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Marital Instability,
and Births Outside Marriage:**

Empirical Evidence from the Late Nineteenth-
and Early Twentieth-Century Greece

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Ph.D Candidate
Tryfonas Lemontzoglou

Supervisor
Prof. John Milios

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Three Essays on Literacy Development, Marital Instability, and Births Outside Marriage:

Empirical Evidence from the Late Nineteenth-
and Early Twentieth-Century Greece.

by
Tryfonas Lemontzoglou

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Summary

According to Marx, social changes are not always characterized only by new material productive forces, but also by new relations of production, as well as new forms of consciousness, religion, philosophy, ethics, etc. In that context, the society's transitional passage from agrarian to modern industrial modes of production brought into the political arena new social classes and antagonisms, completely changing all pre-existing relationships, norms and values in almost every aspect of social life. On the one hand, the newly-rising capitalist class invariably demanded the implementation of radical agrarian reforms as a prerequisite for transforming traditional agriculture into a modern farming system that would be better able to adjust to new market economy's circumstances. On the other hand, industrial revolution significantly redefined the traditional view of gender roles within the household, allowing women to enter the paid labour market, diminishing sex-stereotyping, and reinforcing women's autonomy and independence. Similarly, the spread of a new bourgeois ideology made traditional marriage an even less attractive option among spouses, thus enhancing more egalitarian family forms, such as cohabitation.

Within this framework, empirical studies referring to the case of early modern Greece are still less well established. My doctoral thesis attempts to fill this gap in the empirical literature by providing some of the first evidence linking industrialization to modernization process in the late nineteenth and early twentieth-centuries Greece. For this purpose, a totally new dataset has been constructed using available information from the Population, Agricultural, Natural Movement of Population, and Causes of Death Censuses of Greece over the period 1860-1938. This dataset contains various socioeconomic and demographic indicators, such as land ownership distribution, educational level, gender division of labour, marital status, births, deaths, stuck in agriculture, modernization, urbanization, ethnic differences and religious affiliation, covering almost all Greek areas at the provincial, regional and municipal levels.

More specifically, the **First Chapter** of my thesis, entitled "**People's Access to Land, Stuck in Agriculture and Literacy Development: Empirical Evidence from the Late Nineteenth-Century Greece**", explores the possible relationships between more equal patterns of land ownership and literacy development in the late nineteenth-century Greece, providing some evidence in favour of the so-called capital-skill complementarity hypothesis. After analyzing municipal-level data from the 1870 and 1879 Greek Population Censuses, my empirical results indicate a positive and significant association between people's access to land and literacy levels in the late nineteenth-century Greece. On the contrary, the supremacy of traditional agriculture over modern industry (stuck in agriculture) has been found to negatively affect literacy rates. These results remain robust even after controlling for various other factors, such as marital status, family size, urbanization, ethnic differences, religion, teacher availability and student attainment. However, some noticeable differences in literacy levels have been observed between males and females.

The **Second Chapter**, entitled "**Women's Labour Force Participation and Increasing Divorce Rates: Evidence from the Early-Twentieth-Century Greece**", analyses the impact of female employment on marital instability in the early twentieth-century Greece, using information obtained from the 1907 and 1920 Greek Population Censuses. My findings suggest that women's total employment and female participation in modern occupations (manufacturing, self-employment, trade-commerce, and the public sector) have been shown to have a positive and statistically significant effect on female divorce rates, but only in 1907, while women's employment in traditional agricultural activities (agriculture, livestock production, and fishing-hunting) was found to have no significant influence on female divorces for the whole period from 1907 to 1920. Additionally, early-age marriage for women and gender gap in literacy have been found to negatively affect female divorce rates, whereas availability of single men and urbanization have had positive but non-significant effects on female divorces. Moreover, ethnic and religious differences (non-Greeks, Catholics, and Muslims) were all found to have positive and significant impacts on marriage dissolutions.

Finally, the **Third Chapter** of my thesis, entitled "**Births Outside Marriage and Modernization in the Early Twentieth-Century Greece: Evidence from the Natural Movement of Population, Causes of Death, and Agricultural Censuses, 1921-1938**", gives some insights into the factors that have contributed to the increased rates of births outside marriage in the early twentieth-century Greece. Using

data from the Natural Movement of Population, Causes of Death, and Agricultural Censuses of Greece during the period 1921-1938, my results imply that women's access to divorce and remarriage, as well as agricultural modernity, were both positively associated with childbearing outside marriage in the early twentieth-century Greece. On the contrary, early-age marriage for women and married men's stuck in agriculture have been found to adversely affect non-marital births. Lastly, urban Greek areas and the Greek Islands appeared to be positively associated with illegitimate births.

