
	(0.080)	(0.049)	(0.095)	(0.062)
Separation Rate	0.003	0.002	0.003	0.002
	(0.058)	(0.043)	(0.056)	(0.041)
Transition Rate	0.05	0.02	0.08	0.03
	(0.23)	(0.15)	(0.27)	(0.18)

[61]LFS up until 2015 reported wages in brackets. Throughout the years examined, significant changes in the range of the wage brackets were made. To make our dataset consistent through the years examined, we further widened the wage groups. For all years examined, low paid workers are considered those paid up to €800. For married employees the same definition applies, except from 2009 to 2011 for which low paid (married) employees are considered those paid up to €1000.

Quits	0.04	0.03	0.03	0.02
	(0.19)	(0.17)	(0.18)	(0.14)
Dismissals	0.33	0.26	0.28	0.24
	(0.47)	(0.44)	(0.45)	(0.42)
Female (%)	0.45	0.53	0.46	0.54
	(0.50)	(0.50)	(0.50)	(0.50)
Non-Greek (%)	0.06	0.08	0.05	0.07
	(0.24)	(0.27)	(0.22)	(0.26)
Public sector (%)	0.21	0.24	0.20	0.24
	(0.41)	(0.42)	(0.40)	(0.43)
Agriculture (%)	0.07	0.11	0.07	0.11
	(0.26)	(0.31)	(0.26)	(0.31)
Observations	207,414	513,004	137,110	300,499

Notes: The table reports summary statistics for all individuals in our sample with persons who are considered out of the labour force being excluded. The numbers in parentheses are standard deviations. The period under study covers the quarters between 2008:Q1 and 2016:Q1. The data source is the Greek Labour Force Survey (LFS).

In Panel B of Table 3.2we report summary statistics for several characteristics of the two groups of workers, before and after the reform. The continuing (after 2012) depression of the Greek economy was reflected in a(near) doubling of the unemployment rates for both groups of workers (married: from 9 to 19 percent; singles: from 17 to 32 percent), while there was a 15 per cent decline of the average wage for the married group and almost 17 per cent for the singles. The rest of the variables report similar developments for both groups, with the exception of actual hours worked which show that after the reform there was a small decrease for the singles group, and a small rise for the married.

In Table 3.3we present information for females only. We note that after the reform there was a substantial increase in the percentage of singles females receiving up to the MW (from 21% to 31%), whereas for the married there was a slight decrease in the incidence of low-pay individuals after the reform. When we look at males alone (Table 3.4), there was again a substantial increase in the percentage of non-married individuals receiving up to the MW after the reform (by 9 percentage points), as well as for the married (by 2 percentage points). We also note that the decline in wages after the reform was of similar magnitude (i.e. between 15 and 17 per cent)

across gender and marital groups. We should also highlight changes regarding participation rates and quits: regarding the former we note a *post*-reform increase in the participation rate for married females, whereas the opposite is true for married males;[62] regarding quits, we observe a decrease in the quit rate for females only –note also that this reduction is more substantial for the married ones.

Table 3.3: Summary Statistics forFemale Individuals

	Pre-Reform		**Post-Reform**	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	20.85%	18.24%	30.56%	17.83%
Age	41.52 (12.73)	46.47 (10.26)	41.96 (12.42)	47.41 (9.98)
Unemployment Rate	0.21 (0.41)	0.13 (0.33)	0.35 (0.48)	0.23 (0.35)
Participation Rate	0.72 (0.45)	0.57 (0.50)	0.73 (0.44)	0.60 (0.49)
Actual HoursWorked	36.92 (13.76)	35.46 (15.95)	36.91 (13.89)	35.73 (15.96)
Monthly Wage	888.79 (324.37)	960.10 (344.93)	742.66 (318.95)	817.78 (332.23)
Job Finding Rate	0.006 (0.074)	0.003 (0.053)	0.008 (0.090)	0.004 (0.059)
Separation Rate	0.004 (0.059)	0.002 (0.041)	0.003 (0.059)	0.002 (0.041)
Transition Rate	0.06 (0.23)	0.03 (0.17)	0.08 (0.27)	0.03 (0.18)
Quits	0.05 (0.22)	0.05 (0.21)	0.04 (0.19)	0.03 (0.18)
Dismissals	0.30 (0.46)	0.24 (0.43)	0.28 (0.45)	0.24 (0.42)
Non-Greek (%)	0.06 (0.23)	0.07 (0.27)	0.05 (0.22)	0.07 (0.26)
Public Sector (%)	0.27 (0.44)	0.26 (0.44)	0.24 (0.43)	0.25 (0.43)
Agriculture(%)	0.10 (0.30)	0.04 (0.19)	0.10 (0.30)	0.03 (0.18)
Observations	94,164	273,135	62,487	161,534

[62] Similar patterns across gender groups are also observed for singles, but the effect is less pronounced.

Notes: The table reports summary statistics *only*forfemale individuals in our sample, with persons who are considered out of the labour force beingexcluded. The numbers in parentheses are standard deviations. The period under study covers the quarters between 2008:Q1 and 2016:Q1. The data source is the Greek Labour Force Survey (LFS).

Table 3.4: Summary Statistics forMale Individuals

	Pre-Reform		**Post-Reform**	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	11.81%	8.75%	20.77%	10.54%
Age	36.99 (10.29)	48.45 (9.76)	38.26 (10.62)	49.28 (9.48)
Unemployment Rate	0.15 (0.36)	0.06 (0.24)	0.30 (0.46)	0.15 (0.36)
Participation Rate	0.88 (0.33)	0.84 (0.36)	0.86 (0.34)	0.81 (0.39)
Actual Hours Worked	41.17 (13.74)	41.85 (14.56)	41.17 (14.95)	41.95 (15.17)
Monthly Wage	961.00 (298.62)	1131.71 (279.03)	797.09 (310.96)	963.75 (323.94)
Job Finding Rate	0.007 (0.084)	0.002 (0.045)	0.010 (0.099)	0.004 (0.064)
Separation Rate	0.003 (0.058)	0.002 (0.045)	0.003 (0.054)	0.002 (0.042)
Transition Rate	0.05 (0.22)	0,02 (0.13)	0.08 (0.27)	0.03 (0.17)
Quits	0.03 (0.16)	0.01 (0.11)	0.03 (0.17)	0.01 (0.08)
Dismissals	0.35 (0.48)	0.23 (0.44)	0.27 (0.45)	0.23 (0.42)
Non-Greek (%)	0.06 (0.24)	0.08 (0.27)	0.05 (0.22)	0.07 (0.26)
Public Sector (%)	0.18 (0.38)	0.22 (0.42)	0.17 (0.38)	0.22 (0.42)
Agriculture(%)	0.12 (0.32)	0.10 (0.31)	0.12 (0.33)	0.11 (0.31)
Observations	113,250	239,869	74,623	138,965

Notes: The table reports summary statistics *only* for *male* individuals in our sample, with persons who are considered out of the labour force being excluded. The numbers in parentheses are standard deviations. The period under study covers the quarters between 2008:Q1 and 2016:Q1. The data source is the Greek Labour Force Survey (LFS).

In the Appendix (Tables A.1-A.8) we present further summary statistics where we split the sample across age and education groups. We find that the quit rate for married individuals in the 25-29 age group dropped after the reform to half of its pre-reform level (from 12 to 6 per cent), whereas for married individuals with post-graduate education the quit rate increased from 12 to 15 percent. We note also that for the highest education group of married workers the decline in wages is quite small (by only 8% being the smallest in our sample), whereas the group with the largest drop in wages is those aged 25 to 29 (also those with the largest decline in the quit rate).

3.3.2. Empirical Methodology

In order to assess the potentially differential effect the reform had on married and non-married individuals (if any), we employ a set of binary-response models. In particular, let

$$y_{i,t} = \mathbf{1}\{\alpha T_t + \beta Married_{i,t} + \gamma T_t \cdot Married_{i,t} + \mathbf{x}_{i,t}^{'}\boldsymbol{\theta} + u_{i,t} > 0\} \qquad (1)$$

where $y_{i,t}$ is a binary indicator variable of employment or labour force participation status by individual $i = 1, \dots, N$ in year t, the vector $\mathbf{x}_{i,t}$ contains individual level controls including gender, educational attainment, age[63] and region, as well as controls capturing the overall state of the economy, namely (the log of) real GDP and *Loans*, whereas $u_{i,t}$ is a well-behaved random term.[64]The variable T_t takes the value one during the reform period and zero before that and $Married_{i,t}$ is an indicator that takes a value unity when individual i during year t is married.The probit models we estimate below are akin to difference-in-difference regressions, with the coefficient of γ representing the difference in the outcome variable between the two groups (married and non-married) stemming from the abolition of the marital allowance as a MW top-up

[63] We use age groups as a control variable. The age groups examined are: 25 to 29 years old, 30 to 39 years old, 40 to 49 years old and 50 to 64 years old.

[64] Loans are the total amount of outstanding loans towards firms with maturity between one and five years, deflated by CPI. Data for loans were obtained from the Bank of Greece (Table 2a, https://www.bankofgreece.gr/en/statistics/financial-markets-and-interest-rates/bank-deposit-and-loan-interest-rates) and for CPI from ELSTAT. GDP is measured as (seasonally adjusted figures) of Chain-linked volumes, with reference year 2010 (GDP_SA_CLV10), also obtained from ELSTAT.

(the married group was subject to a 10 per cent decrease in their minimum wage, whereas for single individuals the MW level remained the same).[65]

In the specification (1) the coefficient γ does hot have the usual direct interpretation one finds in linear regression models: its sign and significance does convey useful information, but it is not the *treatment*(or difference-in-differences) effect (Puhani, 2012). We address this issue in two complementary ways. *First*, in many instances what is more straightforward to interpret is the "marginal effect" of T_t via its interaction with $Married_{i,t}$.[66] In particular, we compute the change in the predicted probability caused by a change of $Married_{i,t}$ from zero (singles) to one (married), when $T_t = 0$(in the *pre*-reform period) and when $T_t = 1$ (in the *post*-reform period) and compare the two. So, we compute

$$\Pr\left(y_{it} = 1 \middle| T_t=0, Married_{i,t}=0, \mathbf{x}_{it}\right) - \Pr\left(y_{it} = 1 \middle| T_t=0, Married_{i,t}=1, \mathbf{x}_{it}\right), \quad (2a)$$

and,

$$\Pr\left(y_{it} = 1 \middle| T_t=1, Married_{i,t}=0, \mathbf{x}_{it}\right) - \Pr\left(y_{it} = 1 \middle| T_t=1, Married_{i,t}=1, \mathbf{x}_{it}\right), \quad (2b)$$

and then compare these two differences in predicted probabilities.[67]*Second*, we follow Puhani (2012) and estimate the treatment effect in the ''difference-in-differences'' probit model as:

$$E\left(y_{i,t}^1 \middle| T_t = 1, Married_{i,t} = 1, \mathbf{x}_{it}\right) - E\left(y_{i,t}^0 \middle| T_t = 1, Married_{i,t} = 1, \mathbf{x}_{it}\right) =$$

$$= \Phi\left(\alpha + \beta + \gamma + \mathbf{x}_{i,t}^{'}\boldsymbol{\theta}\right) - \Phi\left(\alpha + \beta + \mathbf{x}_{i,t}^{'}\boldsymbol{\theta}\right), \quad (3)$$

where $y_{i,t}^1$ and $y_{i,t}^0$ are potential outcomes with and without treatment (i.e. being married), respectively.Comparing the results from (3) with the difference in predicted probabilities (i.e. the

[65] The assumption on which our analysis is based, is that in the absence of the reform, the employment status and labour force participation of all individuals, regardless of their marital status, would have followed the same time paths (common trends assumption).

[66]The "direct" marginal effect of T_t would capture the effect of the reform on trend employment or labour force participation (the probability of being employed or participating in the labour force) for both groups of individuals (married vs. non-married). While that has interest in its own right, the "interaction" term is what matters for our interpretation below.

[67] This essentially compares the marginal effect of being married before the reform with the marginal effect of being married during the reform period. As both marginal effects are based on the same estimated probit model, obtaining an estimate of the standard error for this difference is quite straight-forward (see Williams, 2012).

difference (2a)–(2b)), will provide a complete and clear view of the effect (if any) of the MW reform studied here on the outcomes of interest.

3.4. Results

In this section we discuss our main findings and robustness analysis. In what follows we present results only for the effects of the reform on the outcomes of interest and leave a detailed discussion of the effects of included controls in an online appendix. In all specifications the set of explanatory variables includes year and quarter dummies to capture effects and cross-sectional dependencies. We first discuss evidence regarding the effects of the reform on employment probabilities and then results pertaining to labour force participation.

3.4.1 The Differential Effects on Employment Rates

The effects of the abolishment of the MW top-up for the married on the probability of being employed are summarized in Table 3.5. In particular Panel A of the table reports results for the marginal effects of $Married_{i,t}$ and the reform period (T_t)for all individuals (columns 1 and 2), for females (columns 3 and 4) and males (columns 5 and 6) separately. We find that married individuals have had a significantly higher probability of being employed, with married male individuals having about 16 percentage points higher probability than non-married ones, whereas the corresponding probability advantage for females was only about 2.65 to 2.84 percentage points. In the period after the reform, there is a reduction in the probability of employment, capturing the results of the crisis on employment. This reduction in employment probability is not statistically significant for female individuals, indicating that the significant effect we report for the whole sample is driven by the reduction in employment probability of male individuals.

In Panel B of Table 3.5, we report the difference in the marginal effects of $Married_{i,t}$ under the two regimes (before and after the reform), which is an estimate of the (differential) effect of the reform on the probability of being employed for the married individuals; and, in Panel C we report the *treatment* effect of the reform. We first note that the estimates of the differences in predicted probability and the *treatment* effect are closely aligned in terms of sign, magnitude and statistically significance. The conclusion drawn from these estimates is that the abolition of the

10 per cent marital allowance did not generate any (statistically significant) effect on theemployment probability of married individuals, i.e. it did not succeed in boosting their employment prospects relative to singles.

Table 3.5: Employment effects

Panel A: Marginal Effects						
COVARIATES	(1) Pre Reform	(2) Post Reform	(3) Pre Reform	(4) Post Reform	(5) Pre Reform	(6) Post Reform
Married	0.0878***	0.0918***	0.0284***	0.0265***	0.1609***	0.1599***
	(0.0021)	(0.0024)	(0.0032)	(0.0035)	(0.0029)	(0.0033)
Reform (T_t)	-0.0134***		-0.0082		-0.0161**	
	(0.0052)		(0.0080)		(0.0066)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	YES		YES		YES	
Region dummies	YES		YES		YES	
N	388,468		180,820		207,648	
Pseudo R^2	0.0862		0.0609		0.1132	
Wald $\chi^2(37/36)$	40623.13***		14225.81***		25433.04***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0040		-0.0019		-0.0010	
	(0.0030)		(0.0046)		(0.0041)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects						
	0.0280		-0.0020		-0.0040	
	(0.0029)		(0.0045)		(0.0035)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. People who are considered out of the labour force are excluded from the sample. Self-employed, family workers, public servants and persons working in the agricultural sector are excluded from our sample, as the minimum wage does not apply to them. Columns (1)-(2) report results for the full sample of individuals. Columns (3)-(4) report results only for females. Columns (5)-(6) report results only for males. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. The data source is the Greek Labour Force Survey (LFS). Individuals between the ages of 25 and 64 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

In Tables 3.6 and 3.7 we repeat the same exercise focusing each time on a different age and education group. In Table 3.6 we examine the effects of the reform on individuals of different age groups: columns (1)-(2) report results for individuals aged 25 to 29, columns (3)-(4)results for those aged 30 to 39, columns (5)-(6)results for individuals aged 40 to 49 and columns (7)-(8)

results for those aged 50 to 64. We narrow the age groups for two reasons: first we aim at reducing the degree of heterogeneity among individuals, making groups more similar; and second we want to evaluate potential differences across age-groups. Older individuals are expected to be more experienced there by enjoying higher wages, making the MW reforms irrelevant to them. Thus, it could well be the case that the insignificant results for the whole sample were driven by including in our analysis (age) groups to which the reform did not apply.

In Table 3.6 we observe that for all four age groups, married individuals after the reform have a (relative) positive employment probability. For married individuals aged 25 to 29 the employment probability is 2.32 percentage points higher than for singles (and the *treatment* effect about 2.18 percent), while for married individuals age 30-39 the employment probability is 2.61 percentage points higher (and the *treatment* effect 2.32 percent higher). In both cases, the results are statistically significant at the 1% level. Instead, when examining results for relatively older employees (those aged 40 and above) in columns (5)-(8) of Table 3.6, we observe that the reform did not have a statistically significant effect on the employment of the married group. There are two possible explanations for the difference noted for the group of middle-aged and above: either such individuals have a significant amount of tenure, which results to significant tenure increases in their wage relative to the "basic" MW (for whom the 10% top-up may be a small proportion of their overall wage); or because older, more experienced individuals are less likely to be paid MW rates at the first place.

In Table 3.7, we report similar results, but instead each time focus on a different education level. We have chosen to analyze groups based on their educational attainment separately, because MW arguably applies mainly to workers with low levels of education. Thus, another reason for obtain insignificant effects of the reform in the overall sample might have been that we included highly educated individuals, for which the MW is irrelevant.

Table 3.6: Employment effects for Different Age Groups

Panel A: Marginal Effects								
COVARIATES	(1) Pre Reform	(2) Post Reform	(3) Pre Reform	(4) Post Reform	(5) Pre Reform	(6) Post Reform	(7) Pre Reform	(8) Post Reform
Married	0.0799***	0.1030***	0.0953***	0.1214***	0.0787***	0.0810***	0.0615***	0.0657***
	(0.0056)	(0.0074)	(0.0033)	(0.0039)	(0.0045)	(0.0045)	(0.0059)	(0.0061)
Reform (T_t)	-0.0172		-0.0141		0.0044		-0.0379***	
	(0.0129)		(0.0086)		(0.0094)		(0.0123)	
Macro controls	YES		YES		YES		YES	
Age groups	NO		NO		NO		NO	
Education groups	YES		YES		YES		YES	
Region dummies	YES		YES		YES		YES	
N	69,540		134,935		110,979		73,014	
Pseudo R^2	0.0823		0.0851		0.0896		0.0932	
Wald $\chi^2(34)$	7247.12***		13810.85***		11691.75***		8220.52***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects								
	0.0232**		0.0261***		0. 0022		0.0042	
	(0.0091)		(0.0051)		(0.0064)		(0.0084)	
Panel C: "Treatment" Effect: Post-Reform vs. Pre-reform Marginal Effects								
	0.0218**		0.0232***		0.0025		0.0024	
	(0.0090)		(0.0048)		(0.0059)		(0.0083)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. Columns (1)-(2) report results for individuals between 25 and 29 years of age; columns (3)-(4) results for individuals between 30 and 39 years of age; columns (5)-(6) report results for individuals between 40 and 49 years of age; and columns (7)-(8) report results for individuals between 50 and 64 years of age. All specifications include year and quarter effects. See also notes for Table 3.5. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table 3.7: Employment effects (education groups)

Panel A: Marginal Effects						
	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Married	0.0684***	0.0863***	0.1036***	0.0966***	0.1796***	0.2047***
	(0.0026)	(0.0030)	(0.0039)	(0.0041)	(0.0153)	(0.0161)
Reform (T_t)	-0.0177***		-0.0040		-0.0277	
	(0.0064)		(0.0091)		(0.0316)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	NO		NO		NO	
Region dummies	YES		YES		YES	
N	259,168		121,817		7,483	
Pseudo R^2	0.0855		0.0828		0.1411	
Wald $\chi^2(37/36)$	27631.05***		12123.86***		1061.01***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0178***		-0.0070		0.0251	
	(0.0038)		(0.0053)		(0.0230)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects						
	0.0162***		-0.0071		0.0116	
	(0.0037)		(0.0049)		(0.0164)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. Columns (1)-(2) report results for individuals with up to (upper) secondary education, columns (3)-(4) report results for individuals with post-secondary non-tertiary or first stage of tertiary education, and columns (5)-(6) report results for individuals with second stage tertiary education.Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. See also notes for Table 3.5. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Columns (1)-(2) of Table 3.7 report results for individuals with up to (upper) secondary education, columns (3)-(4) for individuals with post-secondary non-tertiary or first stage of tertiary education and columns (5)-(6) for individuals with second stage of tertiary education. We first note that the reform had a positive effect for married individuals with up to (upper) secondary education (columns (1)-(2)),with the probability of being employed being 1.78 percentage points higher for the married group after the reform (and the *treatment* effect being 1.62 percentage points higher). Instead, when we examine the groups composed of individuals with higher education attainment we find that the reform did not have a statistically significant

effect for the married group: both the difference in predicted probabilities and the *treatment* effect are indistinguishable for zero.

Given our findings in Table 3.6andTable 3.7, the reason for not uncovering a significant effect in the overall sample seems to be that we have included individuals for whom the MW was not binding. To further explore this issue, we re-estimated our baseline model (1) but excluded older individuals (aged 50 to 64) and individuals with high (upper tertiary) education. The findings from this experiment are summarized in Table 3.8. We note again that the probability of employment has increased slightly for married individuals in the *post*-reform period: we find that the abolishment of the 10% increase in the minimum wage for married individuals made them 1.26 percentage points more likely to be employed, with the effect being significant at the 1% level. Similarly, the *treatment* effect indicates an increase of the probability of employment for the married of 1.13 percentage points.

Table 3.8: Employment effects (Younger, Less Educated)

Panel A: Marginal Effects		
	(1)	(2)
COVARIATES	Pre Reform	Post Reform
Married	0.0906***	0.1031***
	(0.0023)	(0.0026)
Reform (T_t)	-0.0076	
	(0.0058)	
Macro controls	YES	
Age groups	YES	
Education groups	YES	
Region dummies	YES	
N	308,575	
Pseudo R^2	0.0858	
Wald $\chi^2(35)$	32235.18***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects		
	0.0126***	
	(0.0034)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects		
	0.0113***	
	(0.0032)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. Older individuals (aged 50 to 64) and individuals with high

(second stage) tertiary education are excluded from the sample. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. The specification includes year and quarter effects. See also notes for Table 3.5. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

3.4.2. Effects on Labour Force Participation Rates

We next asses how labour force participation has been affected by the reform again by estimating models like (1). Table 3.9 presents results for the whole sample in columns (1)-(2), for females alone in columns (3)-(4) and for males in columns (5)-(6). We note that when whole sample is examined, married individuals are less likely to participate in the labour force in both periods examined (before and after the reform), and the same applies for the group of females. Instead, when we restrict attention to males, married individuals are more likely to participate in the labour force, in both periods. Moreover, in the period after the reform there does not seem to be any strong effect on the probability of labour force participation for the overall sample and for females; whereas for males, the probability of participating in the labour market has increase by 0.87 percentage points after the reform, with the effect being significant at the 10% significance level.

Table3.9: Labour Force Participation

Panel A: Marginal Effects						
	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Married	-0.0798***	-0.0656***	-0.1841***	-0.1501***	0.0997***	0.0749***
	(0.0015)	(0.0018)	(0.0020)	(0.0024)	(0.0021)	(0.0024)
Reform (T_t)	0.0051		0.0030		0.0087*	
	(0.0036)		(0.0049)		(0.0051)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	YES		YES		YES	
Region dummies	YES		YES		YES	
N	703,812		408,372		295,440	
Pseudo R^2	0.2656		0.2332		0.2761	
Wald $\chi^2(32)$	195437.05***		104749.27***		86565.48***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0142***		0.0340***		-0.0248***	
	(0.0022)		(0.0030)		(0.0030)	
Panel C: "Treatment" Effect: Post-Reform vs. Pre-reform Marginal Effects						
	0.0144***		0.0340***		-0.0218***	

	(0.0023)	(0.0029)	(0.0027)

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of participating in the labour force. Columns (1)-(2) report results for the full sample of individuals. Columns (3)-(4) report results only for females. Columns (5)-(6) report results only for males. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. See also notes for Table 3.5. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

We also find that the probability that a married person participates in the labour market after the reform is 1.42 percentage points higher than the singles group (and the *treatment* effect is 1.44 percentage points) when the whole sample is examined. The effect is even stronger when we focus on females, with married females being more likely to participate in the labour force by 3.4 percentage points compared to single females. Instead, when we focus on male individuals, we find that married males are 2.48 percent less likely to participate after the reform (or 2.18 percent less likely based on the *treatment* effect), compared to single married individuals.[68]

A wage reduction (such as the abolishment of the marital allowance) is expected to lead to a decline in labour force participation, a result that we report only when we restrict our sample to male individuals. On the other hand, the comparatively positive effects of the reform on labour force participation for married female individuals can be attributed to the added worker effect. During periods of high unemployment, the main breadwinner of a family (typically the male) may lose his job. As a consequence, the female of the household, who have been inactive up until then, starts to look for a job (Woytinsky, 1940).A similar scenario may arise when the hours of the breadwinner are decreased or his wage declines, leaving him to face underemployment (Maloney, 1987). In any such case, the female individual is expected to start participating in the labour force to maintain the same household income as before. As female individuals represent 58 per cent of the whole sample, their increased participation after the reform may outweigh the negative effect of the reform on male labour force participation, leading to a (relative)positive labour force participation effect when examining the whole sample. The reported outcome for male married individuals may also arise from a combination of the added worker effect and the discouraged worker effect.

We then continue our analysis by examining how the reform has affected the labour force participation rates of different age groups in Table 3.10. We find that labour force participation

[68] All results for married individuals after the reform are statistically significant at the 1% level.

for married individuals after the reform has increased when examining the first three age groups (25-29 presented at columns (1)-(2), 30-39 presented at columns (3)-(4), and 40-49 presented at columns (5)-(6)). The probability of participating in the labour force is 4.25 percentage points (or 4.71 percent when estimated by the *treatment* effect) higher for married individuals ages 25 to 29; 2.72 percentage points (or 3.03 percent according to the *treatment* effect estimate) higher for married workers aged 30 to 39; and 1.63 percentage points (or 1.65 percent based on the *treatment* effect estimate) higher for married individuals aged 40 to 49 respectively, compared to single individuals in the same age group. As we had already reported a (relatively) positive effect on labour force participation for married individuals, when the whole sample is examined, similar results for most sub-groups were expected. The only different outcome is reported when examining older individuals, age 50 to 64 (columns (7)-(8) of Table 3.10). In this case, the effect of the reform on labour force participation for the married individuals is negative (they are 1.07 percentage points less likely to participate compared to single individuals). Older individuals are likely to fulfill (early) retirement requirements, leading these individuals out of the labour force (a category of individuals with especially loose early retirement requirements are women with young children). In such cases, we may not encounter the added worker effect (the main explanation for the positive labour force participation reported previously); when individuals are faced with unemployment or reduced household income, early retirement may be a reasonable solution. This explanation seems more plausible when we account for the discouraged worker effect; older individuals are more difficult to be re-integrated in the labour market. Early retirement may seem for these individuals as the only feasible solution when faced with unemployment or reduced income.

Table 3.10:Labour Force Participation (Different Age Groups)

Panel A: Marginal Effects

COVARIATES	(1) Pre Reform	(2) Post Reform	(3) Pre Reform	(4) Post Reform	(5) Pre Reform	(6) Post Reform	(7) Pre Reform	(8) Post Reform
Married	-0.1277***	-0.0852***	-0.0861***	-0.0590***	-0.0373***	-0.0210***	-0.0514***	-0.0621***
	(0.0043)	(0.0059)	(0.0024)	(0.0031)	(0.0034)	(0.0041)	(0.0028)	(0.0032)
Reform (T_t)	-0.0012		0.0064		0.0076		0.0054	
	(0.0098)		(0.0067)		(0.0079)		(0.0059)	
Macro controls	YES		YES		YES		YES	

Age Groups	NO	NO	NO	NO
Education groups	YES	YES	YES	YES
Region dummies	YES	YES	YES	YES
N	86,915	172,166	162,389	282,342
Pseudo R^2	0.0970	0.1747	0.1451	0.0734
Wald $\chi^2(34)$	7431.41***	20883.94***	24199.10***	22970.25***
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects				
	0.0425***	0.0272***	0.0163***	-0.0107**
	(0.0074)	(0.0042)	(0.0054)	(0.0042)
Panel C: "Treatment" Effect: Post-Reform vs. Pre-reform Marginal Effects				
	0.0471***	0.0303***	0.0165***	-0.0095**
	(0.0075)	(0.0047)	(0.0056)	(0.0039)

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of participating in the labour force. Columns (1)-(2) report results for individuals between 25 and 29 years of age; columns (3)-(4) report results for individuals between 30 and 39 years of age; columns (5)-(6) report results for individuals between 40 and 49 years of age; and columns (7)-(8) report results for individuals between 50 and 64 years of age. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. See also notes for Table 3.5 and Table 3.9. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively at the 1%, 5% and 10% level respectively.

We next examined how groups with different education attainment were affected by the reform, as far as their labour force participation is concerned. Table 3.11 presents results for individuals with up to (upper) secondary education (columns (1)-(2)), individuals with post-secondary non-tertiary or first stage of tertiary education (columns (3)-(4)) and individuals with second stage of tertiary education. For the first two education groups, we find that married individuals are more likely to be participating in the labour force after the reform. For the first group (columns (1)-(2)), the probability of married individuals of participating in the labour force is 1.87 percentage points higher than the single group, whereas the probability is 1.56 percentage points higher for the second group (columns (3)-(4)) – the probability being 1.52 percent higher when we employ the *treatment* effect estimate. As already discussed above, these results probably reflect the added worker effect and are driven by higher labour force participation of married females. Instead, marital status seems to play no role to the labour force participation of high educated individuals, both before and after the reform.

Table 3.11: Labour Force Participation (Different Education Groups)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Panel A: Marginal Effects						
Married	-0.0586***	-0.0399***	-0.1192***	-0.1035***	0.0080	-0.0114
	(0.0018)	(0.0022)	(0.0028)	(0.0031)	(0.0112)	(0.0093)
Reform (T_t)	0.0035		0.0116*		0.0305	
	(0.0044)		(0.0065)		(0.0261)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	NO		NO		NO	
Region dummies	YES		YES		YES	
N	519,174		175,967		8,671	
Pseudo R^2	0.2419		0.2822		0.1538	
Wald $\chi^2(32)$	138918.59***		48729.22***		1067.79***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0187***		0.0156***		-0.0195	
	(0.0028)		(0.0040)		(0.0136)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects						
	0.0187***		0.0152***		-0.0180	
	(0.0028)		(0.0043)		(0.0119)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of participating in the labour force. Columns (1)-(2) report results for individuals with up to (upper) secondary education,columns (3)-(4) results for individuals with post-secondary non-tertiary or first stage of tertiary education, and columns (5)-(6) report results for individuals with higher (second stage) tertiary education. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. All specifications include year and quarter effects. See also notes for Table 3.5 and Table 3.9. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively at the 1%, 5% and 10% level respectively.

Results from our last experiment are reported in Table 3.12, where we report findings having excluded from our sample older individuals (age 50 to 64) and individuals with second stage tertiary education. As expected, our findings are very similar with those presented in Table 3.9. We find that relatively younger and less educated married individuals are 2.91 percent more likely (or 3.13 percent based on the *treatment* effect estimate) to participate in the labour force, relative to the non-married group with similar characteristics.

Table 3.12:Labour force participation (Younger, Less Educated)

Panel A: Marginal Effects		
	(1)	(2)
COVARIATES	Pre Reform	Post Reform
Married	-0.0778***	-0.0487***
	(0.0017)	(0.0022)
Reform (T_t)	0.0058	
	(0.0047)	
Macro controls	YES	
Age groups	YES	
Education groups	YES	
Region dummies	YES	
N	413,903	
Pseudo R^2	0.1469	
Wald $\chi^2(35)$	51971.75***	
Panel B: Difference: Post-Reform vs. Pre-Reform Marginal Effects		
	0.0291***	
	(0.0028)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects		
	0.0313***	
	(0.0030)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of participating in the labour force. Older individuals (aged 50 to 64) and individuals with higher(second stage) tertiary education are excluded from the sample. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1. The specification includes year and quarter effects. See also notes for Table 3.5 and Table 3.9. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively at the 1%, 5% and 10% level respectively.

3.4.3. Robustness Tests

Thus far we have documented robust effects for the abolishment of the marital allowance on employment (for relatively younger and less educated individuals) and labour force participation (also for relatively younger and less educated individuals). In order to further assess the robustness of our results, we have also experimented with excluding time periods around the reform from our analysis. Results from this experiment are reported in Tables A.9 and A.10in the Appendix. In particular, we first focus on periods closer to the reform date (2010:Q1 to 2014:Q2), as an alternative to 2009:Q1 to 2016:Q1 examined in the main results. Secondly, we dropped from our sample the quarter of the reform, as well as one quarter before and after (i.e. we excluded the period from 2012:Q3 to 2013:Q1). And thirdly, we dropped from our sample

two quarters before and after the reform (excluding the period from 2012:Q2 to 2013:Q2).The results from these experiments are very similar to those presented in the previous subsections, with the overall employment effect remaining statistically insignificant, and the labour force participation for married individuals after the reform being higher statistically significant.[69]Overall this shows that our conclusions above are not driven by the particular choice of reform period.

3.5 Conclusion

In November 2012 the marital allowance, a 10 per cent mandatory top-up in the MW for married individuals, was abolished. Using single individuals as the control group we have relied on administrative data from the Greek LFS over the period 2008:Q1-2016:Q1 to examine the effects of the abolition of the marital allowance. When examining the whole sample of individuals, we do not find any differential change in the probability of employment for individuals depending on their marital status. Excluding from our sample individuals for whom the MW may not be of relevance (older individuals between 50 to 64 years of age and individuals with second stage tertiary education, whom experience and skills move them to a higher wage level), we find that married individuals are 1.26percentage points more likely to be employed after the reform compared to single individuals. Moreover, we find that the probability of married individuals participating in the labour force after the reform is 1.42 percentage points higher than the probability of the singles. This result is driven from the increased participation of married females after the beginning of the crisis, mainly explained through the added worker effect. Our results remain robust to time period alternate specifications.

[69] The main specification for labour force participation presented in Table 9 showed a higher probability for married individuals of 1.42 percentage points. In our robustness analysis, the higher probability for married individuals varies from 0.57% to 1.56%.

Appendix of Chapter 3

Table A.1: Summary Statistics for individuals ages 25-29				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	23.74%	35.16%	39.88%	40.03%
Age	26.94 (1.39)	27.45 (1.35)	26.94 (1.43)	27.46 (1.34)
Unemployment Rate	0.22 (0.42)	0.18 (0.38)	0.42 (0.49)	0.34 (0.47)
Participation rate	0.89 (0.31)	0.71 (0.45)	0.88 (0.32)	0.75 (0.43)
Actual Hours Worked	39.31 (12.65)	38.03 (14.46)	39.10 (13.67)	36.34 (15.21)
Monthly Wage	830.72 (281.80)	844.71 (296.82)	655.78 (271.66)	665.54 (278.12)
Job Finding Rate	0.013 (0.113)	0.007 (0.081)	0.016 (0.126)	0.008 (0.091)
Separation Rate	0.005 (0.071)	0.005 (0.073)	0.005 (0.068)	0.004 (0.068)
Transition Rate	0.10 (0.30)	0.07 (0.25)	0.16 (0.36)	0.10 (0.29)
Quits	0.04 (0.20)	0.12 (0.33)	0.04 (0.21)	0.06 (0.23)
Dismissals	0.36 (0.48)	0.35 (0.48)	0.26 (0.44)	0.28 (0.45)
Female (%)	0.41 (0.49)	0.70 (0.46)	0.42 (0.49)	0.73 (0.44)
Non-Greek (%)	0.07 (0.25)	0.27 (0.44)	0.05 (0.22)	0.25 (0.43)
Public sector (%)	0.16 (0.37)	0.15 (0.36)	0.15 (0.35)	0.13 (0.34)
Agriculture (%)	0.06 (0.23)	0.05 (0.21)	0.05 (0.23)	0.05 (0.21)
Observations	57,536	18,620	32,491	7,735

Table A.2: Summary Statistics for individuals ages 30-39				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	14.37%	19.39%	25.63%	21.54%
Age	33.81 (2.87)	35.11 (2.76)	33.94 (2.82)	35.28 (2.73)
Unemployment Rate	0.17 (0.37)	0.12 (0.32)	0.93 (0.26)	0.22 (0.42)
Participation rate	0.93 (0.26)	0.82 (0.39)	0.88 (0.32)	0.84 (0.37)
Actual Hours Worked	40.16 (13.39)	38.82 (14.71)	39.82 (13.86)	38.81 (14.58)
Monthly Wage	935.05 (294.80)	980.10 (309.25)	769.55 (294.52)	817.16 (312.64)
Job Finding Rate	0.006 (0.076)	0.004 (0.066)	0.010 (0.101)	0.007 (0.082)
Separation Rate	0.004 (0.063)	0.003 (0.054)	0.004 (0.064)	0.004 (0.059)
Transition Rate	0.04 (0.21)	0.03 (0.18)	0.08 (0.27)	0.05 (0.22)
Quits	0.04 (0.20)	0.05 (0.22)	0.03 (0.18)	0.03 (0.17)
Dismissals	0.35 (0.48)	0.34 (0.47)	0.31 (0.46)	0.35 (0.48)
Female (%)	0.34 (0.48)	0.59 (0.49)	0.38 (0.49)	0.60 (0.49)
Non-Greek (%)	0.07 (0.26)	0.15 (0.35)	0.06 (0.23)	0.13 (0.34)
Public sector (%)	0.20 (0.40)	0.21 (0.41)	0.18 (0.38)	0.22 (0.42)
Agriculture (%)	0.07 (0.26)	0.07 (0.26)	0.07 (0.26)	0.07 (0.25)
Observations	65,196	109,621	44,033	57,249

Table A.3: Summary Statistics for individuals ages 40-49				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	9.55%	11.55%	17.90%	13.31%
Age	44.16 (2.91)	44.51 (2.87)	44.35 (2.86)	44.61 (2.84)
Unemployment Rate	0.14 (0.35)	0.09 (0.28)	0.27 (0.45)	0.18 (0.39)
Participation rate	0.86 (0.35)	0.82 (0.38)	0.87 (0.34)	0.84 (0.36)
Actual Hours Worked	39.21 (14.63)	39.24 (15.30)	39.82 (15.21)	39.39 (15.37)
Monthly Wage	1012.08 (317.69)	1084.14 (310.37)	841.02 (321.96)	913.10 (327.47)
Job Finding Rate	0.004 (0.059)	0.003 (0.052)	0.007 (0.084)	0.005 (0.067)
Separation Rate	0.003 (0.052)	0.002 (0.046)	0.002 (0.048)	0.002 (0.043)
Transition Rate	0.03 (0.16)	0.02 (0.14)	0.05 (0.22)	0.03 (0.17)
Quits	0.03 (0.17)	0.02 (0.14)	0.03 (0.18)	0.02 (0.13)
Dismissals	0.32 (0.47)	0.34 (0.47)	0.32 (0.47)	0.27 (0.44)
Female (%)	0.45 (0.50)	0.53 (0.50)	0.44 (0.50)	0.46 (0.50)
Non-Greek (%)	0.06 (0.24)	0.07 (0.26)	0.05 (0.22)	0.08 (0.27)
Public sector (%)	0.27 (0.44)	0.27 (0.45)	0.23 (0.43)	0.27 (0.44)
Agriculture (%)	0.11 (0.31)	0.10 (0.30)	0.11 (0.31)	0.10 (0.30)
Observations	37,937	154,856	27,146	92,268

Table A.4: Summary Statistics for individuals ages 50-64				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	8.64%	6.84%	11.77%	7.82%
Age	57.07 (4.42)	56.81 (4.34)	56.92 (4.38)	56.95 (4.28)
Unemployment Rate	0.12 (0.32)	0.07 (0.25)	0.24 (0.43)	0.16 (0.36)
Participation rate	0.50 (0.50)	0.56 (0.50)	0.51 (0.50)	0.53 (0.50)
Actual Hours Worked	38.82 (16.19)	39.51 (16.22)	38.76 (16.80)	39.56 (16.92)
Monthly Wage	1032.35 (354.19)	1140.28 (316.03)	889.16 (364.44)	979.47 (345.61)
Job Finding Rate	0.001 (0.039)	0.001 (0.031)	0.002 (0.046)	0.002 (0.044)
Separation Rate	0.001 (0.035)	0.001 (0.030)	0.001 (0.034)	0.001 (0.028)
Transition Rate	0.02 (0.13)	0.01 (0.10)	0.02 (0.15)	0.02 (0.14)
Quits	0.03 (0.18)	0.01 (0.08)	0.01 (0.10)	0.01 (0.08)
Dismissals	0.18 (0.38)	0.14 (0.35)	0.19 (0.39)	0.13 (0.34)
Female (%)	0.63 (0.48)	0.49 (0.50)	0.60 (0.50)	0.50 (0.50)
Non-Greek (%)	0.04 (0.20)	0.03 (0.17)	0.04 (0.19)	0.03 (0.18)
Public sector (%)	0.26 (0.44)	0.23 (0.42)	0.25 (0.44)	0.22 (0.42)
Agriculture (%)	0.13 (0.34)	0.09 (0.28)	0.13 (0.34)	0.09 (0.29)
Observations	46,845	229,907	33,440	143,247

Table A.5: Summary Statistics for individuals with up to (upper) secondary education				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	17.44%	14.95%	26.27%	16.33%
Age	41.10 (12.14)	48.10 (10.15)	42.20 (11.86)	49.08 (9.75)
Unemployment Rate	0.17 (0.38)	0.10 (0.30)	0.33 (0.47)	0.21 (0.41)
Participation rate	0.74 (0.44)	0.65 (0.48)	0.74 (0.43)	0.65 (0.48)
Actual Hours Worked	41.35 (13.84)	40.83 (15.39)	40.95 (15.39)	40.55 (16.25)
Monthly Wage	857.98 (293.36)	965.64 (315.46)	700.19 (282.41)	786.59 (317.11)
Job Finding Rate	0.005 (0.070)	0.003 (0.051)	0.008 (0.087)	0.004 (0.064)
Separation Rate	0.004 (0.059)	0.002 (0.044)	0.003 (0.054)	0.002 (0.043)
Transition Rate	0.04 (0.21)	0.02 (0.15)	0.07 (0.25)	0.04 (0.19)
Quits	0.04 (0.19)	0.03 (0.16)	0.04 (0.18)	0.02 (0.12)
Dismissals	0.36 (0.48)	0.27 (0.44)	0.29 (0.46)	0.25 (0.43)
Female (%)	0.42 (0.49)	0.54 (0.50)	0.41 (0.49)	0.54 (0.50)
Non-Greek (%)	0.08 (0.27)	0.09 (0.29)	0.07 (0.25)	0.09 (0.28)
Public sector (%)	0.13 (0.33)	0.14 (0.34)	0.12 (0.33)	0.13 (0.34)
Agriculture (%)	0.14 (0.35)	0.11 (0.31)	0.15 (0.36)	0.11 (0.32)
Observations	130,640	379,978	82,703	213,542

Table A.6: Summary Statistics for individuals with post-secondary non-tertiary or undergraduate education				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	12.78%	7.49%	23.47%	9.08%
Age	35.57 (9.98)	45.43 (9.61)	36.46 (10.44)	46.40 (9.69)
Unemployment Rate	0.18 (0.38)	0.07 (0.25)	0.32 (0.47)	0.14 (0.35)
Participation rate	0.91 (0.28)	0.81 (0.39)	0.89 (0.31)	0.78 (0.41)
Actual Hours Worked	37.03 (13.58)	35.64 (15.05)	37.76 (13.53)	36.93 (14.71)
Monthly Wage	994.42 (311.59)	1186.01 (227.77)	819.45 (322.26)	1018.74 (303.73)
Job Finding Rate	0.009 (0.094)	0.002 (0.045)	0.011 (0.105)	0.003 (0.056)
Separation Rate	0.003 (0.057)	0.001 (0.039)	0.004 (0.060)	0.001 (0.039)
Transition Rate	0.07 (0.25)	0.02 (0.13)	0.09 (0.29)	0.02 (0.15)
Quits	0.04 (0.19)	0.03 (0.18)	0.04 (0.18)	0.02 (0.15)
Dismissals	0.28 (0.45)	0.21 (0.41)	0.26 (0.44)	0.20 (0.40)
Female (%)	0.52 (0.50)	0.52 (0.50)	0.52 (0.50)	0.54 (0.50)
Non-Greek (%)	0.03 (0.16)	0.04 (0.20)	0.02 (0.15)	0.03 (0.18)
Public sector (%)	0.33 (0.47)	0.45 (0.50)	0.28 (0.45)	0.43 (0.50)
Agriculture (%)	0.02 (0.13)	0.01 (0.11)	0.02 (0.13)	0.02 (0.14)
Observations	71,891	127,660	50,536	82,074