* * *

Secondo Marx, i cambiamenti sociali sono sempre stati caratterizzati non solo da nuove forze produttive materiali ma anche da nuove relazioni di produzione e da nuove forme di coscienza, religione, filosofia, etica. La transizione da una società basata su un modo di produzione prettamente agricolo ad una società in cui il modo di produzione prevalente è quello industriale, produce l'entrata nell'arena politica di nuove classi sociali e quindi di nuovi antagonismi. Questo evolversi della società e dell'economia contribuisce al cambiamento delle relazioni, delle norme e dei valori sociali preesistenti così da coinvolgere gran parte degli aspetti della vita sociale. Durante la transizione, la neonata classe capitalistica, da un lato, richiedeva l'attuazione di una radicale riforma agraria come prerequisito al processo che avrebbe consentito la trasformazione dell'agricoltura tradizionale in un moderno sistema agricolo. Di conseguenza, la riforma agraria avrebbe consentito la sopravvivenza del sistema agricolo in un sistema di economia di mercato. La rivoluzione industriale, d'altra parte, ridefiniva sensibilmente la visione tradizionale sui ruoli di genere all'interno della famiglia. Tale processo contribuì all'aumento della partecipazione delle donne al mondo del lavoro non domestico e diminuì gli stereotipi sessuali, rafforzando l'autonomia e l'indipendenza femminile. In modo analogo, la diffusione della nuova ideologia borghese fece sì che il matrimonio tradizionale costituisse l'opzione meno attrattiva tra le giovani donne. Di conseguenza, si svilupparono forme famigliari più egalitarie, come la convivenza.

L'interazione fra la transizione da una società contadina ad una società industriale moderna, da una parte, e l'evoluzione e la trasformazione delle relazioni sociali estranee alla sfera economica nella Grecia contemporanea, è stata scarsamente studiata da un punto di vista storico-quantitativo. Alla luce di ciò, la mia tesi di dottorato è un tentativo di riempire questo vuoto nella letteratura empirica mettendo in relazione il processo di industrializzazione con il processo di modernizzazione che attraversò la società greca a cavallo tra la fine del diciannovesimo secolo e l'inizio del ventesimo secolo. A tal fine, è stato necessario costruire un nuovo dataset sulla base dei dati forniti dal Censimento su Popolazione, Movimento Naturale e Agricolo della Popolazione, e Cause di Morte in Grecia nel periodo 1860-1938. Il dataset, che comprende vari indicatori socioeconomici e demografici come distribuzione della proprietà fondiaria, livelli d'istruzione, divisione del lavoro per genere, stato civile, nascite, morti, indici di modernizzazione e di urbanizzazione, diversità etniche e affiliazioni religiose, permette una copertura quasi totale del Paese a livello regionale, provinciale e municipale.

Il Primo Capitolo della tesi, dal titolo "**People's Access to Land, Stuck in Agriculture and Literacy Development: Empirical Evidence from the Late Nineteenth-**

Century Greece", esplora il rapporto tra alfabetizzazione e proprietà fondiaria, la cui composizione diventava sempre meno diseguale, nella Grecia del tardo diciannovesimo secolo. L'analisi a livello municipale del Censimento sulla Popolazione in Grecia tra il 1870 e il 1879 supporta e evidenzia empiricamente l'ipotesi c.d. della complementarità tra capitale e talenti (*capital-skill complementarity hypothesis*). L'analisi empirica dimostra, da un lato, una relazione positiva e statisticamente significativa tra l'accesso alla terra e livelli di alfabetizzazione, mentre, dall'altro, evidenzia una relazione negativa tra preminenza dell'agricoltura tradizionale sull'industria moderna (*stuck in agriculture*) e livelli di alfabetizzazione. I risultati sono statisticamente robusti anche considerando altre variabili come lo stato civile, la dimensione familiare, l'urbanizzazione, le diversità etniche, le confessioni, la disponibilità di insegnanti e i livelli di studio. Inoltre, i dati confermano il ruolo della la disparità di genere nei livelli di alfabetizzazione.