Table A.7: Summary Statistics for individuals with post-graduate education				
	Pre-Reform		Post-Reform	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	3.47%	2.27%	10.73%	3.08%
Age	35.15 (8.96)	44.02 (9.02)	37,26 (9.25)	44.59 (8.65)
Unemployment Rate	0.15 (0.35)	0.03 (0.18)	0.24 (0.43)	0.06 (0.24)
Participation rate	0.94 (0.23)	0.95 (0.22)	0.93 (0.26)	0.93 (0.26)
Actual Hours Worked	36.19 (13.78)	34.65 (15.03)	36.57 (13.95)	36.02 (14.17)
Monthly Wage	1195.74 (311.59)	1336.07 (211.42)	1057.62 (339.91)	1222.86 (267.98)
Job Finding Rate	0.009 (0.097)	0.0001 (0.024)	0.011 (0.107)	0.001 (0.032)
Separation Rate	0.003 (0.055)	0.002 (0.043)	0.002 (0.039)	0.002 (0.043)
Transition Rate	0.07 (0.26)	0.01 (0.11)	0.08 (0.27)	0.02 (0.13)
Quits	0.07 (0.26)	0.12 (0.33)	0.00	0.15 (0.37)
Dismissals	0.20 (0.40)	0.28 (0.46)	0.19 (0.40)	0.30 (0.47)
Female (%)	0.47 (0.50)	0.39 (0.49)	0.50 (0.50)	0.45 (0.50)
Non-Greek (%)	0.02 (0.14)	0.02 (0.14)	0.02 (0.11)	0.01 (0.15)
Public sector (%)	0.38 (0.49)	0.47 (0.50)	0.40 (0.49)	0.50 (0.50)
Agriculture (%)	0.001 (0.06)	0.001 (0.38)	0.004 (0.07)	0.002 (0.05)
Observations	4,883	5,366	3,864	4,859

Table A.8: Summary Statistics for all individuals except those ages 50-64 and those with post-graduate education				
	Pre-Reform		**Post-Reform**	
Variable \ Marital Status	Single	Married	Single	Married
Percentage paid up to the minimum wage (full time employees)	16.72%	15.97%	27.82%	17.53%
Age	33.82 (6.97)	39.75 (6.19)	34.47 (7.08)	40.38 (5.99)
Unemployment Rate	0.18 (0.39)	0.10 (0.31)	0.34 (0.47)	0.21 (0.41)
Participation rate	0.90 (0.31)	0.81 (0.39)	0.90 (0.30)	0.83 (0.37)
Actual Hours Worked	39.72 (13.46)	39.09 (15.03)	39.72 (14.21)	39.17 (15.11)
Monthly Wage	905.66 (300.11)	1019.89 (315.55)	740.68 (295.73)	852.75 (321.73)
Job Finding Rate	0.008 (0.09)	0.003 (0.06)	0.011 (0.11)	0.006 (0.07)
Separation Rate	0.004 (0.06)	0.003 (0.05)	0.004 (0.06)	0.003 (0.05)
Transition Rate	0.06 (0.24)	0.03 (0.17)	0.09 (0.29)	0.04 (0.20)
Quits	0.04 (0.19)	0.04 (0.20)	0.04 (0.19)	0.02 (0.15)
Dismissals	0.36 (0.48)	0.34 (0.47)	0.30 (0.46)	0.30 (0.46)
Female (%)	0.40 (0.49)	0.57 (0.50)	0.41 (0.49)	0.57 (0.49)
Non-Greek (%)	0.07 (0.25)	0.12 (0.32)	0.05 (0.23)	0.11 (0.31)
Public sector (%)	0.20 (0.40)	0.24 (0.43)	0.16 (0.38)	0.24 (0.43)
Agriculture (%)	0.09 (0.29)	0.07 (0.26)	0.09 (0.29)	0.07 (0.26)
Observations	156,206	279,237	100,304	153,776

Table A.9: Employment effects (periods: 2010-2014 / excluding 2012q3-2013q1 / excluding 2012q2 – 2013q2)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Married	0.0962***	0.0974***	0.0855***	0.0890***	0.0842***	0.0880***
	(0.0028)	(0.0031)	(0.0022)	(0.0025)	(0.0022)	(0.0026)
Reform (T_t)	-0.0205***		0.0048		0.0045	
	(0.0058)		(0.0038)		(0.0045)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	YES		YES		YES	
Region dummies	YES		YES		YES	
N	236,754		354,969		332,287	
Pseudo R^2	0.0589		0.0861		0.0863	
Wald $\chi^2(33/29)$	17800.23		36915.96		34477.50	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0013		0.0036		0.0038	
	(0.0040)		(0.0031)		(0.0032)	
Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects						
	0.0000		0.0038		0.0040	
	(0.0039)		(0.0029)		(0.0030)	

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of being employed. A person is classified as employed if during the reference week preceding the survey, the individual has worked for at least one hour or more or was temporarily absent from work. People who are considered out of the labour force are excluded from the sample. Self-employed, family workers, public servants and persons working in the agricultural sector are excluded from our sample, as the minimum wage does not apply to them. Columns (1)-(2) report results for the period between 2010:Q1 and 2014:Q4. Columns (3)-(4) report results for the whole period, with the extraction of quarters from 2012:Q3 to 2013Q1. Columns (5)-(6) report results for the whole period, with the extraction of quarters from 2012:Q2 to 2013Q2. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1 (depending on the specification years or quarters may have been extracted). All specifications include quarter effects. The data source is the Greek labour Force Survey. Individuals between the ages of 25 and 64 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Table A.10: Labour force participation (periods: 2010-2014 / excluding 2012q3-2013q1 / excluding 2012q2 – 2013q2)

	(1)	(2)	(3)	(4)	(5)	(6)
COVARIATES	Pre Reform	Post Reform	Pre Reform	Post Reform	Pre Reform	Post Reform
Married	-0.0774***	-0.0717***	-0.0805***	-0.0655***	-0.0808***	-0.0651***
	(0.0019)	(0.0022)	(0.0015)	(0.0019)	(0.0016)	(0.0020)
Reform (T_t)	0.0072*		0.0134***		0.0140***	
	(0.0038)		(0.0026)		(0.0031)	
Macro controls	YES		YES		YES	
Age groups	YES		YES		YES	
Education groups	YES		YES		YES	
Region dummies	YES		YES		YES	
N	424,580		644,353		604,229	
Pseudo R^2	0.2647		0.2656		0.2658	
Wald $\chi^2(33/29)$	118756.27		178651.15		167439.13	
Difference: Post-Reform vs. Pre-Reform Marginal Effects						
	0.0057**		0.0149***		0.0156***	
	(0.0248)		(0.0024)		(0.0024)	

Panel C: "Treatment"Effect: Post-Reform vs. Pre-reform Marginal Effects		
0.0055*	0.0148***	0.0155***
(0.0029)	(0.0024)	(0.0025)

Notes: The table reports the marginal effects of the covariates listed in the left column on the probability of participating in the labour force. Self-employed, family workers, public servants and persons working in the agricultural sector are excluded from our sample, as the minimum wage does not apply to them. Columns (1)-(2) report results for the period between 2010:Q1 and 2014:Q4. Columns (3)-(4) report results for the whole period, with the extraction of quarters from 2012:Q3 to 2013Q1. Columns (5)-(6) report results for the whole period, with the extraction of quarters from 2012:Q2 to 2013Q2. Observations are at the quarterly frequency sampled between 2008:Q1 and 2016:Q1 (depending on the specification years or quarters may have been extracted). All specifications include quarter effects. The data source is the Greek labour Force Survey. Individuals between the ages of 25 and 64 are included in the sample. Robust standard errors in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Chapter 4: Employment habits of export firms: Developments during the Greek crisis

4.1. Introduction

Greece in 2010 signed a bailout package, in order to cope with the country's public debt crisis. As a result, the country implemented three economic adjustment programmes, with the latest ending in August 2018. As part of the country's obligation in the Second Memorandum, the minimum wage (MW) decreased by 22 per cent and a subminimum wage for the youth was introduced, with the aim of restoring competitiveness through lower labour costs, as well as easing the re-entry of the unemployed into the labour market and addressing the extremely high levels of youth unemployment. As several studies have examined whether the reform was successful in tackling unemployment (Yannelis, 2014; Karakitsios, 2016; Kakoulidou et al., 2018 and 2020; Georgiadis et al., 2019), we would examine the effect of the reform on competitiveness.

Although MW and the impact it has on employment and firm behaviour has been examined vigorously with contradicting results, only a limited part of the empirical literature examines the relationship between MW and exports.

Using a rich administrative dataset for 2009 to 2014, that allows us to combine information on trade transactions with firms financial and employment information, we apply a difference in difference approach to examine the effect the decrease in the MW had on the behaviour of exporting firms.

The results show that the reform had a positive effect on all firms, irrespectively of whether they employed MW workers or not, with the value of exports being increased by 12% and the number of exporting products by 8%, after the reform. This positive result is also reported when examining separately high productivity firms but is ambiguous for low and medium productivity firms. Nevertheless, the decrease of the MW rate was not linked with a differential impact on

firms based on whether they made use of the measure (by employing MW employees and thus making direct use of the reduced MW level) or not.

Our results remain robust in most of the additional specifications explored, with the only exception being when labour productivity (defined as total sales per total employment) is substituted with physical productivity (defined as the exporting quantity -of the product that represents more than fifty per cent of the total exporting value of the firm- per worker). In this case, the effect of the reform on the value of exports becomes statistically insignificant.

The rest of the chapter is organized as follows. In section 2, we provide a review of the relevant empirical literature. Section 3 presents the data used, as well as a descriptive analysis of them. In section 4, the empirical model applied and the results of our analysis are presented. In the final section, concluding remarks are offered.

4.2. Related Literature

MW has been largely examined, with the main focus being the effect it has on employment and wages.[70] Part of the MW literature investigates the relationship between MW and different firm performance indicators, namely productivity, firm value and profitability (Draca et al., 2011; Riley and Bondibene, 2017; Bell and Machin, 2018). A number of papers study the effects of the MW in general equilibrium models (Brecher, 1974; Davis, 1998). Our research is more closely linked to a small part of the literature that examines the relationship between MW and exports, using empirical evidence.

Gan et al (2016), utilizing firm-level data of medium and large manufacturing enterprises between 1998 and 2007 in China, analyse the behaviour of export firms that encounter changes in MW rates. They find that MW increases are linked with reduced probability of exporting goods and declines in exporting sales.

[70] For an analytical literature review concerning minimum wages see chapter 2.2.

Bai et al (2018) investigate the impact of MW on exports, focusing on the period from 2002 to 2008 in China. They find that an increase in the MW has a negative effect on exports, with the effect being smaller in skill or capital-intensive sectors.

Akgunduz et al (2019) examine the impact a thirty per cent increase of the MW in Turkey in 2016 had on exports (value and price), using a difference-in-difference approach. Focusing on the period prior to the increase (2013 to 2016), they find that the reform had no significant effect on export prices, whereas the impact on exports' amount varied depending on firm's size.

Similar papers that examine the relationship between exports and unit labour costs are those of Decramer et al (2016) and Malgouyres and Mayer (2018). Decramer et al (2016) study the relationship between export performance and unit labour costs. Using firm-level data for Belgium manufacturing firms, they compare the differences in behaviour between exporting and non-exporting firms and examine the effect unit labour costs have on both the intensive (export performance of continuing exporters) and the extensive (entry and exit of firms into export) margin of exports. They find that a 1 per cent increase in unit labour costs is linked with 0.3 to 0.4 reduction in exports, with labour-intensive firms being considerably more sensitive. Additionally, they find that changes in unit labour costs have a small effect on the extensive margin of exports.

Malgouyres and Mayer (2018) take as a starting point a large-scale tax credit reform introduced in France in 2013 and examine the relationship between exporters' performance and labour costs. In the introduced reform firms were granted a tax credit (4% in 2013 and 6% from 2014 and onwards) proportional to the wage bill of their employees paid below 2.5 times the MW. They do not find a statistically significant relationship between the intensity of policy treatment and exported values.

Our work differentiates from the above as by using aggregate data we examine the effect of the MW reform applying a difference-in-difference model, with binary outcomes for the treatment and control groups. Additionally, we control in our model for firms' productivity and we further investigate whether the reform had a different effect on different productivity groups. Finally, we explore how the reform affected not only the value of the exporting products but also the number of exporting products.

4.3. Data and Descriptive Statistics

In this section, we present the dataset and we proceed with a descriptive analysis of the employment characteristics of the firms.

The dataset was produced from a combination of data from various sources. First, we used a detailed dataset on exporting activity of all Greek firms from the Intrastat-Extrastat databank, made available to us by the Hellenic Statistical Authority. The database includes a rich set of information on dispatched goods, including information on the quantity and value of exporting products for each firm based on their exporting destination. To have extra information of the firms' structure, we combine the above merged dataset with financial data from ICAP. We will focus our analysis on firms that export manufacturing products. Additionally, we exclude from our sample firms that the exporting value of petroleum products is representing more than 30 per cent of their total exports.

Finally, firms that were included in 2009's Intrastat-Extrastat databank were matched with their monthly employees' records -as they were declared by the firms to the social security fund.[71] This is the first time, as far as we know, that a detailed dataset for the employees of Greek exporting firms is presented and examined.

Table4.3: Number of firms in dataset

Year	Number of firms
2009	4,386
2010	4,440
2011	4,371
2012	4,278
2013	4,166
2014	4,134

[71] Data were made available to us by the Ministry of Labour, Social Security and Social Solidarity and EFKA.

The employees' data used come from the database of the Analytical Periodic Declaration (APD),[72] for the period of 2009 to 2014. The employer declares at the APD his AFM, the employee's AMA (the unique number its employee has at EFKA), information concerning the employee (his sex, date of birth and occupation) and information concerning the monthly remuneration of the employee (days of work, monthly salary -gross and net-, the amount of social security contributions, any subsidies on the contributions may apply and if the employee worked full time or on Sunday). Apart from the monthly salary of the employee we also have information on employees' bonuses.

Furthermore, we know the concrete gross minimum wage per year. The minimum wage in Greece has a complex structure with two categories of minimum wage rates, one for blue-collar employees, in which case the minimum wage is set in a daily base, and one for white-collar employees, where there is a monthly minimum wage. At the same time, seniority premiums for every three years of work experience apply mandatorily, for up to 9 years of tenure (the premiums is about a 10% top-up for every three years of work experience). Up until November 2012 a marital allowance was also in effect, set as a 10% mandatory top-up to the MW rated for married employees. Both premiums were obligatory for minimum wage employees (see table 2.2 for the evolution of all monthly MWs from 2008 to 2018).

In our analysis, an employee is marked as MW employee if he receives a wage equal up to the second decimal with one of the minimum wage rates (depending on work experience and marital status). Our method is a more strict approach of studies examining the effects of the MW on firm indicators, using as a treatment group low-wage firms (Draca et al, 2011; Riley and Bondibene, 2017). The same applies to employees below 25 years of age, for whom a subminimum wage was introduced in March 2012. If an employee below 25 years old receives a wage equal up to the second decimal to one of the subminimum wage rates, he is marked as a minimum wage employee. An employee's wage, as declared at APD, may differentiate slightly from the monthly rate of his contract based on hours or days worked. In order to factor in these differentiations we used the following identification definition: an employee is considered to be a MW employee if he is paid at least 1 month per year a MW rate (as defined above) and the other months his wage

[72] APD are monthly deposited by the employer to EFKA (EFKA is the social security fund). Social security contributions for private-sector employees are calculated based on APD declarations.

deviated up to 5% from the basic MW. Our identification method is applied only to those employees that are declared as full-time workers.

To move fromthe employees' level monthly datasets for each firm to the firm level annual exports' dataset, we need to construct firm level observations for each year.[73] To create a unique observation for each firm per year, we transform monthly observations per employee to yearly ones. For each employee two weights apply each year: one marking how many months he was employed per year, and another one marking how many months per year he had received the minimum wage. Afterwards, we combine employees' information for each firm, making one observation per year. For each firm we first create the following monthly variables: the number of employees, and the number of MW workers, as full-year equivalent, as well as gross wages and social security contributions. We have also information about how many employees per sex and age group each company employed. This type of information allows us to estimate the yearly number of employees and MW employees for each firm by making the following calculations. E.g. if a company had two employees for a given year, one of which was employed 9 months and the other one was employed the whole year, then we mark the company as having 1.75 employees (9/12 + 1= 1.75).

Respectively, if a company had two employees, one of which received the MW for 4 months and the other one had for the whole year higher wages, then we note that the company had 0.33 MW employees (4/12 + 0 = 0.33).

Table 4.2 reports the total number of employees per year in our sample of exporting firms, as well as the average number of employees per firm. We observe that through the years the number of employees in our sample declines. A possible reason may be that we match the firms in our datasets in 2009 and afterwards we obtain information only for these firms; firms that may have start exporting after 2009 are not included whereas some firms might exit the market. The average firm in our sample is rather large in size, taking into account the Greek economy, (about 90 per cent of the Greek firms have up to 10 employees, whereas in our sample the average firm

[73] During our analysis we found mistakes at the employee's declarations. For our analysis, when we observe an employee (identified by his AMA) working in one firm, we combine all information as one. Most common reporting mistakes concerns occupation, with the same employee observed the same month, in the same company, two or three times, each time with a different occupation. As the declaration of occupation does not affect paid wages or social security contributions, we think this is an accountant's mistake and report them as one observation. We should note that EFKA's officials informed us that these kinds of mistakes are usual and not linked with misreporting.

employs 67 workers), with the firms' size declining from 2009 to 2013 and increasing in 2014.[74]This result is consistent with the relevant literature suggesting that exporting firms are on average larger than non-exporting firms.

Table 4.3 reports the percentages of full time employees in column 1, the percentage of employees below 25 years old in column 3,[75] the percentage of male employees in column 4, as well as the percentage of MW workers in our dataset in column 2.[76] Table 4.4 reports columns 1,3 and 4 of the previous table for all (exporting and non-exporting) private sector employees, based on EFKA's published aggregate data.

Table 4.2: Number of employees: total and average per firm

	(1)	(2)
Year	**Total number of employees**	**Average number of employees per firm**
2009	309,732.7	71.43
2010	306,846.2	70.01
2011	281,423.8	65.42
2012	267,474.9	63.70
2013	258,929.6	63.23
2014	274,890.0	67.62

Table 4.3: Percentage of full time, MW, below 25 and male employees

	(1)	(2)	(3)	(4)
year	**Full time employees**	**MW employees**	**Employees below 25**	**Male employees**
2009	91.91%	0,30%	6.82%	60.94%
2010	92.20%	0,40%	5.51%	61.59%
2011	90.86%	0,40%	4.43%	61.37%
2012	90.39%	0,63%	3.64%	61.10%
2013	89.16%	1,26%	3.43%	60.71%
2014	88.63%	1,46%	3.53%	61.93%

[74] Drivas and Katsimi (2019) find that Greek exports are made mainly by a very small portion of large firms, leading to an important over-concentration of exports to a few large firms (Kalyvitis et al., 2018).
[75]Statistics for employees below 25 years of age are reported separately due to the introduction of the subminimum wage for the youth in March 2012.
[76]As it is difficult to identify part-time MW workers, when presented percentages of MW employees we calculate them relative to the number of full-time employees.

Table 4.4: Percentage of full time, below 25 and male employees (total of private sector employees)

	(1)	(2)	(3)
year	**Full time employees**	**Employees below 25**	**Male employees**
2009	83.69%	9.68%	52.31%
2010	82.01%	8.71%	52.19%
2011	80.93%	7.84%	52.02%
2012	86.71%	7.41%	52.04%
2013	76.95%	7.88%	52.72%
2014	73.94%	8.90%	52.65%

Source: EFKA aggregate statistics, our calculations

The percentage of MW employees although increasing though the years (from 0.30 per cent in 2009 to 1.46 per cent in 2014) is considerably lower with what is reported in various studies for the Greek economy. Although no accurate reports exist on the percentage of MW employees in the economy, researches account that between 7 and 14 per cent of the workforce is paid the MWrate (Committee of Experts on the Minimum Wage and KEPE, 2018; EIEAD, 2018; European Commission, 2020). Three reasons may account for this differentiation. Firstly, researches mainly use surveys and do not have access to administrative data, in which surveys employees may consider themselves MW employees even though they are not paid the MW. Furthermore, mainly small firms employ MW workers. As reported above (and consistent with existing literature) export firms are bigger in size than average firms. The fact that our average firm is larger in size may be the reason why we do not report a high percentage of MW employees. Additionally, export firms pay generally higher wages than the average firm (Yeaple, 2005; Verhoogen, 2008; Drivas and Katsimi, 2019), making it less probable of paying their workers the MW rate. We should note that the very low percentage of MW workers implies that only a very small fraction of firms was directly benefited from the MW reform.

The percentage of full time employment is higher in exporting firms than the average firm (similar results are found by Duda-Nuczak and Viegelahn (2017) for African exporting firms, whereas the opposite is found by Wehsthead (1995) for the UK), but the percentage is descending during the years examined (from 91.91 per cent in 2009 to 88.63 in 2014). The percentage of full-time employment in the Greek labour market follows a similar trend (descending from 83.69 per cent in 2009 to 73.95 per cent in 2014).

The percentage of employees below 25 years of age decreased from 2009 to 2013 (from 6.82 per cent to 3.43 per cent) and slightly increased in 2014 (to 3.53 per cent). Similar statistics are reported for the total of private sector employees, with the percentage of employees below 25 years of age being about 3 per cent higher in the average firm than the average exporting firm.

Male employees are about 61 per cent in our sample, all years examined, whereas when examining the whole of private sector employees' males are about 52 per cent of the total. A relative higher percentage of male employment in export-supported jobs is recorded in most EU countries (Rueda-Cantuche et al, 2019).

Table 4.5: Evolution of average wage and average labour cost

	(1)	(2)	(3)	(4)
year	**Average wage – private sector employees**	**Average wage – export sample**	**Average wage for employees below 25 – export sample**	**Average labour cost – export sample**
2009	1,246.42	1,356.07	847.88	1,700.53
2010	1,265.09	1,386.04	856.38	1,739.87
2011	1,269.11	1,370.54	830.29	1,723.24
2012	1,208.01	1,296.16	740.58	1,629.71
2013	1,115.75	1,209.19	648.39	1,516.52
2014	1,026.20	1,194.20	615.89	1,440.83

Table 4.5 presents the evolution of average wages and labour costs for the employees in our whole sample, as well as the average wages of employees below 25 years of age. The table also reports the average wage for all private sector employees, as being reported by EFKA's published aggregate statistics. The nature of the recession is clear in all columns, as we observe a decrease of the average wage through the years examined. The recession affected worst younger employees, as youth average wage in 2014 is about 30 per cent lower of its 2009 level. Examining the average wage for all private sector employees, we report that they experience a 18 per cent decrease from 2009 to 2014, whereas when focusing on the employees of export firms the decrease is 12 per cent. Average labour cost in exporting firms is experiencing a greater

reduction (about 15 per cent), mainly attributing to a 4 per cent decrease in social security contributions.[77]

Higher wages paid by exporters is reported widely in the literature (Yeaple, 2005; Verhoogen; 2008), a fact reflected also in data examined. Average wage from 2009 to 2013 is about 8 per cent higher in exporting firms, and the relative difference increases in 2014, reaching 15 per cent. This premium is in line with the export wage premium reported in the literature, ranging from 5 to 9 per cent (Bernard et al, 1995; Breau and Rigby, 2006).

To continue our analysis, we divide our sample in three, based on the firms' labour productivity. Table 4.6 presents the average number of employees per productivity group. Medium productivity firms are quite larger in size than the other two groups, with more than 80 employees on average all the years examined, whereas low and high productivity firms size vary (depending on the year examined) from 52 to 66 employees. Medium productivity firms experience the most rapid decrease in employment (a decrease in employment by 12 per cent from 2010 to 2011, whereas for low productivity firms the decrease was 4 per cent and 3 per cent for high productivity firms).

From the above, we observe that although the nature of the recession is reported in the statistics of exporting firms the magnitude seems to be smaller, with full time employment and average wages experiencing a greater decrease in total economy compared to exporting firms. At the same time, MW employment in exporting firms increased, but continuous to be significantly lower with what is reported for the Greek economy.

Table 4.6: Average number of employees

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	63.30	94.60	60.98
2010	64.07	92.02	59.44
2011	62.04	80.74	57.90
2012	52.49	81.47	54.93
2013	54.31	84.23	53.53
2014	59.93	85.30	65.94

[77]Employer's social security contributions were reduced by 1.1 percentage points in 2012 and by additionally 2.9 percentage points in 2014. In 2014 employees' contributions were also reduced by 1 percentage point, but we do not expect this reduction to affect reported wages.

Tables 4.7 to 4.10 report statistics concerning employees' characteristics (full time employment, MW workers, young employees and male employees). Table 4.7 presents the percentage of full-time employees for the three productivity groups. Low productivity firms had the larger decrease in the percentage of full-time employment, from 95.05 per cent in 2009 to 88.78 per cent in 2014. Medium productivity firms have the lower percentage of full-time employment, starting from 85.55 per cent in 2009 and reaching 81.79 per cent in 2014. For both groups, the percentage of full time employment decreased though out the years (in low productivity firms we have an increase from 2009 to 2010 and the decline follows), whereas in high productivity firms the differentiation in the percentage of full time employment though the years is very small, starting with 98.04 per cent in 2009 and reaching 97.49 per cent in 2014 (with the lowest percentage of full time employment being in 2011 at 96.57 per cent).

Table 4.7: Percentage of full time employees

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	95.05%	85.55%	98.04%
2010	96.43%	85.39%	98.18%
2011	93.81%	84.56%	96.57%
2012	92.16%	87.83%	97.92%
2013	89.66%	83.68%	97.24%
2014	88.78%	81.79%	97.49%

The percentage of MW employees is quite small in all three groups but increases throughout the years. As we can see in Table 4.8, low productivity firms have, as expected, the higher percentage of MW workers among the three groups, starting from 0.46 per cent and increasing to 2.44 per cent in 2014. A significant increase of MW workers is also recorded in medium productivity firms, from 0.22 per cent in 2009 to 1.20 per cent at 2014, with a sharp increase in MW workers at 2013, the year after the MW reform. As with full time employment, high productivity firms have the smallest variation on the percentage of MW workers throughout the years, starting from 0.26 per cent in 20019. A sharp increase in MW workers is recorded at 2013

(from 0.32 per cent in 2012 to 0.81 per cent) in high productivity firms as well, but at 2014 the percentage of MW workers decreases (to 0.75 per cent).

Table 4.8: Percentage of MW employees

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	0.46%	0.22%	0.26%
2010	0.69%	0.27%	0.29%
2011	0.64%	0.28%	0.31%
2012	1.26%	0.43%	0.32%
2013	1.86%	1.14%	0.81%
2014	2.44%	1.20%	0.75%

Young employees (below 25 years of age) represent about 5% of the workforce in our dataset in 2009, a percentage that decreases almost to half in 2014. Young employees are mostly inexperienced and a proxy for low-wage employees (wage descriptive follow in Tables 4.11 and 4.12). Medium productivity firms have the higher percentage of young employees from 2009 to 2012 (in 2009 8.74 per cent of the workforce of medium productivity firms was young employees, with the same percentage being 6.59 per cent for low productivity firms and 4.25 per cent for high productivity firms). After 2012, low productivity firms have the higher percentage of young employees. High productivity firms are the only group that reports an increase in the percentage of young employees in 2014 (2.24 per cent, whereas it was at 2.07 per cent in 2013.

Table 4.9: Percentage of employees below 25 years old

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	6.59%	8.74%	4.25%
2010	5.14%	7.05%	3.48%
2011	4.56%	5.41%	2.92%
2012	4.08%	4.15%	2.38%
2013	4.14%	3.80%	2.07%
2014	4.74%	3.61%	2.24%

Table 4.10 reports the percentage of male employees for the three productivity groups. Medium productivity firms have the lowest percentage of male employees, starting from 55.80 per cent in 2009 and reaching 54.90 per cent in 2014. The percentage of male employees from 2009 to 2014 slightly increases for the other two productivity groups (from 59.49 per cent to 61.54 per cent for

the low productivity group and from 69.04 per cent to 71.46 per cent for the high productivity group).

Table 4.10: Percentage of male employees

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	59.49%	55.80%	69.04%
2010	61.56%	56.25%	69.33%
2011	62.48%	54.59%	69.55%
2012	60.22%	59.53%	69.07%
2013	61.17%	54.97%	69.03%
2014	61.54%	54.90%	71.46%

In line with existing literature (Yeaple, 2005; Verhoogen, 2008), the relative average wage of each productivity group is corresponding with the firms' productivity level: low productivity firms have the lowest average wage and high productivity firms the highest (Table 4.11). The average wage difference between the groups increases throughout the years. In 2009, medium productivity firms have on average about €100 higher wages relative to low productivity groups and high productivity firms have on average about €200 higher wages compared to medium productivity firms. The same comparison in 2014 is €200 for medium to low productivity firms and €300 for high to medium productivity firms. Average wage of low productivity firms decreases from 2010 to 2014 (from €1,253 in 2010 to €995 in 2014) whereas the average wage of medium and high productivity firms decreases from 2010 to 2013 and increases in 2014 (from €1,326 in 2009 to €1,182 in 2014 for medium productivity firms and from €1,503 in 2009 to €1,461 in 2014 for high productivity firms).

Table 4.11: Average wage

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	1,224.32	1,326.89	1,503.58
2010	1,253.01	1,355.70	1,564.87
2011	1,229.62	1,344.17	1,552.25
2012	1,135.33	1,291.17	1,508.99
2013	1,033.03	1,180.40	1,438.60
2014	995.69	1,182.94	1,461.00

The average wages of younger workers (reported in Table 4.12) decreased more than for the whole workforce. The average wage decreased from 2009 to 2014 about 19 per cent in low

productivity firms, 11 per cent in medium productivity firms and 3 per cent in high productivity firms, whereas the same decline for the average wage of young employees was 31 per cent, 27 per cent and 23 per cent respectively. The average wage of young employees decreases for all groups from 2010 to 2014, with the average wage for the youth for each group being considerably lower than their total average wage. Additionally, the disparity between each productivity group is lower that what is reported when examining the average wage in Table 4.11.

Table 4.12: Average wage for employees below 25 years old

	(1)	(2)	(3)
year	**Low productivity firms**	**Medium productivity firms**	**High productivity firms**
2009	807.80	844.85	891.38
2010	800.30	866.22	915.71
2011	783.75	833.10	883.02
2012	685.31	745.94	812.78
2013	588.37	654.86	716.29
2014	559.16	619.13	691.38

In general, high productivity firms seem to have been only slightly affected by the recession or the reform, with their firms in this productivity group reporting only slight changes in full-time employment, average wage and MW employment, whereas they are the only productivity group reporting an increase in employment between 2009 to 2014. Low productivity firms are the ones most affected by the recession, with the larger reported decrease in average wage and full-time employment. Both low and medium productivity groups report a significant increase in the percentage of MW employee. It is worth noting that medium productivity groups were the first that reported a significant decrease in their workforce.

In Table A.1 to A.2 of the Appendix, descriptive statistics for the exporting activity of the firms are presented (in aggregate and for each productivity group separately). The average value of manufactured exports increased substantially from 2009 to 2011 (by 41 per cent) whereas small increases occurred for the next two years and with a small increase in 2014. All productivity groups recorded a sharp increase in the value of manufactures exports from 2009 to 2010, an increase that continued for high productivity firms up until 2013 and for medium productivity

firms up until 2011. Low productivity firms had a sharp decrease in their value of exports in 2010 and 2012, but steadily increased afterwards.

The average firm exports between 6.3 and 7.6 manufactured products, with low productivity firms exporting less (from 4.9 to 6) and high productivity firms after 2012 exporting the highest average number of products (about 9 manufacturing products). The evolution of the average number of manufacturing products exported is similar with that of the average value of manufactured exports.

4.4. Empirical Methodology & Results

4.4.1. Empirical Methodology

In order to estimate the results, the MW reform had on export firms, we use a difference in difference approach comparing firms with and without MW employees before and after the decrease of the MW.

Firms may periodically employ MW employees in tasks that do not affect their primary production or only as an introductory rate for the first trial months. To avoid declaring as MW firm a firm that does not use MW employees systematically, we mark as MW firms those that more than 1 per cent of their labour force is MW employees (as defined in the previous section).A similar approach is followed by a part of existing literature (Drake et al, 2011; Riley and Bondibene, 2017; Bell and Machin, 2018) which in order to examine the effect of the MW on various firm indicators they use as their treatment group low wage firms.

Taking account the above our estimation equation is the following:

$$y_{it} = \beta_0 + \beta_1 \mathbf{1}(\text{MW} = 1) \times \mathbf{1}(t \geq 2012) + \beta_2 \mathbf{1}(t \geq 2012) + \beta_3 \mathbf{1}(\text{MW} = 1) + f_{it} + c_t + \epsilon_{it}$$

The variable $\mathbf{1}(t \geq 2012)$is an indicator of whether the period is after the reform; and $\mathbf{1}(MW = 1)$is an indicator of whether the firm employs MW workers, implying that she is subject to the reform. The vector f_i contains firm specific characteristics, whereas c_t denotes year fixed effects. Firm-specific characteristics include the labour productivity of the firm –defined as total sales of

the firm per total employment–, capital intensity –defined as total assets over total wages[78]–, and alternative proxies for productivity such as firm's age and the total number of exporting destinationsas well as variables capturing the size of the firm such as total assets. For some specifications financial characteristics (such as liquidity and cash flow) are included in order to control for the financial constraints of the firms. Fixed effects include year, sector (using firm's NACE code) and broad product categories (using BEC code). The dependent variables y_{it} include the value of manufacture exports and the number of exporting manufactured products. Standard errors are clustered on sectoral level. In regressions, the log values of the continuous variables are being used.

The models we estimate below are akin to difference-in-difference regressions, with the coefficient of interest β_1 representing the difference in the outcome variable between the two groups (firms with MW workers and firms without MW workers) stemming from the decrease of the MW by 22 per cent in 2012.

The results are presented in two levels: aggregate, where all firms all included, and splitting the firms in three groups based on labour productivity.

4.4.2. Results

In this section we discuss the main results, in particular how the decrease in the minimum wage has affected exports for firms with MW employees relative to firms with no MW employees.

4.4.2.1. Value of Exports Estimates

In table 4.13 results for all firms are presented, using as controls labour productivity, the size of the firm, capital intensity, financial constraints as well as different alternatives for productivity. In each column different controls are included.

[78] In the denominator we use total wages and not total labour cost in order to eliminate as long as possible the effect of the reduction of the employer's social security contribution rate by 4 percentage points in 2012 and 2014.

First of all, we start by noting that the reform*, per se*, appears to have influenced positively the value of exports for all firms.[79] The effect (in those specifications that is statistically significant) ranges from 8% to 50%, but with most estimates being around 12% and statistically significant at 5% level. MW firms' value of exports is not differentially affected compared to firms with no MW employees, with the results being statistically insignificant in all specifications. Similarly, the coefficient of interest (MW x post reform) is negative but statistically insignificant in all specifications, implying that the reform did not have any effect on the relative value of exports for firms with MW employees compared to firms with no MW employees.

One possible explanation for not finding any differential impact of the reform could be that all firms benefited from it in terms of labour cost reduction, regardless if the firm employed MW workers or not. After the reform, the lower wage floor (combined with the effective abolition of collective bargaining) allowed firms to decrease wages in all the range of the wage distribution and not only on the MW workers. The wages after the reform may not be set to the MW rate, but without the minimum wage (and collective bargaining) reform(s), the decreases in wages reported would not be made possible. To make our explanation clearer, we could use the example of a firm which did not employ MW workers, in both time periods examined. The firm before 2012 paid wages above the MW, let's say €800 (with the MW ranging from €700 to €750 in this period). The firm continued to pay wages above the MW level after 2012, with the MW being €586 and the firm paying wages around €690 (this hypothesis is consistent with the decrease of wages that we encounter in our data, presented at table 4.5). MW before the reform was higher than 700€, making it impossible for the firm to impose wages below that limit, but after the 2012 reform the firm was able to decrease its labour cost significantly by imposing wages below the initial MW limit, without though being marked as MW firm.[80] In this case, the firm will be in our control group before and after the reform, even though the firm indirectly benefited from the decrease in the MW level. This explanation is consistent with the positive post-reform coefficient and the statistically insignificant coefficient for MW firms.

[79] The post-reform period includes the implication of various reforms in Greece, with the most important though, according to the IMF, being the labour market reforms that took place from 2012 to 2014.

[80] The "wage restriction" for the firm was even stronger if we take into account the fact that before 2010 collective agreements imposed higher wage floors in many sectors. Most collective agreements were no longer universally binding after 2011, allowing the firms to set lower wages.

Labour productivity (defined as total sales to total employment) has a positive impact on the value of exports, with 1% increase of labour productivity leading to about 0.5% increase in the value of exports with the results being significant at a 1% level. The positive impact remains in all specifications with the coefficient ranging from 0.4 to 1.09. Other proxies for productivity have ambiguous results, with the number of exporting destinations being statistically significant and positive in all specifications (the coefficient indicates that 1% increase in the number of exporting destinations lead to a 1.4% increase in the value of exports) but the coefficient for the impact of the firm's age being mostly statistically insignificant. In the only specification that the coefficient of the firm's age is statistically significant in the 10% level, the effect is negative, implying a 0.07% decline in the value of exports if there is a 1% increase in the firm's age.

The size of the firm (indicated by the total assets of the firm) has a positive effect on the value of exports, with the coefficient being around 0.4. On the other hand, capital intensity (the ratio of total assets to total wage bill) is negative with the coefficient ranging from 0.14 to 0.61 depending on the specifications.

Finally, controls for financial constrains have contradictory results: liquidity seems to have a small negative effect on the value of exports (around 0.03%) whereas cash flow a small positive effect (0.8%). It should be noted though that the results for liquidity remain statistically significant in all specifications, whereas the coefficient of cash flow is statistically significant only in one (column 10).

Year and broad product categories fixed effects are generally statistically insignificant, whereas sectoral fixed effects have a statistically significant effect. We reproduce the regressions presented in this section with the addition of multiplicative FE (year x sector fixed effects), but our main results were not altered.

Table 4.13: Effect on value of exports, all firms included

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0510	-0.0405	0.0464	0.0054	0.0564	0.0514	0.0260	0.0213	-0.0198	0.0031
	(0.0683)	(0.0667)	(0.0646)	(0.0618)	(0.0915)	(0.0929)	(0.0680)	(0.0703)	(0.0709)	(0.0914)
Post reform	0.5045***	-0.0012	0.5318***	0.0776	0.1382*	0.1624*	0.0892	0.1117**	0.0532	0.1407*
	(0.0609)	(0.0567)	(0.0579)	(0.0566)	(0.0762)	(0.0779)	(0.0562)	(0.0498)	(0.0449)	(0.0765)
MW x after reform	-0.0690	-0.0802	-0.0990	-0.0933	-0.1015	-0.1050	-0.0707	-0.0694	-0.0932	-0.1415
	(0.0946)	(0.0728)	(0.1001)	(0.0752)	(0.1031)	(0.1076)	(0.0880)	(0.0909)	(0.0967)	(0.1108)
Log sales/employment	1.0920***	0.6496***	0.7551***	0.5435***	0.7042***	0.6979***	0.5264***	0.5192***	0.3959***	0.5141***
	(0.1037)	(0.0709)	(0.0720)	(0.0573)	(0.0699)	(0.0702)	(0.0576)	(0.0608)	(0.0546)	(0.0465)
Log assets/wages	-0.4338***	-0.1412***	-0.6055***	-0.2624***	-0.3306***	-0.3366***	-0.2874***	-0.2919***		
	(0.0499)	(0.0383)	(0.0661)	(0.0416)	(0.0691)	(0.0684)	(0.0334)	(0.0325)		
Log number of destinations		1.6383***		1.4259***	1.4226***	1.4231***	1.4141***	1.4122***	1.4661***	1.4537***
		(0.0470)		(0.0470)	(0.0448)	(0.0446)	(0.0444)	(0.0446)	(0.0487)	(0.0465)
Log assets			0.8655***	0.4198***	0.4179***	0.4284***	0.4698***	0.4803***	0.4399***	0.4035***
			(0.0464)	(0.0243)	(0.0314)	(0.0328)	(0.0227)	(0.0228)	(0.0230)	(0.0298)
Log cash flow					0.0300	0.0281				0.0838***
					(0.0199)	(0.0200)				(0.0187)
Log firm's age						-0.0714*		-0.0701**	-0.0350	-0.0425
						(0.0362)		(0.0321)	(0.0323)	(0.0350)
Log liquidity							-0.0351*	-0.0318*	-0.0375**	
							(0.0167)	(0.0175)	(0.0175)	
Constant	-2.7368***	-1.2181	-12.0954***	-5.9540***	-8.7066***	-8.5599***	-7.0000***	-6.8318***	-5.6761***	-6.9172***
	(0.8556)	(0.8354)	(1.0716)	(0.9686)	(1.0945)	(1.0958)	(0.7945)	(0.8634)	(0.8080)	(0.9370)
Observations	23,130	23,130	23,130	23,130	13,176	13,128	13,535	13,486	13,486	13,128
Number of firms	5,627	5,627	5,627	5,627	4,161	4,136	3,991	3,967	3,967	4,136
R-squared	0.2944	0.5805	0.4236	0.6061	0.6224	0.6223	0.6286	0.6290	0.6242	0.6178
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

To investigate if different productivity groups have different outcomes, we proceed by dividing our sample in three groups based on the firms' productivity (low, medium and high productivity firms presented in Table 4.14 to 4.16 respectively).Firms with higher productivity are in general expected to charge lower prices, sell larger quantities, and earn higher operating profits (Behrens, 2014). More productive firms are expected to be positively impacted by the reform, with lower labour costs leading to higher exports. For lower productivity firms the possible positive effects of the reform are expected to compensate for the negative implications of the economic crisis.

Results for most control variables are similar in all productivity groups, consistent with when examining all firms in aggregate. Differences are reported in the three dummy variables of interest (firms with MW workers, post-reform and the interaction of these two).

The post-reform indicator is statistically insignificant in most specifications for medium productivity firms but remains positive when low and high productivity firms are examined. In both cases the coefficient is higher than the one we found when we examined all firms in aggregate (Table 4.13).A possible explanation is that the reform led to a reduction in labour cost of full time employees, which is a higher percentage of the labour force in low and high productivity firms. These results are consistent with the findings of Georgiadis et al (2020), implying that changes in MW level stir changes in the whole of the wage distribution.

The interaction coefficient, indicating the differential effect of firms with MW workers after the reform compared to firms with no MW workers, is statistically insignificant when medium and high productivity firms are examined, but some negative and statistically significant results are recorded for low productivity firms. In this case (Table 4.14) the coefficient indicates that firms with MW workers are expected to have 3% lower value of exports after the reform compared to their counterparts with no MW employees. A possible explanation is that lower productivity firms with MW workers were already operating in a narrow profit margin. The MW decrease was not substantial enough to exceed the negative implications of the economic crisis.

Finally, the dummy indicator for firms with MW workers is statistically insignificant in the majority of specifications.