Il **Secondo Capitolo**, intitolato "**Women's Labour Force Participation and Increasing Divorce Rates: Evidence from the Early-Twentieth-Century Greece**", analizza l'impatto dell'occupazione femminile sull'instabilità coniugale, attraverso i dati forniti dal Censimento sulla Popolazione in Grecia nel periodo 1907-1920. I risultati sono eterogenei. Per esempio, nel 1907, si osserva che entrambe l'occupazione femminile totale e la partecipazione femminile tra gli impieghi moderni (settore manifatturiero, lavoro autonomo, commercio e impiego pubblico) hanno un effetto positivo e statisticamente significativo sui tassi di divorzio femminile. Tra il 1907 e il 1920, invece, la partecipazione femminile tra le occupazioni nelle attività agricole (agricoltura, allevamento, caccia e pesca) non ha alcun effetto significativo sui tassi di divorzio femminile. Inoltre, si rivela una relazione negativa tra matrimoni precoci per le donne e disparità di genere nei tassi di alfabetizzazione, da una parte, e divorzi femminili, dall'altra. Mentre, la disponibilità di uomini single e l'indice di urbanizzazione hanno un effetto positivo ma non statisticamente significativo sui divorzi. Le diversità etniche e religiose (non-greci, cattolici e musulmani) infine, hanno un impatto positivo e statisticamente significativo sullo scioglimento dei matrimoni.

Infine, il **Terzo Capitolo**, dal titolo "**Births Outside Marriage and Modernization in the Early Twentieth-Century Greece: Evidence from the Natural Movement of Population, Causes of Death, and Agricultural Censuses, 1921-1938**" aiuta a gettare luce sui fattori che hanno contribuito all'incremento dei tassi di nascite fuori dal matrimonio nella Grecia di inizio ventesimo secolo. L'analisi dei dati forniti dal Censimento su Popolazione, Movimento Naturale e Agricolo della Popolazione, e Cause di Morte in Grecia nel periodo che va dal 1921 al 1938, dimostra che sia l'accesso delle donne all'istituto del divorzio sia la possibilità di sposarsi in secondo nozze, nonché l'adozione di tecniche agricole più moderne, sono positivamente associati alle nascite fuori dal matrimonio. I matrimoni precoci e l'occupazione agricola degli uomini sposati, invece, hanno un impatto negativo sulle nascite fuori dal matrimonio. Infine, su scala geografica, si osserva che le nascite illegittime sono perlopiù osservate nelle aree urbane e alle isole greche.

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Chapter 1

People's Access to Land, Stuck in Agriculture and Literacy Development:

Empirical Evidence from the Late Nineteenth-Century Greece

Tryfonas Lemontzoglou

University of Siena

Department of Economics and Statistics

trifonaslemon@gmail.com

E-mail:

Abstract

Many economic and agrarian historians have argued that more equal patterns of landownership, as well as the overall supremacy of modern industry over traditional agriculture, have been both found to be strictly correlated with the rise of mass public education systems in the late eighteenth and early nineteenth centuries. The theoretical background behind this argument mainly relies on the so-called capital-skill complementarity hypothesis, which states that land and industrial capital were characterized by different levels of complementarity with human skills. Consequently, large landowning elites were often reluctant to promote and support mass public education, while, on the other hand, early capitalists were much more favored by a better-educated workforce, thus promoting major educational reforms. In this context, the present paper constitutes a first empirical attempt to explore possible linkages between people's access to land and literacy development in the late nineteenth-century Greece, using available data from the 1870 and 1879 Greek Population Censuses. In fact, my empirical estimates largely confirm previous findings in the literature, indicating a positive and significant relationship between access to land and literacy rates in the late nineteenth-century Greece. On the contrary, stuck in agriculture has been found to be negatively related to literacy expansion. These results remain robust even after controlling for various other factors, such as marital status, family size, urbanization, ethnic differences, religious affiliation, teacher availability and student attainment.

JEL Codes: I24, N93, N33, O15.

Key Words: capital-skill complementarity, industrialization, land inequality, literacy development, mass public education.