Table 4.14: Effect on value of exports, low productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0117	0.0841	0.0432	0.0909	0.1551	0.1445	0.1347	0.1279	0.0954	0.1013
	(0.1248)	(0.1018)	(0.1138)	(0.0953)	(0.1400)	(0.1404)	(0.1188)	(0.1194)	(0.1213)	(0.1503)
Post reform	0.4033***	-0.0549	0.5343***	0.0653	0.3130***	0.3215***	0.0639	0.1061	-0.0245	0.2433**
	(0.1030)	(0.0892)	(0.0970)	(0.0862)	(0.1159)	(0.1157)	(0.1026)	(0.1035)	(0.0997)	(0.1136)
MW x post reform	-0.0550	-0.1651	-0.1121	-0.1800	-0.2693*	-0.2790*	-0.0926	-0.0993	-0.0909	-0.3178*
	(0.1459)	(0.1149)	(0.1450)	(0.1149)	(0.1605)	(0.1612)	(0.1475)	(0.1483)	(0.1480)	(0.1648)
Log sales/employment	0.8205***	0.2522***	0.4311***	0.1282	0.3188*	0.3234*	0.1767*	0.1744	0.1944*	0.2180
	(0.1458)	(0.0935)	(0.1263)	(0.0912)	(0.1840)	(0.1850)	(0.1042)	(0.1069)	(0.1058)	(0.1709)
Log assets/wages	-0.3327***	-0.1328***	-0.6821***	-0.3298***	-0.4048***	-0.4079***	-0.2794***	-0.2840***		
	(0.0665)	(0.0496)	(0.0589)	(0.0456)	(0.0797)	(0.0812)	(0.0565)	(0.0561)		
Log number of destinations		1.5941***		1.4014***	1.3806***	1.3812***	1.4164***	1.4149***	1.4756***	1.4301***
		(0.0367)		(0.0408)	(0.0513)	(0.0513)	(0.0455)	(0.0455)	(0.0424)	(0.0511)
Log assets			0.8943***	0.4424***	0.4233***	0.4330***	0.4967***	0.5099***	0.4367***	0.3646***
			(0.0579)	(0.0437)	(0.0621)	(0.0640)	(0.0416)	(0.0424)	(0.0401)	(0.0631)
Log cash flow					0.0051	0.0014				0.0736*
					(0.0381)	(0.0384)				(0.0413)
Log firm's age						-0.0468		-0.1226*	-0.0909	-0.0292
						(0.0865)		(0.0680)	(0.0681)	(0.0870)
Log liquidity							-0.0144	-0.0094	-0.0133	
							(0.0337)	(0.0340)	(0.0346)	
Constant	-1.4197	2.4454**	-9.6600***	-2.0983	-5.7069**	-5.7673**	-3.3505*	-3.1193	-2.9636	-4.3905*
	(1.6506)	(1.1233)	(1.8743)	(1.3704)	(2.6987)	(2.7127)	(1.9688)	(1.9897)	(2.0121)	(2.6505)
Observations	7,708	7,708	7,708	7,708	3,133	3,119	4,481	4,467	4,467	3,119
Number of firms	2,630	2,630	2,630	2,630	1,378	1,366	1,709	1,699	1,699	1,366
R-squared	0.3229	0.5927	0.4376	0.6169	0.6693	0.6697	0.6579	0.6593	0.6547	0.6633
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4.15: Effect on value of exports, medium productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.1809	-0.2320**	-0.0086	-0.1417	-0.0582	-0.0597	-0.1506	-0.1521	-0.1971*	-0.1015
	(0.1422)	(0.1056)	(0.1204)	(0.1014)	(0.1253)	(0.1257)	(0.1193)	(0.1196)	(0.1192)	(0.1213)
Post reform	0.3851***	-0.1208*	0.4382***	-0.0167	-0.0594	-0.0389	-0.0072	0.0043	-0.0502	-0.0678
	(0.0806)	(0.0679)	(0.0748)	(0.0670)	(0.1020)	(0.1069)	(0.0886)	(0.0940)	(0.0913)	(0.1047)
MW x post reform	0.0765	0.1614	0.0298	0.1259	0.0321	0.0327	0.1232	0.1265	0.0915	0.0143
	(0.1926)	(0.1445)	(0.1617)	(0.1356)	(0.1559)	(0.1587)	(0.1501)	(0.1524)	(0.1550)	(0.1600)
Log sales/employment	1.1639***	0.6778***	0.7400***	0.5508***	0.6167***	0.6174***	0.5339***	0.5438***	0.3977**	0.4707**
	(0.2351)	(0.1688)	(0.1887)	(0.1534)	(0.2208)	(0.2172)	(0.1860)	(0.1852)	(0.1880)	(0.2178)
Log assets/wages	-0.4116***	-0.1139*	-0.6458***	-0.2721***	-0.2710***	-0.2744***	-0.3319***	-0.3314***		
	(0.0831)	(0.0663)	(0.0758)	(0.0674)	(0.0971)	(0.0985)	(0.0740)	(0.0753)		
Log number of destinations		1.6671***		1.4076***	1.4533***	1.4581***	1.3529***	1.3556***	1.4115***	1.4848***
		(0.0479)		(0.0518)	(0.0604)	(0.0597)	(0.0580)	(0.0574)	(0.0552)	(0.0565)
Log assets			0.9856***	0.4711***	0.4668***	0.4735***	0.5342***	0.5404***	0.4920***	0.4485***
			(0.0432)	(0.0430)	(0.0502)	(0.0528)	(0.0538)	(0.0537)	(0.0577)	(0.0525)
Log cash flow					0.0316	0.0299				0.0732*
					(0.0418)	(0.0416)				(0.0383)
Log firm's age						-0.0588		-0.0480	-0.0223	-0.0415
						(0.0648)		(0.0661)	(0.0663)	(0.0641)
Log liquidity							-0.0197	-0.0206	-0.0272	
							(0.0324)	(0.0321)	(0.0321)	
Constant	-2.5038	-0.6082	-12.9381***	-5.8909***	-6.5635**	-6.4910**	-6.0767***	-6.1499***	-4.7726**	-5.1005*
	(2.8933)	(2.0328)	(2.5843)	(2.1119)	(3.0235)	(2.9775)	(2.3341)	(2.3161)	(2.3871)	(3.0014)
Observations	7,782	7,782	7,782	7,782	4,755	4,738	4,696	4,681	4,681	4,738
Number of firms	2,870	2,870	2,870	2,870	2,022	2,016	1,903	1,895	1,895	2,016
R-squared	0.3372	0.6260	0.4893	0.6538	0.6849	0.6854	0.6691	0.6696	0.6651	0.6832
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4.16: Effect on value of exports, high productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0962	0.0829	0.1436	0.1062	0.1195	0.1177	0.0466	0.0504	-0.0110	0.0561
	(0.1969)	(0.1584)	(0.1730)	(0.1509)	(0.1827)	(0.1850)	(0.1932)	(0.1954)	(0.1950)	(0.1958)
Post reform	0.6143***	0.1326	0.5872***	0.1731**	0.2164**	0.2297**	0.1155	0.1200	0.1369*	0.2418**
	(0.1001)	(0.0806)	(0.0811)	(0.0714)	(0.0906)	(0.0911)	(0.0748)	(0.0733)	(0.0756)	(0.0919)
MW x post reform	-0.2882	-0.2916	-0.2476	-0.2724	-0.2772	-0.2714	-0.1986	-0.2069	-0.2505	-0.3176
	(0.2146)	(0.1770)	(0.2165)	(0.1764)	(0.2027)	(0.2054)	(0.2312)	(0.2291)	(0.2245)	(0.2074)
Log sales/employment	1.2252***	0.9026***	0.8878***	0.7825***	0.8926***	0.8905***	0.7615***	0.7589***	0.5500***	0.6767***
	(0.1998)	(0.1116)	(0.1589)	(0.1037)	(0.1145)	(0.1140)	(0.1068)	(0.1078)	(0.1082)	(0.0993)
Log assets/wages	-0.5392***	-0.2583***	-0.5530***	-0.2956***	-0.3543***	-0.3636***	-0.3478***	-0.3483***		
	(0.1144)	(0.0759)	(0.1104)	(0.0746)	(0.1036)	(0.1047)	(0.0588)	(0.0621)		
Log number of destinations		1.6420***		1.4611***	1.4124***	1.4106***	1.4646***	1.4635***	1.5110***	1.4341***
		(0.0790)		(0.0717)	(0.0846)	(0.0840)	(0.0617)	(0.0618)	(0.0655)	(0.0872)
Log assets			0.7628***	0.3519***	0.3691***	0.3777***	0.3957***	0.3971***	0.3759***	0.3639***
			(0.0577)	(0.0229)	(0.0267)	(0.0309)	(0.0467)	(0.0494)	(0.0485)	(0.0309)
Log cash flow					0.0298	0.0309				0.0869***
					(0.0319)	(0.0303)				(0.0232)
Log firm's age						-0.0430		-0.0086	0.0353	0.0009
						(0.0454)		(0.0433)	(0.0397)	(0.0401)
Log liquidity							-0.0410	-0.0403	-0.0502*	
							(0.0246)	(0.0245)	(0.0254)	
Constant	-3.8739	-2.9551	-11.3194***	-6.4912**	-8.6323***	-8.6105***	-9.0912***	-9.0596***	-7.2305***	-6.9012***
	(2.9577)	(2.2227)	(2.6059)	(2.2483)	(2.3298)	(2.3235)	(1.4259)	(1.4183)	(1.3952)	(2.1569)
Observations	7,640	7,640	7,640	7,640	5,288	5,271	4,358	4,338	4,338	5,271
Number of firms	2,410	2,410	2,410	2,410	1,885	1,876	1,623	1,623	1,623	1,876
R-squared	0.3277	0.5862	0.4297	0.6047	0.6144	0.6146	0.6260	0.6263	0.6202	0.6092
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

4.4.2.2. Number of Exporting Products Estimates

In table 4.17 results on the effect of the reform on the number of exporting products for all firms in aggregate are presented, with the same controls and specifications as in Table 4.13.

In general, the results are similar with those observed about the effect of the reform on the value of exports. The impact of the reform is positive, signifying that after the reform the firms are likely to export about 8% more products(with the coefficient ranging from 0.03 to 0.24, but in the specifications in which most controls are specified the coefficient is 0.08). On the other hand, the fact that the firm has MW employees does not seem to affect the number of exporting products, as the relevant coefficient is statistically insignificant. The same occurs also with the interaction coefficient, which shows how firms with MW workers were affected from the reform relative to firms with no MW employees, with all results being statistically insignificant.

These results are consistent with our explanation in section 4.4.2.1, implying that all firms were affected by the labour market reforms, irrespectively whether they employed MW workers or not. The results are also compatible with those of Decramer et al (2016) who find that higher unit labour costs are linked with a lower probability of increasing the number of exporting products.[81]

Examining the rest of the control variables, the results are similar with those of Table 4.13 presented in the previous section, but with all coefficients being smaller. For example, labour productivity has a coefficient that ranges from 0.07 to 0.27 on Table 4.17, meaning that a 1% increase on labour productivity is linked with 0.07% to 0.27% increase on the number of exporting products. The same coefficient ranges from 0.4 to 1.09 when examining the effect that labour productivity has on the value of exports (Table 4.13).

[81]Decramer et al (2016) find that a 1% increase of the ULC is linked with a 0.03% lower probability of increasing the number of exporting products and with a 0.02% higher probability of decreasing the number of exporting products per firm.

Table 4.17: Effect on number of exporting products, all firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0494	-0.0453	-0.0141	-0.0306	-0.0097	-0.0086	-0.0396	-0.0391	-0.0523	-0.0271
	(0.0333)	(0.0305)	(0.0313)	(0.0300)	(0.0327)	(0.0328)	(0.0392)	(0.0393)	(0.0400)	(0.0336)
Post reform	0.2281***	0.0309*	0.2381***	0.0563***	0.0818***	0.0854***	0.0325	0.0326	0.0138	0.0770***
	(0.0225)	(0.0166)	(0.0244)	(0.0174)	(0.0292)	(0.0298)	(0.0217)	(0.0227)	(0.0219)	(0.0294)
MW x post reform	0.0414	0.0370	0.0305	0.0328	-0.0064	-0.0116	0.0750	0.0754	0.0677	-0.0256
	(0.0410)	(0.0341)	(0.0396)	(0.0336)	(0.0455)	(0.0452)	(0.0459)	(0.0458)	(0.0465)	(0.0454)
Log sales/employment	0.2709***	0.0984***	0.1490***	0.0643**	0.0877**	0.0864**	0.0687**	0.0674**	0.0276	0.0158
	(0.0300)	(0.0235)	(0.0299)	(0.0251)	(0.0408)	(0.0412)	(0.0334)	(0.0338)	(0.0313)	(0.0342)
Log assets/wages	-0.1652***	-0.0510***	-0.2273***	-0.0900***	-0.1267***	-0.1292***	-0.0941***	-0.0940***		
	(0.0211)	(0.0159)	(0.0203)	(0.0161)	(0.0234)	(0.0233)	(0.0231)	(0.0231)		
Log number of destinations		0.6389***		0.5707***	0.5472***	0.5469***	0.5735***	0.5739***	0.5913***	0.5587***
		(0.0196)		(0.0199)	(0.0224)	(0.0224)	(0.0205)	(0.0209)	(0.0215)	(0.0228)
Log assets			0.3134***	0.1350***	0.1422***	0.1450***	0.1519***	0.1526***	0.1396***	0.1355***
			(0.0166)	(0.0121)	(0.0143)	(0.0149)	(0.0161)	(0.0156)	(0.0157)	(0.0150)
Log cash flow					0.0094	0.0096				0.0310*
					(0.0168)	(0.0165)				(0.0165)
Log firm's age						-0.0106		0.0033	0.0145	0.0005
						(0.0268)		(0.0221)	(0.0222)	(0.0270)
Log liquidity							-0.0025	-0.0024	-0.0043	
							(0.0107)	(0.0107)	(0.0109)	
Constant	-1.8350***	-1.2426***	-5.2236***	-2.7655***	-3.1686***	-3.1594***	-3.1651***	-3.1733***	-2.8013***	-2.5289***
	(0.4167)	(0.3531)	(0.5529)	(0.4130)	(0.5598)	(0.5707)	(0.4772)	(0.4930)	(0.4712)	(0.5167)
Observations	23,128	23,128	23,128	23,128	13,175	13,127	13,534	13,485	13,485	13,127
Number of firms	5,626	5,626	5,626	5,626	4,160	4,135	3,991	3,967	3,967	4,135
R-squared	0.1887	0.4611	0.2947	0.4777	0.4800	0.4804	0.4857	0.4855	0.4825	0.4762
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Tables 4.18 to 4.20 present the effect the reform had on the number of exporting products, with the firms divided based on their labour productivity (similarly with the results presented in Tables 4.14 to 4.16 concerning the value of exports). Results are similar with those in Table 4.17, when all firms are examined, with the main differences being in the variables that are directly linked with the reform.

Only the medium productivity group seems to be directly affected by the reform, with MW firms exporting a lower number of products but with this number being increased after the reform.In low productivity firms we do not observe any significant effect, whereas in high productivity firms the number of exporting products increased after the reform.

Combining the results on value of exports and the number of exporting products, we observe that high productivity firms were positively affected from the lower labour costs linked with the MW reform. After the 2012 reform, high productivity firms were able to increase their value of exports and the number of exporting products as well. These results are in line with the hypothesis that for firms with higher productivity lower labour cost led to higher exports, whereas for the other two productivity groups the reform mainly neutralized the negative effects of the economic crisis.

Table 4.18: Effect on number of exporting products, low productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0246	0.0036	-0.0144	0.0052	0.0094	0.0092	-0.0379	-0.0380	-0.0437	0.0032
	(0.0584)	(0.0500)	(0.0607)	(0.0510)	(0.0638)	(0.0641)	(0.0609)	(0.0614)	(0.0614)	(0.0648)
Post reform	0.1930***	0.0149	0.2354***	0.0430	0.0641	0.0643	0.0372	0.0339	0.0108	0.0534
	(0.0414)	(0.0331)	(0.0409)	(0.0338)	(0.0554)	(0.0552)	(0.0420)	(0.0434)	(0.0393)	(0.0540)
MW x post reform	0.0405	-0.0023	0.0221	-0.0058	-0.0474	-0.0526	0.0216	0.0215	0.0230	-0.0580
	(0.0576)	(0.0508)	(0.0610)	(0.0520)	(0.0676)	(0.0683)	(0.0650)	(0.0656)	(0.0656)	(0.0676)
Log sales/employment	0.3210***	0.1000***	0.1952***	0.0710**	0.1592*	0.1560*	0.1176**	0.1164**	0.1200**	0.1413*
	(0.0501)	(0.0352)	(0.0477)	(0.0356)	(0.0897)	(0.0896)	(0.0550)	(0.0553)	(0.0550)	(0.0851)
Log assets/wages	-0.0650***	0.0127	-0.1779***	-0.0334	-0.0579	-0.0570	-0.0515	-0.0503		
	(0.0243)	(0.0176)	(0.0281)	(0.0217)	(0.0426)	(0.0428)	(0.0329)	(0.0333)		
Log number of destinations		0.6198***		0.5746***	0.5445***	0.5443***	0.5718***	0.5718***	0.5826***	0.5512***
		(0.0271)		(0.0265)	(0.0313)	(0.0310)	(0.0301)	(0.0302)	(0.0309)	(0.0321)
Log assets			0.2890***	0.1037***	0.0767***	0.0784***	0.1147***	0.1137***	0.1007***	0.0688***
			(0.0255)	(0.0213)	(0.0268)	(0.0266)	(0.0335)	(0.0336)	(0.0306)	(0.0253)
Log cash flow					-0.0180	-0.0180				-0.0079
					(0.0201)	(0.0204)				(0.0184)
Log firm's age						-0.0080		0.0079	0.0135	-0.0055
						(0.0404)		(0.0372)	(0.0369)	(0.0408)
Log liquidity							-0.0116	-0.0114	-0.0121	
							(0.0181)	(0.0181)	(0.0180)	
Constant	-3.0312***	-1.5284***	-5.6940***	-2.5934***	-3.1160***	-3.0815***	-3.1708***	-3.1675***	-3.1399***	-2.8890***
	(0.6123)	(0.4555)	(0.7075)	(0.5372)	(1.0603)	(1.0636)	(0.8560)	(0.8732)	(0.8543)	(1.0131)
Observations	7,708	7,708	7,708	7,708	3,133	3,119	4,481	4,467	4,467	3,119
Number of firms	2,630	2,630	2,630	2,630	1,378	1,366	1,709	1,699	1,699	1,366
R-squared	0.2251	0.4878	0.3022	0.4963	0.5202	0.5200	0.5177	0.5169	0.5160	0.5191
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4.19: Effect on number of exporting products, medium productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.1218**	-0.1420***	-0.0557	-0.1089***	-0.0319	-0.0296	-0.1279**	-0.1247**	-0.1412***	-0.0548
	(0.0548)	(0.0439)	(0.0451)	(0.0402)	(0.0480)	(0.0485)	(0.0549)	(0.0548)	(0.0543)	(0.0505)
Post reform	0.1967***	-0.0030	0.2171***	0.0351	0.0705	0.0894	0.0016	0.0185	-0.0016	0.0720
	(0.0376)	(0.0331)	(0.0323)	(0.0331)	(0.0496)	(0.0551)	(0.0473)	(0.0523)	(0.0527)	(0.0556)
MW x post reform	0.1126	0.1462**	0.0947	0.1331**	-0.0117	-0.0244	0.2047***	0.1995***	0.1866**	-0.0354
	(0.0748)	(0.0607)	(0.0662)	(0.0585)	(0.0748)	(0.0742)	(0.0757)	(0.0751)	(0.0766)	(0.0755)
Log sales/employment	0.3332***	0.1414*	0.1705**	0.0949	0.1043	0.1050	0.1565*	0.1526*	0.0987	0.0168
	(0.0905)	(0.0815)	(0.0715)	(0.0744)	(0.0947)	(0.0962)	(0.0907)	(0.0910)	(0.0902)	(0.0953)
Log assets/wages	-0.1606***	-0.0430*	-0.2504***	-0.1010***	-0.1516***	-0.1650***	-0.1163***	-0.1221***		
	(0.0262)	(0.0256)	(0.0276)	(0.0257)	(0.0343)	(0.0343)	(0.0382)	(0.0385)		
Log number of destinations		0.6580***		0.5630***	0.5502***	0.5513***	0.5525***	0.5531***	0.5737***	0.5673***
		(0.0226)		(0.0272)	(0.0308)	(0.0306)	(0.0287)	(0.0288)	(0.0295)	(0.0313)
Log assets			0.3782***	0.1724***	0.1825***	0.1932***	0.1877***	0.1958***	0.1780***	0.1782***
			(0.0199)	(0.0231)	(0.0262)	(0.0277)	(0.0255)	(0.0260)	(0.0274)	(0.0276)
Log cash flow					-0.0208	-0.0243				0.0017
					(0.0212)	(0.0208)				(0.0208)
Log firm's age						-0.0555		-0.0365	-0.0270	-0.0451
						(0.0405)		(0.0358)	(0.0359)	(0.0400)
Log liquidity							-0.0047	-0.0039	-0.0063	
							(0.0153)	(0.0154)	(0.0160)	
Constant	-2.6703**	-1.9228**	-6.6735***	-3.8558***	-4.3143***	-4.2815***	-4.7003***	-4.6513***	-4.1437***	-3.4457***
	(1.0736)	(0.9723)	(0.8962)	(0.9262)	(1.1493)	(1.1743)	(1.1476)	(1.1531)	(1.1475)	(1.1691)
Observations	7,781	7,781	7,781	7,781	4,754	4,737	4,695	4,680	4,680	4,737
Number of firms	2,869	2,869	2,869	2,869	2,021	2,015	1,902	1,894	1,894	2,015
R-squared	0.2316	0.5017	0.3661	0.5240	0.5509	0.5538	0.5204	0.5223	0.5187	0.5489
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4.20: Effect on number of exporting products, high productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0147	0.0097	0.0325	0.0184	0.0056	0.0112	0.0079	0.0149	-0.0065	-0.0170
	(0.0542)	(0.0537)	(0.0543)	(0.0551)	(0.0583)	(0.0589)	(0.0797)	(0.0824)	(0.0841)	(0.0604)
Post reform	0.2747***	0.0936***	0.2648***	0.1088***	0.1089***	0.0906**	0.0890*	0.0709	0.0768	0.0961**
	(0.0537)	(0.0324)	(0.0584)	(0.0345)	(0.0407)	(0.0394)	(0.0455)	(0.0470)	(0.0479)	(0.0398)
MW x post reform	-0.0300	-0.0313	-0.0149	-0.0242	0.0164	0.0132	0.0429	0.0376	0.0224	-0.0079
	(0.0816)	(0.0658)	(0.0828)	(0.0676)	(0.0791)	(0.0805)	(0.1000)	(0.1033)	(0.1040)	(0.0805)
Log sales/employment	0.1610***	0.0397	0.0350	-0.0047	-0.0110	-0.0086	-0.0563	-0.0530	-0.1259**	-0.1063**
	(0.0430)	(0.0438)	(0.0379)	(0.0447)	(0.0536)	(0.0535)	(0.0605)	(0.0603)	(0.0566)	(0.0451)
Log assets/wages	-0.2462***	-0.1406***	-0.2515***	-0.1545***	-0.1696***	-0.1661***	-0.1279***	-0.1214***		
	(0.0385)	(0.0279)	(0.0361)	(0.0283)	(0.0331)	(0.0323)	(0.0404)	(0.0402)		
Log number of destinations		0.6175***		0.5505***	0.5333***	0.5324***	0.5783***	0.5806***	0.5972***	0.5432***
		(0.0381)		(0.0387)	(0.0433)	(0.0432)	(0.0403)	(0.0409)	(0.0415)	(0.0433)
Log assets			0.2852***	0.1304***	0.1382***	0.1316***	0.1467***	0.1370***	0.1296***	0.1253***
			(0.0221)	(0.0173)	(0.0193)	(0.0188)	(0.0216)	(0.0215)	(0.0204)	(0.0190)
Log cash flow					0.0260	0.0270				0.0526*
					(0.0292)	(0.0288)				(0.0291)
Log firm's age						0.0461		0.0626	0.0779**	0.0662*
						(0.0349)		(0.0388)	(0.0386)	(0.0355)
Log liquidity							0.0105	0.0089	0.0054	
							(0.0205)	(0.0201)	(0.0201)	
Constant	-0.1651	0.1797	-2.9511***	-1.1315**	-0.8523	-0.8741	-1.1740	-1.2193	-0.5818	-0.0931
	(0.5305)	(0.5777)	(0.5305)	(0.5599)	(0.6792)	(0.6832)	(0.7538)	(0.7538)	(0.6917)	(0.6235)
Observations	7,639	7,639	7,639	7,639	5,288	5,271	4,358	4,338	4,338	5,271
Number of firms	2,409	2,409	2,409	2,409	1,885	1,876	1,623	1,615	1,615	1,876
R-squared	0.2451	0.4765	0.3353	0.4927	0.4928	0.4935	0.5036	0.5040	0.4995	0.4864
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

4.4.2.3. Robustness Checks

Previous sections have documented the effect of the reform in our main specification. We test the robustness of our results in the following ways:

(a) Physical productivity

To address any endogeneity issues that may arise from the definition of labour productivity used (defined as total sales per total employment), we replace it with the physical productivity of each firm following Foster et al (2008). In Tables A.3 to A.10 in the Appendix, we replace labour productivity with physical productivity (as control, but also as criterion to divide the firms). In order to define physical productivity (taking a similar approach withKalyvitis et al, 2017 and Card et al, 2018) we will use the value added per worker - instead of sales per worker that is used when labour productivity is defined. To define value added per worker, but also to avoid any collinearity, we use the quantity of exporting products. To create the "physical productivity" variable, we use the exporting quantity of the product that represents more than 50% of the total exporting value of the firm. When this variable is used, our main result (that all firms benefited from the reform, captured in the positive and statistically significant coefficient of the post-reform period) is not validated, with the coefficient being statistically insignificant in most specifications. Additionally, the coefficient that captures the relative "advantage" of firms with MW workers after the reform, is positive and statistically significant when high productivity firms are examined (for both value of exports and for number of exporting products, presented in Tables A.3 and A.7 respectively), an effect not reported when we used the labour productivity variable. The dummy for firms with MW workers is statistically insignificant in almost all specifications (with the only exception being when examining the effect of the reform on exporting value for low productivity firms).

(b) Firm fixed effects

Tables A.11 to A.18 include firm fixed effects (and we excluded the control for firm's age, as it is a time-invariant firm specific control). In this specification, the post reform coefficient is positive and statistically significant, similarly with the results presented in the two previous sections. The other two variables of interest (firms with MW workers and the relative

"advantage" of firms with MW workers after the reform) are statistically insignificant in all specifications.

(c) Initial labour productivity

In the final alteration, presented in Tables A.19 to A.24, we divide the firms based on their initial labour productivity (instead of the categorization varying per year, used in the previous sections). Verhoogen (2008) have reported that initially more productive plants increased their export share of sales and wages more than initially less productive plants. In our analysis, we find different results for firms with medium initial productivity, whereas low and high initial productivity firms seem to be effected similarly. The post reform coefficient is statistically significant and positive when examining the value of exports for low and high initial productivity firms, indicating the robustness of our initial specification, but is statistically insignificant when examining the number of exporting products. The results are reverse when examining medium initial productivity firms (the coefficient is statistically insignificant when examining the value of exports, but significant and positive when examining the number of exporting products). The other two coefficients of interest are statistically insignificant in all specifications.

From the above, we can conclude that although some of the results presented in the previous sections are sensitive to the specifications used, and may not universally apply, the effect reported in our initial specification is relatively robust and depends mainly in the definition of labour productivity.

4.5. Conclusion

MW in Greece was decreased by 22 per cent in February 2012, as part of the "internal devaluation" policy package, with the main aim being restoring the country's competitiveness through lower labour cost.

Using a rich dataset from Intrastat-Extrastat, ICAP and EFKA over the period 2009 to 2014, that combines exporting and wage data, we investigate the impact of the MW reform on exporting firms. Firstly, we find that only a very small portion of the employees are paid the MW, a percentage that slightly increases when focusing on low or medium productivity firms. We proceed by creating a difference-in-difference model with the control group being firms without

MW workers. Even though we do not find a comparative advantage for firms with MW workers, the overall effect of the reform is found to be positive, with the value of exports being 12 per cent higher and the number of exporting products 8 per cent higher the period after the reform, when all firms are examined. The results indicate that the reform, combined with the previous changes in the collective bargaining framework, had a positive impact on all exporting firms and not only on those with MW workers (that were directly affected by the decrease).

The positive effect of the reform remains when we examine high productivity firms, validating the hypothesis that MW reforms affect the whole of the wage distribution. The effects of the reform on low and medium productivity firms are unclear, implying that the reform mainly balanced the negative implications of the economic crisis.

Robustness checks show that although the effect survives in a number of alternative specifications it depends on the definition of labour productivity.

Appendix of Chapter 4

Table A.1. Average value of manufactured exports

year	All firms	Low productivity firms	Medium productivity firms	High productivity firms
2009	€ 1.357.369	€ 741.556	€ 1.173.781	€ 2.176.098
2010	€ 1.766.568	€ 1.032.239	€ 1.434.477	€ 3.023.685
2011	€ 1.916.046	€ 782.196	€ 1.975.049	€ 3.288.678
2012	€ 2.015.184	€ 671.077	€ 1.920.266	€ 3.708.042
2013	€ 2.068.119	€ 750.556	€ 1.947.951	€ 3.396.974
2014	€ 2.024.820	€ 857.571	€ 1.996.285	€ 3.285.825

Table A.2. Average number of exporting manufactured products per firm

year	All firms	Low productivity firms	Medium productivity firms	High productivity firms
2009	6.2	4.9	7.1	7.0
2010	7.2	5.9	8.3	7.8
2011	7.3	5.8	8.6	8.0
2012	7.3	5.7	8.0	8.8
2013	7.5	5.4	8.5	9.1
2014	7.6	6.0	8.5	9.2

Table A.3. Effect on value of exports using physical productivity, all firms included

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0205	0.0119	0.0589	0.0433	0.0170	0.0152	-0.0176	-0.0164	-0.0499	-0.0161
	(0.1010)	(0.0946)	(0.0830)	(0.0823)	(0.1062)	(0.1067)	(0.0915)	(0.0922)	(0.0961)	(0.1138)
Post reform	0.1193**	-0.1025*	0.2157***	0.0416	0.0766	0.0853	0.0762	0.0995	-0.0380	0.0488
	(0.0582)	(0.0566)	(0.0493)	(0.0507)	(0.0700)	(0.0713)	(0.0683)	(0.0732)	(0.0740)	(0.0773)
MW x post reform	-0.1032	-0.0681	-0.0529	-0.0421	-0.0079	-0.0117	0.0387	0.0320	-0.0005	-0.0554
	(0.1175)	(0.1074)	(0.1014)	(0.0973)	(0.1281)	(0.1290)	(0.1075)	(0.1093)	(0.1140)	(0.1359)
Log physical productivity	0.6490***	0.4738***	0.6397***	0.5240***	0.5386***	0.5387***	0.5203***	0.5208***	0.4743***	0.4944***
	(0.0191)	(0.0162)	(0.0149)	(0.0154)	(0.0178)	(0.0178)	(0.0196)	(0.0197)	(0.0185)	(0.0158)
Log assets/wages	-0.4522***	-0.2599***	-0.7225***	-0.5238***	-0.5157***	-0.5195***	-0.5575***	-0.5643***		
	(0.0608)	(0.0453)	(0.0366)	(0.0324)	(0.0512)	(0.0515)	(0.0402)	(0.0409)		
Log number of destinations		1.0912***		0.7352***	0.7363***	0.7363***	0.7459***	0.7418***	0.8966***	0.8481***
		(0.0404)		(0.0423)	(0.0488)	(0.0486)	(0.0458)	(0.0459)	(0.0443)	(0.0426)
Log assets			0.8376***	0.6236***	0.6322***	0.6365***	0.6376***	0.6462***	0.5175***	0.5337***
			(0.0313)	(0.0352)	(0.0341)	(0.0352)	(0.0385)	(0.0404)	(0.0408)	(0.0356)
Log cash flow					0.0498**	0.0467**				0.1145***
					(0.0224)	(0.0227)				(0.0226)
Log firm's age						-0.0279		-0.0673	0.0266	0.0330
						(0.0383)		(0.0479)	(0.0495)	(0.0407)
Log liquidity							0.0080	0.0107	-0.0018	
							(0.0198)	(0.0194)	(0.0207)	
Constant	3.6468***	2.9493***	-8.1616***	-5.6140***	-6.7232***	-6.6950***	-5.6034***	-5.4919***	-4.9055***	-6.3175***
	(0.5071)	(0.4723)	(0.7268)	(0.7354)	(0.9878)	(0.9903)	(0.8862)	(0.8761)	(0.8765)	(0.9680)
Observations	11,455	11,455	11,455	11,455	6,273	6,247	6,591	6,559	6,559	6,247
Number of firms	4,574	4,574	4,574	4,574	3,012	2,995	2,996	2,978	2,978	2,995
R-squared	0.6223	0.7103	0.7239	0.7572	0.7783	0.7788	0.7740	0.7750	0.7570	0.7662
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.4. Effect on value of exports using physical productivity, low productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.1408	0.1670	0.2095*	0.2178**	0.2542*	0.2499*	0.2346	0.2344	0.2215	0.2666*
	(0.1401)	(0.1263)	(0.1126)	(0.1056)	(0.1438)	(0.1443)	(0.1685)	(0.1666)	(0.1789)	(0.1577)
Post reform	0.0201	-0.0893	0.1693*	0.0536	0.0594	0.0803	0.1662	0.2150*	0.0656	0.0927
	(0.1114)	(0.0998)	(0.0973)	(0.0916)	(0.1181)	(0.1210)	(0.1178)	(0.1172)	(0.1146)	(0.1209)
MW x post reform	-0.1334	-0.1568	-0.1463	-0.1626	-0.2231	-0.2358	-0.2324	-0.2585	-0.2968	-0.3486
	(0.1688)	(0.1621)	(0.1337)	(0.1318)	(0.2065)	(0.2059)	(0.1907)	(0.1926)	(0.2015)	(0.2248)
Log physical productivity	0.4916***	0.3995***	0.5494***	0.4645***	0.4802***	0.4796***	0.5096***	0.5097***	0.4812***	0.4542***
	(0.0296)	(0.0248)	(0.0269)	(0.0262)	(0.0307)	(0.0307)	(0.0323)	(0.0324)	(0.0325)	(0.0305)
Log assets/wages	-0.2208*	-0.1722*	-0.5691***	-0.4652***	-0.4470***	-0.4505***	-0.5342***	-0.5413***		
	(0.1138)	(0.0979)	(0.0549)	(0.0514)	(0.0891)	(0.0890)	(0.0513)	(0.0518)		
Log number of destinations		1.2521***		1.0064***	1.0385***	1.0421***	0.8373***	0.8356***	0.9367***	1.1089***
		(0.0683)		(0.0793)	(0.0824)	(0.0820)	(0.0749)	(0.0748)	(0.0769)	(0.0756)
Log assets			0.7033***	0.5723***	0.5748***	0.5882***	0.6302***	0.6503***	0.5172***	0.5010***
			(0.0803)	(0.0816)	(0.0638)	(0.0663)	(0.0659)	(0.0708)	(0.0669)	(0.0637)
Log cash flow					0.0182	0.0168				0.0803**
					(0.0439)	(0.0446)				(0.0386)
Log firm's age						-0.0695		-0.1303	-0.0665	-0.0423
						(0.0618)		(0.0883)	(0.0836)	(0.0625)
Log liquidity							0.0137	0.0208	0.0034	
							(0.0367)	(0.0374)	(0.0406)	
Constant	9.6883***	9.1811***	-0.6193	0.8922	0.8493	0.9070	-0.0477	0.0569	0.8788	1.2856
	(0.6463)	(0.7076)	(1.4137)	(1.3877)	(1.0390)	(1.0169)	(1.2120)	(1.1678)	(1.0435)	(1.0320)
Observations	3,663	3,663	3,663	3,663	1,952	1,949	2,050	2,045	2,045	1,949
Number of firms	1,974	1,974	1,974	1,974	1,298	1,206	1,193	1,190	1,190	1,206
R-squared	0.4090	0.5043	0.5082	0.5664	0.5994	0.6005	0.6256	0.6288	0.6057	0.5868
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.5. Effect on value of exports using physical productivity, medium productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0627	0.0336	-0.0253	0.0305	0.0578	0.0585	-0.0798	-0.0817	-0.0988	0.0419
	(0.1410)	(0.1187)	(0.1080)	(0.0985)	(0.1133)	(0.1144)	(0.1033)	(0.1053)	(0.1085)	(0.1231)
Post reform	0.1493*	-0.0782	0.3001***	0.1162*	0.1325	0.1222	0.0730	0.1042	-0.0721	0.0304
	(0.0796)	(0.0778)	(0.0632)	(0.0671)	(0.0890)	(0.0893)	(0.0851)	(0.0886)	(0.0952)	(0.1060)
MW x post reform	-0.0438	-0.1890	0.0323	-0.0807	-0.1276	-0.1238	0.0180	0.0162	-0.0696	-0.2295
	(0.1867)	(0.1510)	(0.1572)	(0.1374)	(0.1759)	(0.1784)	(0.1633)	(0.1648)	(0.1630)	(0.1899)
Log physical productivity	0.7809***	0.5417***	0.7284***	0.5809***	0.5803***	0.5813***	0.5556***	0.5545***	0.4763***	0.5086***
	(0.0397)	(0.0372)	(0.0317)	(0.0319)	(0.0368)	(0.0365)	(0.0394)	(0.0396)	(0.0429)	(0.0391)
Log assets/wages	-0.5356***	-0.3298***	-0.8549***	-0.6488***	-0.6523***	-0.6505***	-0.6390***	-0.6442***		
	(0.0538)	(0.0445)	(0.0388)	(0.0339)	(0.0433)	(0.0446)	(0.0537)	(0.0527)		
Log number of destinations		1.0567***		0.7019***	0.7062***	0.7069***	0.7299***	0.7278***	0.9067***	0.8627***
		(0.0451)		(0.0414)	(0.0512)	(0.0512)	(0.0516)	(0.0512)	(0.0470)	(0.0443)
Log assets			0.9040***	0.7075***	0.7450***	0.7434***	0.6923***	0.7003***	0.5458***	0.6020***
			(0.0310)	(0.0299)	(0.0407)	(0.0386)	(0.0368)	(0.0341)	(0.0411)	(0.0451)
Log cash flow					0.0752**	0.0730**				0.1377***
					(0.0348)	(0.0351)				(0.0359)
Log firm's age						0.0131		-0.0838	0.0068	0.1006*
						(0.0541)		(0.0608)	(0.0594)	(0.0526)
Log liquidity							-0.0025	0.0005	-0.0140	
							(0.0275)	(0.0275)	(0.0272)	
Constant	5.1970***	6.1082***	-6.2125***	-3.1271***	0.3322	0.2944	1.0702**	1.2697**	0.6092	-0.5421
	(0.7544)	(0.6274)	(0.7297)	(0.6795)	(0.7322)	(0.7586)	(0.5306)	(0.5860)	(0.6557)	(0.8861)
Observations	3,895	3,895	3,895	3,895	2,152	2,144	2,407	2,403	2,403	2,144
Number of firms	2,074	2,074	2,074	2,074	1,258	1,250	1,341	1,337	1,337	1,250
R-squared	0.5443	0.6707	0.7100	0.7580	0.8029	0.8031	0.7861	0.7863	0.7518	0.7758
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.6. Effect on value of exports using physical productivity, high productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0750	-0.1948	-0.0591	-0.1304	-0.2677	-0.2646	-0.2258	-0.2222	-0.3176	-0.4232*
	(0.1812)	(0.1741)	(0.1707)	(0.1677)	(0.2300)	(0.2321)	(0.1929)	(0.1959)	(0.2049)	(0.2509)
Post reform	0.2857**	0.0079	0.2799***	0.1253	0.1104	0.1409	0.0757	0.1052	-0.0226	0.0891
	(0.1122)	(0.1071)	(0.0972)	(0.1038)	(0.1315)	(0.1296)	(0.1540)	(0.1557)	(0.1551)	(0.1372)
MW x post reform	0.0897	0.2313	0.1770	0.2347	0.3525	0.3536	0.4873**	0.4838*	0.4514*	0.4139
	(0.2155)	(0.1993)	(0.2005)	(0.1948)	(0.2658)	(0.2684)	(0.2403)	(0.2456)	(0.2467)	(0.2794)
Log physical productivity	0.7007***	0.4880***	0.6340***	0.5312***	0.5552***	0.5561***	0.5071***	0.5064***	0.3921***	0.4451***
	(0.0394)	(0.0447)	(0.0353)	(0.0436)	(0.0514)	(0.0516)	(0.0704)	(0.0707)	(0.0602)	(0.0485)
Log assets/wages	-0.6776***	-0.3852***	-0.7825***	-0.5921***	-0.5897***	-0.6049***	-0.6402***	-0.6551***		
	(0.0698)	(0.0579)	(0.0549)	(0.0539)	(0.1030)	(0.1021)	(0.0816)	(0.0848)		
Log number of destinations		0.9183***		0.5159***	0.5108***	0.5115***	0.5758***	0.5658***	0.8006***	0.6766***
		(0.0548)		(0.0715)	(0.0767)	(0.0767)	(0.1007)	(0.1023)	(0.0920)	(0.0725)
Log assets			0.8114***	0.6089***	0.6431***	0.6502***	0.5854***	0.5924***	0.4646***	0.5391***
			(0.0343)	(0.0442)	(0.0571)	(0.0575)	(0.0668)	(0.0670)	(0.0629)	(0.0559)
Log cash flow					0.0613	0.0537				0.1230**
					(0.0483)	(0.0491)				(0.0504)
Log firm's age						-0.0761		-0.0647	0.0740	0.0175
						(0.0824)		(0.0876)	(0.0899)	(0.0931)
Log liquidity							-0.0103	-0.0071	-0.0230	
							(0.0360)	(0.0347)	(0.0352)	
Constant	1.3253	1.0924	-9.6416***	-7.0357***	-5.7344***	-5.5976***	-4.1010***	-3.9459***	-3.2717**	-4.7827***
	(1.4050)	(0.9908)	(1.5822)	(1.4712)	(1.1254)	(1.1125)	(1.3476)	(1.3556)	(1.3826)	(1.1674)
Observations	3,897	3,897	3,897	3,897	2,169	2,154	2,134	2,111	2,111	2,154
Number of firms	1,722	1,722	1,722	1,722	1,095	1,088	1,093	1,082	1,082	1,088
R-squared	0.6044	0.6898	0.7166	0.7366	0.7637	0.7639	0.7499	0.7502	0.7252	0.7462
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.7. Effect on number of exporting products using physical productivity, all firms included

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0114	0.0077	0.0208	0.0118	-0.0027	-0.0031	-0.0098	-0.0102	-0.0130	-0.0054
	(0.0267)	(0.0240)	(0.0251)	(0.0235)	(0.0315)	(0.0317)	(0.0357)	(0.0359)	(0.0365)	(0.0318)
Post reform	0.1313***	0.0356*	0.1548***	0.0542***	0.0857***	0.0780***	0.0480*	0.0475*	0.0358	0.0753***
	(0.0223)	(0.0188)	(0.0221)	(0.0188)	(0.0283)	(0.0283)	(0.0248)	(0.0252)	(0.0243)	(0.0282)
MW x post reform	-0.0324	-0.0173	-0.0202	-0.0139	-0.0156	-0.0132	0.0036	0.0041	0.0013	-0.0164
	(0.0339)	(0.0280)	(0.0312)	(0.0272)	(0.0384)	(0.0385)	(0.0389)	(0.0391)	(0.0393)	(0.0386)
Log physical productivity	0.0852***	0.0097***	0.0830***	0.0162***	0.0152***	0.0156***	0.0187***	0.0187***	0.0148***	0.0123***
	(0.0051)	(0.0027)	(0.0040)	(0.0026)	(0.0041)	(0.0041)	(0.0038)	(0.0038)	(0.0035)	(0.0040)
Log assets/wages	-0.0834***	-0.0005	-0.1492***	-0.0345***	-0.0396**	-0.0386**	-0.0478***	-0.0479***		
	(0.0133)	(0.0092)	(0.0122)	(0.0104)	(0.0166)	(0.0168)	(0.0149)	(0.0154)		
Log number of destinations		0.4703***		0.4245***	0.4250***	0.4247***	0.4259***	0.4261***	0.4393***	0.4329***
		(0.0163)		(0.0171)	(0.0219)	(0.0218)	(0.0183)	(0.0184)	(0.0178)	(0.0209)
Log assets			0.2038***	0.0803***	0.0806***	0.0786***	0.0942***	0.0941***	0.0831***	0.0710***
			(0.0117)	(0.0084)	(0.0112)	(0.0118)	(0.0109)	(0.0113)	(0.0103)	(0.0113)
Log cash flow					0.0140	0.0145				0.0195**
					(0.0100)	(0.0101)				(0.0097)
Log firm's age						0.0183		0.0014	0.0093	0.0228
						(0.0166)		(0.0182)	(0.0177)	(0.0163)
Log liquidity							0.0132	0.0130	0.0120	
							(0.0098)	(0.0099)	(0.0099)	
Constant	0.0167	-0.2838***	-2.8571***	-1.3862***	-1.5271***	-1.5599***	-1.4231***	-1.4260***	-1.3762***	-1.5319***
	(0.1254)	(0.0967)	(0.1966)	(0.1560)	(0.2315)	(0.2287)	(0.1924)	(0.1972)	(0.1989)	(0.2264)
Observations	11,453	11,453	11,453	11,453	6,272	6,246	6,590	6,558	6,558	6,246
Number of firms	4,572	4,572	4,572	4,572	3,011	2,994	2,995	2,977	2,977	2,994
R-squared	0.2277	0.4755	0.3190	0.4873	0.5043	0.5044	0.5005	0.4999	0.4981	0.5034
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.8. Effect on number of exporting products using physical productivity, low productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0078	0.0164	0.0178	0.0210	0.0207	0.0207	0.0486	0.0491	0.0486	0.0209
	(0.0336)	(0.0268)	(0.0325)	(0.0266)	(0.0385)	(0.0385)	(0.0325)	(0.0326)	(0.0326)	(0.0387)
Post reform	0.0654**	0.0294	0.0871***	0.0423**	0.0707**	0.0716**	0.0456	0.0501	0.0445	0.0717**
	(0.0264)	(0.0207)	(0.0260)	(0.0207)	(0.0324)	(0.0322)	(0.0315)	(0.0310)	(0.0318)	(0.0323)
MW x post reform	0.0027	-0.0050	0.0008	-0.0055	-0.0379	-0.0351	-0.0311	-0.0307	-0.0321	-0.0365
	(0.0463)	(0.0405)	(0.0463)	(0.0406)	(0.0633)	(0.0631)	(0.0462)	(0.0456)	(0.0453)	(0.0641)
Log physical productivity	0.0359***	0.0056	0.0443***	0.0115***	0.0136**	0.0135**	0.0122**	0.0120**	0.0109**	0.0132**
	(0.0059)	(0.0039)	(0.0053)	(0.0038)	(0.0062)	(0.0063)	(0.0048)	(0.0048)	(0.0044)	(0.0059)
Log assets/wages	-0.0082	0.0078	-0.0588***	-0.0186	-0.0057	-0.0058	-0.0190	-0.0202		
	(0.0139)	(0.0105)	(0.0140)	(0.0125)	(0.0223)	(0.0219)	(0.0216)	(0.0219)		
Log number of destinations		0.4120***		0.3899***	0.3843***	0.3837***	0.3823***	0.3816***	0.3854***	0.3846***
		(0.0211)		(0.0218)	(0.0331)	(0.0332)	(0.0290)	(0.0290)	(0.0289)	(0.0323)
Log assets			0.1022***	0.0515***	0.0529***	0.0529***	0.0574***	0.0577***	0.0528***	0.0518***
			(0.0096)	(0.0078)	(0.0093)	(0.0091)	(0.0127)	(0.0128)	(0.0109)	(0.0087)
Log cash flow					0.0206*	0.0199*				0.0207*
					(0.0123)	(0.0120)				(0.0119)
Log firm's age						-0.0054		-0.0115	-0.0091	-0.0051
						(0.0180)		(0.0142)	(0.0136)	(0.0188)
Log liquidity							0.0009	0.0015	0.0009	
							(0.0094)	(0.0095)	(0.0096)	
Constant	0.4717***	0.3047**	-1.0267***	-0.4410**	-0.4174**	-0.3963*	-0.5567*	-0.5146	-0.4840	-0.3914*
	(0.1690)	(0.1269)	(0.2326)	(0.1920)	(0.2039)	(0.2134)	(0.3140)	(0.3143)	(0.3179)	(0.2087)
Observations	3,663	3,663	3,663	3,663	1,952	1,949	2,050	2,045	2,045	1,949
Number of firms	1,974	1,974	1,974	1,974	1,209	1,206	1,193	1,190	1,190	1,206
R-squared	0.1330	0.3652	0.1802	0.3765	0.4131	0.4135	0.3790	0.3793	0.3786	0.4134
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