1.1 Introduction

For many decades, economist’s attention has been strongly attracted to the so-called geography hypothesis, suggesting that different climatic and geographical conditions are the main factors behind the low and uneven development across countries and regions (Bloom and Sachs 1998 ; Diamond 1997 ; Machiavelli 1519 ; Montesquieu 1748 ; Myrdal 1968 ; Sachs 2001). However, such an approach did not always fully or effectively explain why some initially resource-rich areas have suffered from low growth rates, while others, much poorer in natural resource endowments, have enjoyed higher levels of economic development and prosperity (Acemoglu et al. 2001). In fact, a modern approach for better understanding regional disparities has emerged, highlighting the important role of different quality institutions (“good” and “bad” policies) in generating highly divergent growth paths within and between economies (Acemoglu et al. 2005 ; Engerman and Sokoloff 1997 ; Hall and Jones 1999 ; North 2005). Thus, following the institutional line of thought, a significant number of studies have provided evidence for the existence of a strong negative relationship between rising inequality and economic growth (Aghion et al. 1999 ; Alesina and Perotti 1996 ; Barro 2000 ; Kuznets 1955 ; Stiglitz 1969). In addition, several other studies have reported significant negative associations between land asset inequality and economic development (Alesina and Rodrik 1994 ; Deininger and Olinto 2000 ; Easterly 2007 ; Frankema 2010 ; Keefer and Knack 2002 ; Lipton 1974). Even more interestingly, some recent scholars have further expanded the existing literature, emphasizing the negative effects of landownership concentration on human capital development (Cinnirella and Hornung 2016 ; Goni 2013 ; Ramcharan 2010 ; Tapia and Martinez-Galarraga 2015 ; Vollrath 2013). Within this framework, the society’s transitional passage from agrarian to modern industrial modes of production can provide the best chance to examine the so-called capital-skill complementarity hypothesis (Galor and Moav 2006 ; Galor, Moav, and Vollrath 2009). According to Galor, Moav, and Vollrath’s approach, during that era, the powerful landowning elites were used to largely exploit poor and landless peasants, through the expansion of the traditional

sharecropping relations of production. Thus, from the landlord's point of view, greater poor people's access to mass public education would result in an even greater social mobility from villages to cities, increasing wage demands, and lowering land exploitation rates. On the contrary, early capitalists had great incentives to promote and support mass public schooling, being mainly favoured by the high level of complementarity between productivity of physical capital in manufacturing activities and human skills (Galor 2011 ; Galor and Moav 2006).

However, the case of late nineteenth-century Greece remains empirically less-well studied in the literature, providing a unique opportunity to re-test Galor, Moav, and Vollrath's hypothesis in a very different institutional domain. In general, medieval and early modern Greece had never completely experienced the Western-type of feudalism (Mouzelis 1990, 1983 ; Ricks and Magdalino 1998). Even the Byzantine or the Ottoman land-grant institutions were both limited to a specific period of time, revocable, and not transferable (Imber 2002 ; Papademetriou 2015 ; Papastathes 1998). Moreover, contrary to most Western European societies, the vast majority of landholdings throughout Greek territories remained strictly state-controlled, at least until the late sixteenth century (Laiou 2002 ; Bartusis 2012 ; Tucker 2010). Unfortunately, it was only late in the seventeenth century when the decline of the Ottoman's power allowed the transformation of land-grant institutions into a system of private ownership in land, the so-called "chifliks" ¹ (Mouzelis 1978).

Nevertheless, during the years following the Greek War of Independence (1821-1830) ², the "agrarian question" became an issue of major importance among Greeks. Immediately after the Revolution, the First National Assembly of Epidaurus (1822) ³ declared that all former

¹chifliks: hereditary privately owned estates.

²The Greek War of Independence, also known as the Greek Revolution, was a successful war of independence waged by Greek revolutionaries against the Ottoman Empire between 1821 and 1830.

³The First National Assembly of Epidaurus (December 1821 – January 1822), proclaimed Independence and adopted the first provisional constitution of Greece.