TableA.9. Effect on number of exporting products using physical productivity, medium productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0143	0.0285	-0.0054	0.0282	0.0181	0.0189	-0.0798	0.0077	0.0061	0.0179
	(0.0543)	(0.0431)	(0.0495)	(0.0418)	(0.0470)	(0.0472)	(0.1033)	(0.0517)	(0.0520)	(0.0473)
Post reform	0.1153***	0.0139	0.1511***	0.0399	0.0276	0.0191	0.0730	0.0709*	0.0547	0.0137
	(0.0358)	(0.0294)	(0.0351)	(0.0291)	(0.0403)	(0.0413)	(0.0851)	(0.0416)	(0.0409)	(0.0409)
MW x post reform	-0.0227	-0.0872	-0.0049	-0.0728	-0.0080	-0.0061	0.0180	-0.0770	-0.0849	-0.0123
	(0.0757)	(0.0585)	(0.0692)	(0.0572)	(0.0726)	(0.0727)	(0.1633)	(0.0725)	(0.0718)	(0.0732)
Log physical productivity	0.1459***	0.0395***	0.1334***	0.0447***	0.0389**	0.0396**	0.5556***	0.0583***	0.0511***	0.0354**
	(0.0153)	(0.0123)	(0.0142)	(0.0124)	(0.0179)	(0.0179)	(0.0394)	(0.0184)	(0.0165)	(0.0170)
Log assets/wages	-0.0914***	0.0002	-0.1666***	-0.0423**	-0.0394	-0.0382	-0.6390***	-0.0590**		
	(0.0193)	(0.0188)	(0.0231)	(0.0197)	(0.0318)	(0.0322)	(0.0537)	(0.0279)		
Log number of destinations		0.4700***		0.4227***	0.4265***	0.4269***	0.7299***	0.4205***	0.4369***	0.4361***
		(0.0294)		(0.0288)	(0.0381)	(0.0383)	(0.0516)	(0.0335)	(0.0313)	(0.0353)
Log assets			0.2126***	0.0942***	0.0825***	0.0800***	0.6923***	0.1120***	0.0978***	0.0717***
			(0.0175)	(0.0115)	(0.0172)	(0.0174)	(0.0368)	(0.0175)	(0.0159)	(0.0204)
Log cash flow					0.0138	0.0149				0.0187
					(0.0170)	(0.0170)				(0.0162)
Log firm's age						0.0224		-0.0216	-0.0133	0.0276
						(0.0229)		(0.0244)	(0.0243)	(0.0231)
Log liquidity							-0.0025	0.0048	0.0034	
							(0.0275)	(0.0156)	(0.0156)	
Constant	-0.5214***	-0.1165	-3.2038***	-1.3455***	-1.1098***	-1.1591***	1.0702**	-1.4977***	-1.5582***	-1.2082***
	(0.1768)	(0.2127)	(0.2634)	(0.2594)	(0.3477)	(0.3460)	(0.5306)	(0.2693)	(0.2716)	(0.3333)
Observations	3,893	3,893	3,893	3,893	2,151	2,143	2,407	2,402	2,402	2,143
Number of firms	2,072	2,072	2,072	2,072	1,257	1,249	1,340	1,336	1,336	1,249
R-squared	0.2003	0.4465	0.2906	0.4618	0.4870	0.4867	0.7861	0.4895	0.4869	0.4858
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.10. Effect on number of exporting products using physical productivity, high productivity firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0178	-0.0486	0.0231	-0.0391	-0.0610	-0.0639	-0.0970	-0.1027	-0.1105	-0.0771
	(0.0524)	(0.0524)	(0.0519)	(0.0521)	(0.0644)	(0.0644)	(0.0831)	(0.0833)	(0.0854)	(0.0646)
Post reform	0.2026***	0.0487	0.2007***	0.0658	0.1172*	0.1002	0.0248	0.0094	-0.0011	0.0959
	(0.0581)	(0.0456)	(0.0537)	(0.0464)	(0.0627)	(0.0631)	(0.0637)	(0.0634)	(0.0617)	(0.0635)
MW x post reform	0.0203	0.0988	0.0489	0.0993*	0.0753	0.0812	0.1586*	0.1653*	0.1627*	0.0862
	(0.0703)	(0.0603)	(0.0658)	(0.0597)	(0.0820)	(0.0825)	(0.0861)	(0.0864)	(0.0874)	(0.0825)
Log physical productivity	0.0832***	-0.0347**	0.0613***	-0.0284**	-0.0305	-0.0296	-0.0108	-0.0096	-0.0189	-0.0389**
	(0.0179)	(0.0141)	(0.0151)	(0.0141)	(0.0190)	(0.0192)	(0.0201)	(0.0204)	(0.0189)	(0.0176)
Log assets/wages	-0.1575***	0.0045	-0.1919***	-0.0257	-0.0545*	-0.0504	-0.0587*	-0.0537*		
	(0.0285)	(0.0194)	(0.0254)	(0.0197)	(0.0316)	(0.0319)	(0.0324)	(0.0323)		
Log number of destinations		0.5089***		0.4501***	0.4652***	0.4635***	0.4457***	0.4472***	0.4665***	0.4772***
		(0.0194)		(0.0219)	(0.0274)	(0.0273)	(0.0285)	(0.0289)	(0.0276)	(0.0268)
Log assets			0.2657***	0.0890***	0.0869***	0.0822***	0.0937***	0.0888***	0.0783***	0.0730***
			(0.0186)	(0.0188)	(0.0239)	(0.0256)	(0.0262)	(0.0285)	(0.0277)	(0.0245)
Log cash flow					-0.0030	-0.0033				0.0025
					(0.0246)	(0.0249)				(0.0248)
Log firm's age						0.0447		0.0441	0.0554	0.0525
						(0.0481)		(0.0476)	(0.0483)	(0.0478)
Log liquidity							0.0269	0.0239	0.0226	
							(0.0211)	(0.0212)	(0.0216)	
Constant	0.1789	0.0498	-3.4124***	-1.1388***	-0.9504**	-1.0502***	-1.1268**	-1.2243***	-1.1690***	-0.9823**
	(0.3841)	(0.1894)	(0.5006)	(0.3390)	(0.4026)	(0.3866)	(0.4485)	(0.4393)	(0.4386)	(0.3819)
Observations	3,897	3,897	3,897	3,897	2,169	2,154	2,134	2,111	2,111	2,154
Number of firms	1,722	1,722	1,722	1,722	1,095	1,088	1,093	1,082	1,082	1,088
R-squared	0.2567	0.4963	0.3667	0.5055	0.5166	0.5178	0.5256	0.5243	0.5228	0.5167
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.11. Effect on Value of exports – all firms, firm FE included				
VARIABLES	(1)	(2)	(3)	(4)
MW firms	0.0064	0.0113	0.0328	-0.0284
	(0.0535)	(0.0522)	(0.0699)	(0.0657)
Post reform	0.0159	0.1094**	0.1202*	0.1302**
	(0.0516)	(0.0466)	(0.0616)	(0.0587)
MW x post reform	0.0350	0.0193	0.0004	0.0679
	(0.0646)	(0.0630)	(0.0908)	(0.0727)
Log sales/employment	0.4751***	0.4153***	0.4208***	0.3401***
	(0.0464)	(0.0473)	(0.0713)	(0.0775)
Log assets/wages	-0.3308***	-0.4016***	-0.3697***	-0.4495***
	(0.0534)	(0.0468)	(0.0841)	(0.0711)
Log number of destinations	1.2531***	1.2116***	1.1681***	1.1548***
	(0.0358)	(0.0364)	(0.0427)	(0.0410)
Log assets		0.5841***	0.5904***	0.5503***
		(0.0755)	(0.1207)	(0.1402)
Log cash flow			0.0322	
			(0.0253)	
Log liquidity				0.0081
				(0.0201)
Constant	2.7905***	-4.6406***	-5.6214**	-3.3933
	(0.6305)	(1.2297)	(2.1865)	(2.8141)
Observations	23,130	23,130	13,176	13,535
Number of firms	5,627	5,627	4,161	3,991
R-squared	0.8805	0.8818	0.9055	0.8970
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.12. Effect on Value of exports – low productivity firms, firm FE included				
VARIABLES	(1)	(2)	(3)	(4)
MW firms	0.0436	0.0394	0.0207	0.1471
	(0.1017)	(0.0993)	(0.1558)	(0.1367)
Post reform	0.0924	0.2532***	0.1667	0.2519**
	(0.0973)	(0.0923)	(0.1445)	(0.1233)
MW x post reform	-0.0634	-0.0658	-0.0628	-0.0843
	(0.1259)	(0.1233)	(0.1988)	(0.1581)
Log sales/employment	0.6613***	0.5826***	0.8057***	0.7141***
	(0.0962)	(0.0968)	(0.2233)	(0.1612)
Log assets/wages	-0.3134***	-0.4213***	-0.2231	-0.4037***
	(0.0989)	(0.0958)	(0.1732)	(0.1216)
Log number of	1.1922***	1.1706***	1.1575***	1.1507***

destinations				
	(0.0619)	(0.0599)	(0.1027)	(0.0815)
Log assets		0.7192***	0.6047**	0.5631***
		(0.1593)	(0.3067)	(0.1986)
Log cash flow			0.0212	
			(0.0624)	
Log liquidity				0.0098
				(0.0360)
Constant	-2.0472*	-11.9917***	-14.1222***	-10.5776**
	(1.1517)	(2.4921)	(4.8018)	(4.0920)
Observations	7,708	7,708	3,133	4,481
Number of firms	2,630	2,630	1,378	1,709
R-squared	0.8872	0.8886	0.9195	0.9049
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.13. Effect on Value of exports – medium productivity firms, firm FE included

VARIABLES	(1)	(2)	(3)	(4)
MW firms	-0.0535	-0.0557	-0.0791	-0.0844
	(0.0959)	(0.0971)	(0.1353)	(0.1304)
Post reform	-0.0004	0.0707	0.0581	0.1322
	(0.0945)	(0.0880)	(0.1109)	(0.0961)
MW x post reform	0.1257	0.1195	0.0775	0.0844
	(0.1290)	(0.1288)	(0.1598)	(0.1535)
Log sales/employment	0.6307***	0.5282***	0.4657*	0.4737*
	(0.1487)	(0.1564)	(0.2645)	(0.2720)
Log assets/wages	-0.3160***	-0.3997***	-0.3525*	-0.4160**
	(0.0955)	(0.1015)	(0.1897)	(0.1624)
Log number of destinations	1.1948***	1.1595***	1.1286***	1.0374***
	(0.0661)	(0.0651)	(0.0913)	(0.0822)
Log assets		0.5264***	0.5284**	0.4438**
		(0.1376)	(0.2384)	(0.2177)
Log cash flow			0.0888*	
			(0.0507)	
Log liquidity				-0.0263
				(0.0378)
Constant	0.6207	-5.3828**	-4.4643	-2.6588
	(1.6989)	(2.2848)	(4.7490)	(4.7693)
Observations	7,782	7,782	4,755	4,696
Number of firms	2,870	2,870	2,022	1,903
R-squared	0.9189	0.9194	0.9309	0.9272
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.14. Effect on Value of exports – high productivity firms, firm FE included				
VARIABLES	(1)	(2)	(3)	(4)
MW firms	0.0413	0.0543	0.1174	-0.1768
	(0.1331)	(0.1355)	(0.1518)	(0.1479)
Post reform	0.0686	0.1374**	0.2093**	0.1069
	(0.0694)	(0.0691)	(0.0861)	(0.1016)
MW x post reform	-0.0419	-0.0673	-0.1350	0.1996
	(0.1753)	(0.1767)	(0.1899)	(0.1680)
Log sales/employment	0.4930***	0.4665***	0.4560***	0.3216*
	(0.1194)	(0.1150)	(0.1483)	(0.1671)
Log assets/wages	-0.3433***	-0.4599***	-0.4228**	-0.6577***
	(0.1244)	(0.1176)	(0.2040)	(0.1787)
Log number of destinations	1.2573***	1.2094***	1.1790***	1.1585***
	(0.0675)	(0.0658)	(0.0838)	(0.0737)
Log assets		0.5436***	0.6148***	0.7051***
		(0.1144)	(0.1982)	(0.1893)
Log cash flow			-0.0265	
			(0.0510)	
Log liquidity				0.0313
				(0.0306)
Constant	5.3095**	-2.9348	-6.5513*	-8.4167**
	(2.1989)	(2.6132)	(3.6950)	(3.9498)
Observations	7,640	7,640	5,288	4,358
Number of firms	2,410	2,410	1,885	1,623
R-squared	0.8966	0.8976	0.9118	0.9119
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

TableA.15. Effect on the number of exporting products– all firms, firm FE included				
VARIABLES	(1)	(2)	(3)	(4)
MW firms	-0.0113	-0.0105	-0.0264	-0.0030
	(0.0241)	(0.0239)	(0.0306)	(0.0330)
Post reform	0.0362**	0.0518***	0.0881***	0.0531**
	(0.0153)	(0.0160)	(0.0236)	(0.0247)
MW x post reform	0.0059	0.0033	0.0241	-0.0139
	(0.0260)	(0.0258)	(0.0341)	(0.0317)
Log sales/employment	0.0648***	0.0547***	0.1057***	0.0465*
	(0.0162)	(0.0159)	(0.0331)	(0.0249)
Log assets/wages	-0.0679***	-0.0798***	-0.1099***	-0.0975***

	(0.0164)	(0.0172)	(0.0337)	(0.0259)
Log number of destinations	0.5475***	0.5405***	0.5440***	0.5328***
	(0.0190)	(0.0196)	(0.0209)	(0.0212)
Log assets		0.0980***	0.0861	0.0666*
		(0.0261)	(0.0569)	(0.0394)
Log cash flow			-0.0066	
			(0.0094)	
Log liquidity				-0.0045
				(0.0076)
Constant	-0.7314***	-1.9777***	-2.2907**	-1.0489
	(0.1878)	(0.3995)	(1.0472)	(0.7359)
Observations	23,128	23,128	13,175	13,534
Number of firms	5,626	5,626	4,160	3,991
R-squared	0.8783	0.8785	0.8951	0.8868
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

TableA.16. Effect on the number of exporting products– low productivity firms, firm FE included

VARIABLES	(1)	(2)	(3)	(4)
MW firms	0.0008	0.0003	-0.0037	0.0119
	(0.0456)	(0.0456)	(0.0767)	(0.0600)
Post reform	-0.0224	-0.0051	-0.0177	-0.0038
	(0.0298)	(0.0317)	(0.0578)	(0.0530)
MW x post reform	-0.0035	-0.0038	0.0399	-0.0434
	(0.0484)	(0.0483)	(0.0890)	(0.0641)
Log sales/employment	0.0761**	0.0676*	0.2031**	0.0867
	(0.0366)	(0.0370)	(0.0841)	(0.0554)
Log assets/wages	-0.0083	-0.0199	0.0094	0.0059
	(0.0353)	(0.0367)	(0.0930)	(0.0522)
Log number of destinations	0.5110***	0.5086***	0.4871***	0.5119***
	(0.0284)	(0.0285)	(0.0425)	(0.0324)
Log assets		0.0775*	-0.0187	0.0609
		(0.0467)	(0.1095)	(0.0951)
Log cash flow			-0.0245	
			(0.0253)	
Log liquidity				-0.0043
				(0.0148)
Constant	-1.1928***	-2.2639***	-2.5783	-2.2964
	(0.4555)	(0.8250)	(1.7046)	(1.6482)
Observations	7,708	7,708	3,133	4,481

Number of firms	2,630	2,630	1,378	1,709
R-squared	0.8851	0.8852	0.8987	0.8938
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.17. Effect on the number of exporting products– medium productivity firms, firm FE included

VARIABLES	(1)	(2)	(3)	(4)
MW firms	-0.0183	-0.0186	0.0054	-0.0303
	(0.0524)	(0.0525)	(0.0682)	(0.0698)
Post reform	0.0386	0.0501*	0.0868**	0.0399
	(0.0296)	(0.0299)	(0.0420)	(0.0416)
MW x post reform	0.0180	0.0170	-0.0529	0.0212
	(0.0622)	(0.0624)	(0.0993)	(0.0880)
Log sales/employment	-0.0560	-0.0726	-0.1346	-0.0662
	(0.0710)	(0.0736)	(0.1192)	(0.1188)
Log assets/wages	-0.0768*	-0.0904**	-0.0701	-0.1109
	(0.0439)	(0.0446)	(0.0756)	(0.0795)
Log number of destinations	0.5465***	0.5408***	0.5473***	0.5225***
	(0.0278)	(0.0285)	(0.0399)	(0.0403)
Log assets		0.0854	0.1257	0.1309
		(0.0668)	(0.0972)	(0.1008)
Log cash flow			0.0003	
			(0.0175)	
Log liquidity				0.0049
				(0.0164)
Constant	0.4473	-0.5272	-0.6789	-0.8173
	(0.8357)	(1.0680)	(1.9286)	(1.9318)
Observations	7,781	7,781	4,754	4,695
Number of firms	2,869	2,869	2,021	1,902
R-squared	0.9058	0.9059	0.9225	0.9038
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.18. Effect on the number of exporting products– high productivity firms, firm FE included

VARIABLES	(1)	(2)	(3)	(4)
MW firms	-0.0310	-0.0283	-0.0350	-0.0239
	(0.0452)	(0.0453)	(0.0547)	(0.0583)
Post reform	0.0809**	0.0950***	0.1143***	0.1035*
	(0.0341)	(0.0349)	(0.0394)	(0.0593)
MW x post reform	0.0433	0.0381	0.0702	0.0651
	(0.0483)	(0.0487)	(0.0604)	(0.0677)
Log sales/employment	0.0777*	0.0722	0.1553*	0.0760
	(0.0460)	(0.0440)	(0.0818)	(0.0638)
Log assets/wages	-0.1169***	-0.1408***	-0.1883**	-0.2013***
	(0.0392)	(0.0424)	(0.0779)	(0.0568)
Log number of destinations	0.5575***	0.5476***	0.5527***	0.5544***
	(0.0295)	(0.0293)	(0.0356)	(0.0340)
Log assets		0.1115**	0.1352	0.1032
		(0.0534)	(0.0930)	(0.0680)
Log cash flow			-0.0071	
			(0.0145)	
Log liquidity				-0.0196
				(0.0140)
Constant	-0.7068	-2.3976**	-3.7559**	-2.3529
	(0.6581)	(1.1605)	(1.7784)	(1.4276)
Observations	7,639	7,639	5,288	4,358
Number of firms	2,409	2,409	1,885	1,623
R-squared	0.8987	0.8990	0.9069	0.9118
Products FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table A.19. Effects on the value of exports (standard errors clustered at sectoral level) – Low productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.1404	0.0203	-0.0814	0.0303	0.1671	0.1549	0.1391	0.1356	0.1069	0.1004
	(0.1405)	(0.1158)	(0.1236)	(0.1081)	(0.1455)	(0.1460)	(0.1379)	(0.1394)	(0.1410)	(0.1621)
Post reform	0.4199***	-0.0421	0.6095***	0.0968	0.2930**	0.3018**	0.1305	0.1590*	0.0270	0.2050*
	(0.0942)	(0.0760)	(0.0882)	(0.0756)	(0.1198)	(0.1264)	(0.0911)	(0.0945)	(0.0944)	(0.1238)
MW x post reform	0.1397	-0.0597	-0.0243	-0.1145	-0.2558	-0.2612	-0.1705	-0.1804	-0.1717	-0.3083*
	(0.1591)	(0.1247)	(0.1565)	(0.1226)	(0.1802)	(0.1803)	(0.1602)	(0.1605)	(0.1599)	(0.1859)
Log sales/employment	0.9166***	0.4177***	0.6876***	0.3654***	0.5343***	0.5457***	0.2848***	0.2906***	0.2051*	0.2636
	(0.1251)	(0.0775)	(0.1233)	(0.0820)	(0.1644)	(0.1647)	(0.1063)	(0.1063)	(0.1182)	(0.1783)
Log assets/wages	-0.4782***	-0.1821***	-0.7206***	-0.3275***	-0.5154***	-0.5207***	-0.2854***	-0.2883***		
	(0.0754)	(0.0522)	(0.0677)	(0.0506)	(0.0853)	(0.0862)	(0.0640)	(0.0620)		
Log number of destinations		1.6678***		1.4856***	1.4450***	1.4451***	1.5128***	1.5133***	1.5755***	1.5134***
		(0.0363)		(0.0398)	(0.0564)	(0.0565)	(0.0449)	(0.0448)	(0.0446)	(0.0565)
Log assets			0.9135***	0.4261***	0.4486***	0.4596***	0.4961***	0.5083***	0.4470***	0.3781***
			(0.0828)	(0.0593)	(0.0918)	(0.0949)	(0.0513)	(0.0520)	(0.0514)	(0.0944)
Log cash flow					0.0668	0.0655				0.1671***
					(0.0474)	(0.0479)				(0.0508)
Log firm's age						-0.0389		-0.0817	-0.0427	-0.0078
						(0.1057)		(0.0789)	(0.0791)	(0.1084)
Log liquidity							-0.0578	-0.0552	-0.0580	
							(0.0388)	(0.0397)	(0.0402)	
Constant	-2.8080*	-0.1659	-13.2158***	-5.3088***	-7.9057***	-8.0573***	-5.4060***	-5.3820***	-4.2129**	-4.6852*
	(1.6536)	(1.3160)	(2.4626)	(1.9397)	(2.4921)	(2.5168)	(1.9713)	(1.9658)	(2.0591)	(2.6925)
Observations	6,282	6,282	6,282	6,282	2,776	2,767	3,669	3,655	3,655	2,767
Number of firms	1,658	1,658	1,6581	1,658	1,001	992	1,144	1,135	1,135	992
R-squared	0.3664	0.6446	0.4752	0.6649	0.6971	0.6977	0.7077	0.7095	0.7047	0.6872
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.20. Effects on the value of exports (standard errors clustered at sectoral level) – Medium productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0069	-0.0672	0.1419	0.0148	0.0099	0.0149	0.0714	0.0790	0.0486	-0.0120
	(0.1408)	(0.0898)	(0.1092)	(0.0816)	(0.1127)	(0.1159)	(0.0989)	(0.1017)	(0.1011)	(0.1144)
Post reform	0.4661***	-0.0304	0.5397***	0.0834	0.0495	0.1033	0.1006	0.1516*	0.0970	0.0864
	(0.0727)	(0.0662)	(0.0683)	(0.0645)	(0.1005)	(0.1062)	(0.0745)	(0.0801)	(0.0758)	(0.1030)
MW x post reform	-0.0724	-0.0069	-0.0986	-0.0300	-0.0620	-0.0780	-0.1290	-0.1468	-0.1785	-0.1042
	(0.1795)	(0.1235)	(0.1595)	(0.1168)	(0.1609)	(0.1623)	(0.1334)	(0.1336)	(0.1345)	(0.1647)
Log sales/employment	1.1179***	0.5679***	0.8833***	0.5400***	0.6491***	0.6475***	0.4928***	0.4841***	0.4108***	0.5494***
	(0.1130)	(0.0766)	(0.1126)	(0.0794)	(0.1562)	(0.1529)	(0.1110)	(0.1100)	(0.1083)	(0.1400)
Log assets/wages	-0.4276***	-0.0968	-0.7324***	-0.2972***	-0.1992**	-0.2121**	-0.2494***	-0.2602***		
	(0.0831)	(0.0669)	(0.0792)	(0.0671)	(0.0949)	(0.0959)	(0.0781)	(0.0782)		
Log number of destinations		1.6410***		1.3833***	1.4154***	1.4143***	1.3862***	1.3796***	1.4311***	1.4367***
		(0.0519)		(0.0554)	(0.0617)	(0.0621)	(0.0613)	(0.0611)	(0.0610)	(0.0595)
Log assets			1.0077***	0.4909***	0.4707***	0.4923***	0.5195***	0.5407***	0.4934***	0.4690***
			(0.0478)	(0.0524)	(0.0602)	(0.0629)	(0.0640)	(0.0627)	(0.0660)	(0.0620)
Log cash flow					0.0141	0.0045				0.0343
					(0.0450)	(0.0440)				(0.0419)
Log firm's age						-0.1560**		-0.1431**	-0.1178*	-0.1445*
						(0.0781)		(0.0704)	(0.0694)	(0.0763)
Log liquidity							-0.0209	-0.0151	-0.0177	
							(0.0286)	(0.0283)	(0.0280)	
Constant	-4.4794***	1.4378	-15.1125***	-4.6717***	-0.5586	-0.3013	-3.0459*	-2.7226*	-2.2496	0.4895
	(1.4580)	(0.9813)	(1.5721)	(1.3012)	(2.1372)	(2.0657)	(1.5665)	(1.5410)	(1.5414)	(1.9795)
Observations	7,144	7,144	7,144	7,144	4,173	4,165	4,339	4,333	4,333	4,165
Number of firms	1,724	1,724	1,724	1,724	1,364	1,360	1,257	1,253	1,253	1,360
R-squared	0.3665	0.6529	0.5182	0.6818	0.7116	0.7128	0.7017	0.7024	0.6995	0.7115
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.21. Effect on the value of exports (standard errors clustered at sectoral level) – High productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	0.0504	0.0047	0.0866	0.0263	0.1474	0.1534	-0.0202	-0.0152	-0.0800	0.0907
	(0.1778)	(0.1250)	(0.1518)	(0.1211)	(0.1316)	(0.1300)	(0.1481)	(0.1484)	(0.1565)	(0.1356)
Post reform	0.7145***	0.1739**	0.5971***	0.1783**	0.1915**	0.1677**	0.1428	0.1402	0.1485	0.1816**
	(0.0923)	(0.0723)	(0.0923)	(0.0735)	(0.0824)	(0.0849)	(0.0879)	(0.0970)	(0.1019)	(0.0879)
MW x post reform	-0.1874	-0.1602	-0.1417	-0.1421	-0.1912	-0.1992	0.0072	0.0013	-0.0222	-0.2251
	(0.2205)	(0.1577)	(0.2073)	(0.1583)	(0.1714)	(0.1690)	(0.1531)	(0.1530)	(0.1558)	(0.1708)
Log sales/employment	1.0464***	0.7942***	0.7096***	0.6661***	0.8392***	0.8431***	0.6365***	0.6361***	0.4873***	0.6634***
	(0.1291)	(0.0908)	(0.1159)	(0.0823)	(0.1133)	(0.1125)	(0.0894)	(0.0871)	(0.0704)	(0.0853)
Log assets/wages	-0.4028***	-0.2182***	-0.4960***	-0.2813***	-0.3564***	-0.3495***	-0.3487***	-0.3481***		
	(0.0916)	(0.0668)	(0.0739)	(0.0637)	(0.0996)	(0.1013)	(0.0701)	(0.0721)		
Log number of destinations		1.7437***		1.5548***	1.5178***	1.5197***	1.4975***	1.4982***	1.5419***	1.5355***
		(0.0353)		(0.0378)	(0.0511)	(0.0517)	(0.0536)	(0.0536)	(0.0533)	(0.0523)
Log assets			0.8430***	0.3891***	0.4038***	0.3916***	0.4341***	0.4323***	0.4029***	0.3741***
			(0.0585)	(0.0363)	(0.0450)	(0.0486)	(0.0535)	(0.0488)	(0.0511)	(0.0492)
Log cash flow					0.0254	0.0251				0.0804**
					(0.0387)	(0.0382)				(0.0340)
Log firm's age						0.0773		0.0132	0.0513	0.1138
						(0.0742)		(0.0716)	(0.0674)	(0.0725)
Log liquidity							-0.0498*	-0.0496*	-0.0616**	
							(0.0279)	(0.0283)	(0.0306)	
Constant	-1.2961	-0.9566	-8.9262***	-4.5153***	-6.3337***	-6.3608***	-4.7493***	-4.7480***	-3.5146**	-4.7667**
	(2.0840)	(1.4126)	(1.7415)	(1.3921)	(2.2180)	(2.1997)	(1.4303)	(1.4220)	(1.3645)	(2.0133)
Observations	7,365	7,365	7,365	7,365	4,876	4,866	4,270	4,257	4,257	4,866
Number of firms	1,755	1,755	1,755	1,755	1,469	1,463	1,265	1,260	1,260	1,463
R-squared	0.3080	0.6210	0.4297	0.6433	0.6557	0.6557	0.6574	0.6574	0.6503	0.6504
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.22. Effect on the number of exporting products (standard errors clustered at sectoral level) – Low productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0694	-0.0090	-0.0504	-0.0065	0.0252	0.0277	-0.0441	-0.0436	-0.0484	0.0163
	(0.0644)	(0.0566)	(0.0653)	(0.0572)	(0.0737)	(0.0741)	(0.0655)	(0.0663)	(0.0668)	(0.0754)
Post reform	0.1506***	-0.0232	0.2118***	0.0106	0.0040	-0.0008	0.0276	0.0106	-0.0119	-0.0210
	(0.0335)	(0.0277)	(0.0342)	(0.0285)	(0.0510)	(0.0509)	(0.0383)	(0.0411)	(0.0395)	(0.0510)
MW x post reform	0.0975	0.0225	0.0445	0.0092	-0.0856	-0.0884	0.0405	0.0423	0.0438	-0.0983
	(0.0666)	(0.0598)	(0.0667)	(0.0590)	(0.0832)	(0.0832)	(0.0672)	(0.0683)	(0.0691)	(0.0834)
Log sales/employment	0.2814***	0.0937***	0.2074***	0.0809**	0.2194***	0.2207***	0.1003*	0.1031*	0.0885	0.1616***
	(0.0482)	(0.0356)	(0.0519)	(0.0376)	(0.0656)	(0.0659)	(0.0592)	(0.0600)	(0.0591)	(0.0607)
Log assets/wages	-0.1174***	-0.0060	-0.1957***	-0.0414*	-0.1098**	-0.1091**	-0.0536	-0.0492		
	(0.0298)	(0.0210)	(0.0293)	(0.0216)	(0.0492)	(0.0495)	(0.0345)	(0.0352)		
Log number of destinations		0.6274***		0.5831***	0.5475***	0.5471***	0.5820***	0.5826***	0.5932***	0.5615***
		(0.0292)		(0.0282)	(0.0313)	(0.0313)	(0.0314)	(0.0317)	(0.0330)	(0.0326)
Log assets			0.2950***	0.1037***	0.0878***	0.0878***	0.1255***	0.1215***	0.1111***	0.0708**
			(0.0308)	(0.0238)	(0.0296)	(0.0305)	(0.0341)	(0.0349)	(0.0345)	(0.0304)
Log cash flow					-0.0340	-0.0334				-0.0121
					(0.0256)	(0.0259)				(0.0240)
Log firm's age						0.0111		0.0469	0.0535	0.0176
						(0.0521)		(0.0523)	(0.0522)	(0.0528)
Log liquidity							-0.0280	-0.0289	-0.0293	
							(0.0209)	(0.0210)	(0.0207)	
Constant	-2.0851***	-1.0911**	-5.4463***	-2.3428***	-3.4868***	-3.5354***	-2.9844***	-3.1174***	-2.9179***	-2.8286***
	(0.5694)	(0.4655)	(0.8033)	(0.6340)	(0.8212)	(0.8284)	(0.8700)	(0.8890)	(0.8717)	(0.8166)
Observations	6,282	6,282	6,282	6,282	2,776	2,767	3,669	3,655	3,655	2,767
Number of firms	1,658	1,658	1,658	1,658	1,001	992	1,144	1,135	1,135	1,144
R-squared	0.2547	0.5223	0.3318	0.5305	0.5529	0.5521	0.5535	0.5531	0.5521	0.5487
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.23. Effect on the number of exporting products (standard errors clustered at sectoral level) – Medium productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0479	-0.0722	0.0075	-0.0456	0.0124	0.0141	-0.0491	-0.0445	-0.0564	-0.0040
	(0.0678)	(0.0517)	(0.0529)	(0.0462)	(0.0527)	(0.0538)	(0.0628)	(0.0632)	(0.0634)	(0.0557)
Post reform	0.2380***	0.0381	0.2654***	0.0750**	0.1362**	0.1607***	0.0394	0.0647	0.0432	0.1492***
	(0.0406)	(0.0339)	(0.0415)	(0.0364)	(0.0525)	(0.0578)	(0.0410)	(0.0483)	(0.0469)	(0.0573)
MW x post reform	0.0063	0.0326	-0.0035	0.0251	-0.0612	-0.0670	0.0798	0.0719	0.0594	-0.0847
	(0.0752)	(0.0565)	(0.0704)	(0.0554)	(0.0765)	(0.0768)	(0.0733)	(0.0734)	(0.0744)	(0.0778)
Log sales/employment	0.2293***	0.0079	0.1421***	-0.0012	0.0945	0.0930	0.0338	0.0276	-0.0013	0.0267
	(0.0599)	(0.0397)	(0.0536)	(0.0389)	(0.0633)	(0.0642)	(0.0476)	(0.0476)	(0.0482)	(0.0669)
Log assets/wages	-0.1602***	-0.0270	-0.2736***	-0.0920***	-0.1365***	-0.1434***	-0.0955**	-0.1023***		
	(0.0347)	(0.0296)	(0.0382)	(0.0322)	(0.0407)	(0.0415)	(0.0387)	(0.0389)		
Log number of destinations		0.6607***		0.5771***	0.5593***	0.5579***	0.5747***	0.5726***	0.5929***	0.5730***
		(0.0309)		(0.0332)	(0.0382)	(0.0384)	(0.0319)	(0.0327)	(0.0347)	(0.0384)
Log assets			0.3748***	0.1592***	0.1778***	0.1894***	0.1597***	0.1712***	0.1527***	0.1737***
			(0.0251)	(0.0216)	(0.0276)	(0.0287)	(0.0261)	(0.0264)	(0.0284)	(0.0283)
Log cash flow					-0.0172	-0.0214				-0.0012
					(0.0246)	(0.0244)				(0.0243)
Log firm's age						-0.0793		-0.0724*	-0.0624	-0.0716
						(0.0486)		(0.0428)	(0.0422)	(0.0481)
Log liquidity							0.0031	0.0062	0.0051	
							(0.0184)	(0.0186)	(0.0183)	
Constant	-2.8174***	-0.4350	-6.7728***	-2.4163***	-3.9315***	-3.7924***	-2.4932***	-2.3120**	-2.1259**	-3.2578***
	(0.9427)	(0.6122)	(0.9470)	(0.6802)	(0.9605)	(0.9793)	(0.8697)	(0.8930)	(0.8991)	(1.0118)
Observations	7,143	7,143	7,143	7,143	4,172	4,164	4,338	4,332	4,332	4,164
Number of firms	1,724	1,724	1,724	1,724	1,363	1,359	1,257	1,253	1,253	1,359
R-squared	0.2652	0.5271	0.3836	0.5442	0.5781	0.5795	0.5461	0.5477	0.5451	0.5763
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.24. Effect on the number of exporting products (standard errors clustered at sectoral level) – High productivity firms based on initial productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MW firms	-0.0230	-0.0403	-0.0092	-0.0321	-0.0258	-0.0198	-0.0548	-0.0469	-0.0753	-0.0553
	(0.0628)	(0.0458)	(0.0557)	(0.0460)	(0.0549)	(0.0549)	(0.0609)	(0.0630)	(0.0683)	(0.0566)
Post reform	0.2777***	0.0728**	0.2336***	0.0746***	0.0612	0.0404	0.0432	0.0216	0.0253	0.0482
	(0.0489)	(0.0280)	(0.0448)	(0.0286)	(0.0399)	(0.0407)	(0.0444)	(0.0440)	(0.0444)	(0.0417)
MW x post reform	0.0023	0.0126	0.0195	0.0194	0.0358	0.0283	0.0644	0.0564	0.0461	0.0136
	(0.0888)	(0.0592)	(0.0812)	(0.0585)	(0.0774)	(0.0779)	(0.0751)	(0.0781)	(0.0796)	(0.0778)
Log sales/employment	0.1682***	0.0726*	0.0407	0.0242	0.0140	0.0167	-0.0175	-0.0133	-0.0786	-0.0849*
	(0.0448)	(0.0408)	(0.0372)	(0.0412)	(0.0575)	(0.0576)	(0.0516)	(0.0519)	(0.0490)	(0.0497)
Log assets/wages	-0.2174***	-0.1475***	-0.2528***	-0.1713***	-0.2035***	-0.1977***	-0.1583***	-0.1527***		
	(0.0378)	(0.0276)	(0.0330)	(0.0277)	(0.0338)	(0.0343)	(0.0381)	(0.0383)		
Log number of destinations		0.6614***		0.5900***	0.5582***	0.5591***	0.6009***	0.6053***	0.6245***	0.5680***
		(0.0353)		(0.0356)	(0.0428)	(0.0429)	(0.0390)	(0.0400)	(0.0411)	(0.0433)
Log assets			0.3194***	0.1471***	0.1560***	0.1460***	0.1722***	0.1593***	0.1464***	0.1361***
			(0.0249)	(0.0172)	(0.0213)	(0.0214)	(0.0190)	(0.0189)	(0.0188)	(0.0218)
Log cash flow					0.0276	0.0283				0.0596**
					(0.0259)	(0.0254)				(0.0261)
Log firm's age						0.0674*		0.0757*	0.0924**	0.0881**
						(0.0374)		(0.0400)	(0.0397)	(0.0371)
Log liquidity							-0.0057	-0.0070	-0.0123	
							(0.0222)	(0.0219)	(0.0225)	
Constant	1.0825*	1.2104**	-1.8102**	-0.1361	0.3581	0.3364	-0.2794	-0.3274	0.2136	1.2383*
	(0.6062)	(0.5729)	(0.7476)	(0.6166)	(0.7757)	(0.7682)	(0.7158)	(0.7105)	(0.7242)	(0.7139)
Observations	7,364	7,364	7,364	7,364	4,876	4,866	4,270	4,257	4,257	4,866
Number of firms	1,754	1,754	1,754	1,754	1,469	1,463	1,265	1,260	1,260	1,463
R-squared	0.2366	0.4955	0.3370	0.5138	0.5034	0.5045	0.5026	0.5032	0.4958	0.4945
year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
product FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Chapter 5: Conclusion

5.1. Summary of Research Results

The main aim of the current thesis is to examine the impact of the minimum wage (MW) reforms introduced under the Second Economic Adjustment Programme on employment, labour force participation and exports. The MW in Greece was reduced in 2012 by 22 per cent, being of the agreement between the country and her creditors. The reduction of the MW was legislated together with the introduction of a youth minimum wage rate for employees below 25 years old almost 15 per cent lower than the national MW. The objective of these reforms was to restore the countries competitiveness by lowering labour cost, to facilitate the re-entry of the unemployed into the labour market and to tackle the extremely high youth unemployment rates. Later in the same year the marital allowance, a 10 per cent mandatory top-up on the MW, was abolished, aiming at further reducing labour costs and simplifying the MW framework. Using difference-in-difference models, we estimate the effect of these reforms on youth employment and labour force participation and on the differential impact of the reforms on married and single individuals. Finally, the effects of the reform on export firms are examined, with the goal of evaluating if the MW reduction made firms more competitive.

As presented in Chapter 1, the changes in the MW framework were part of an extensive labour market's reform package. The package attempted to remove and prevent rigidities in the labour market in order to restore the country's competitiveness and include significant changes mainly at collective bargaining, employment protection legislation and the MW framework, with most reforms being implemented from 2010 to 2012. The country's creditors have continuously noted that the most successful reforms implemented under the Economic Adjustment Programmes were those that took place in the labour markets the years 2010 to 2014.

The effects of the introduction of the subminimum wage for the youth are examined in Chapter 2. Focusing on individuals between 22 and 27 years of age and relying on administrative data from the Greek LFS for the period 2008Q1 to 2016Q1, we use difference-in-difference regressions in order to evaluate the impact of the new MW rate. Although we do not find any

evidence justifying the labour-labour hypothesis, we find that older individuals (relative to younger individuals subject to the MW reduction) have a higher probability of participating in the labour market. The reform is not found to have any significant differential impact on employment terminations (neither dismissals or quits). The results are robust to using different age bands around the age threshold.

To analyze the effect of the abolition of the marital allowance, we use single individuals as the control group and proceed with difference-in-difference regressions. Even though initially we do not find any differential change in the probability of employment for individuals depending on their marital status, when we exclude from our sample older individuals and individuals with second stage tertiary education (for whom the MW may not be of relevance), we discover that married individuals are more likely to be employed (relative to single individuals). Additionally, married individuals are more likely to participate in the labour force after the reform, compared to the single. By focusing our analysis on different groups separately, we find that the labour force participation results are mainly allocated to the increased participation of female individuals after the reform, mainly attributed to the added worker effect.

Taking into account that one of the three main reasons for the MW reform was to restore the country's competitiveness, we evaluate the impact of the reform on exporting firms. We utilize a rich dataset which provides us detailed information on firms' export activity and their financial constraints, as well as their employment habits (wages paid and the number of employees). The first finding of interest is the considerably average low percentage of MW employees (less than 1 per cent), a percentage that although increases the years of the crisis, it continues to be remarkably low. The low percentage of MW workers is increased slightly when examining low or medium productivity firms. To estimate the effect of the reform on the value of exports and on the number of exporting products, we introduce a difference-in-difference model where the control group is firms without MW workers. The reform does not have a differential impact on the firms with MW workers (relative to the control group), but we do find an overall positive effect of the reform. The results indicate that the MW reform, combined with the previous changes in the collective bargaining framework, had a positive impact on all exporting firms and not only on those with MW workers (that were directly affected by the decrease), a result that remains when examining high productivity firms, but is not reported for low or medium

productivity firms. The results are sensitive to our specifications and the effect disappears when substituting labour productivity with physical productivity.

5.2. Policy Implications

The current thesis focuses on the impact the implemented MW reforms had on different policy aspects. The introduction of the youth minimum wage was not accompanied by a higher probability of employment for the treated group. The abolition of the marital allowance seems to have helped the employability of married individuals. Finally, the MW reform appears to have ambiguous results for exporting firms.

Greece suffered during the crisis a significant reduction of GDP (a cumulative reduction of 25 per cent the period 2010-2014), accompanied with skyrocketing unemployment rates (reaching almost 28 per cent in 2013, with youth unemployment being close to 60 per cent). Long-term unemployment increased dramatically, and jobless households reached 19.4 per cent in the first quarter of 2014.

Structural competitiveness has deteriorated during the crisis. This is due to the huge destruction of production capacity, a fall in investments and a reduction in productivity. Gross fixed capital formation decreased by 56 per cent from 2010 to 2015 (-67 per cent between 2008 and 2015). Since the second semester of 2011, the Greek economy has also entered a period of de-investment (INE-GSEE 2016), which has undermined technological and organizational change that increases productivity and product/service quality, thereby non-price competitiveness. Therefore, the relatively high level of labour costs could be only one of the reasons, and probably not the quintessential reason, for Greece's high current account deficit and low competitiveness.

In addition, lower labour costs were not coupled with a substantial decrease in prices, since the latter were mainly determined by other factors (cost of credit, energy cost, taxation, etc) indicating the futility of focusing exclusively on wage adjustments. At the same time, the repercussions of the adjustment of wages in terms of economic recession, internal demand and unemployment clearly outweighed any minor gains in competitiveness.

Reaching the end of the Economic Adjustment Programmes for Greece, we should consider whether implemented reforms had the anticipated results. Enforced policies mayhave been helpful if the country was in a growth-path, but different outcomes are to be expected with a country experiencing such an unprecedented crisis.

5.3. Future Research

Although widely and thoroughly investigated, MW and its implications on key economic indicators continue to baffle economists. The literature so far has produced a mixture of ambiguous results. This is reflected in the present thesis as well: depending on the groups examined and the specifications introduced, the effects of the reform vary.

As the MW seems to be sensitive in other policies implemented, we should proceed with analyzing the impact of the MW reforms combined with changes in the labour law in general (the employment protection regulations and the collective bargaining framework). If a strong collective bargaining framework exists, MW level may be almost obsolete. Similarly, the ease with which an employer can make changes in his personnel depends on the existing level of employment protection legislation. Future research should try to examine if including in our examination the rest of the labour market reforms introduced under the Economic Adjustment Programmes, the results change.

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