Muslim lands had to be radically transformed into “national lands” (ethikes gaies) ⁴ under the direct control of the newly founded Greek state, with a view to be redistributed among landless and poor Greek peasants (Davis and Pereira 2003 ; Milios 2018 ; Mouzelis 1978 ; Petropoulos 1985). In this sense, major redistributive land reform attempts took place in Greece in the period from 1828 to 1871, such as the Kapodistrias’s land reform ⁵, the King Otto’s reform (Law for the Donation of Greek Families, 1835) ⁶, and the first large-scale redistribution of national lands (1871) ⁷. However, these redistributive attempts did not affect the whole country equally. More specifically, the Southern Greek areas (Peloponnese) were found to be associated with the mass expropriation of all former Muslim lands that later became national property and redistributed among landless Greek peasants (Aroni-Tsichli 2002). On the other hand, the Treaty of Constantinople (1832) ⁸ granted to Muslim individuals located in Central Greece (Sterea Ellada and Euboea) some exceptional rights to dispose of their land through sale (Bantekas 2015 ; Katsikas et al. 2012). As a result, these lands were finally sold to wealthy Greek individuals (the Phanariotes) ⁹, who actually became a new class of landowners in Central Greek areas (Petmezas 2003). Therefore, a highly diversified structure of landownership emerged in the late nineteenth-century Greece, with small-scale family farming has been found to be prevailed in almost all Southern Greek areas, while large landed estates and semi-feudal relations of production remained dominant in Central Greece (Evangelinides 1980 ; Mouzelis 1990). At the same time, the country’s modernization process has been also accompanied by important educational changes, such

⁴According to a decree of the First Greek National Assembly of Epidaurus (1822), all lands and other property till then belonging to the Turkish government and individuals, was confiscated, and became Greek national property.

⁵Kapodistrias had made land reform one of his major priorities, having drawn up an extensive land distribution plan that he was not able to put into practice.

⁶The “Law for the Dotation of Greek Families” of 1835 extended 2,000 drachmas credit to every family, to be used to buy a 12-acre (49,000 m²) farm at auction under a low-cost loan plan.

⁷In 1871, the government of Koumoundouros recommended land reform for distribution of land and the change of ownership in Greece.

⁸The Treaty of Constantinople (1832) was the product of the Constantinople Conference which opened in February 1832 with the participation of the Great Powers (Britain, France and Russia) on the one hand and the Ottoman Empire on the other.

⁹The Phanariotes were members of rich families belonging to the Greek aristocracy in Istanbul.

as the introduction of free elementary education for all Greeks (1822) ¹⁰, the Primary and Communal Education Law (1833) ¹¹, and the foundation of the Pedagogical Institute of Athens (1834), leading to a significant increase in the numbers of schools and students in Greece during the second half of the nineteenth century.

This present paper represents a first empirical attempt to provide some evidence for the existence of a positive and significant relationship between people's access to land and literacy development in the late nineteenth-century Greece. For this purpose, a totally new dataset has been constructed based on information obtained from the 1870 and 1879 Greek Population Censuses ¹². This dataset includes various socioeconomic and demographic indicators, such as literacy levels, student attainment, teacher availability, access to land, family size, stuck in agriculture, marital status, urbanization, sex ratio, ethnic differences, and religious affiliation, covering 350 Greek municipalities for the years 1870 and 1879. In fact, my empirical results seem consistent with earlier literature's findings, indicating a positive and significant relationship between people's access to land and literacy development. On the contrary, the supremacy of agriculture over industry (stuck in agriculture) appeared to have a negative and significant impact on literacy levels. These results remain robust even after controlling for all other factors. However, the effect of people's access to land on literacy development has been found to be decreased from 1870 to 1879, even though it remained positive and significant for both sexes. Lastly, some noticeable gender differences in coefficient magnitudes of both access to land and stuck in agriculture have been observed, indicating the existence of gender inequality in the late nineteenth-century Greece.

¹⁰In 1822, the First Greek National Assembly advocated for free elementary education for all.

¹¹In 1833, the King Ottot enacted the Primary and Communal Education Law.

¹²source: Hellenic Statistical Authority.

The rest of the paper is organized as follows. **Section 1.2** discusses the related literature and provides the theoretical background. **Section 1.3** offers an introduction and outline of landownership patterns in medieval and early modern Greece. **Section 1.4** describes the data and presents some descriptive statistics. **Section 1.5** analyzes methods and models. **Section 1.6** reports the empirical results. Conclusions are presented in **Section 1.7**.

* * *

1.2 Literature Review

1.2.1 Land Inequality, Growth, and Mass Public Education

Contrary to the traditional approach to the theory of economic growth (geography hypothesis), many scholars have reported low-quality institutions as the main factor behind the growing disparities between countries and regions (Acemoglu and Robinson 2008 ; Acemoglu et al. 2005, 2013 ; Landes 1999 ; North 1981). Along this line of thought, a significant number of studies have provided evidence that land inequality negatively affects economic growth (Alesina and Rodrik 1994 ; Fort and Ruben 2006 ; Frankema 2010 ; Keefer and Knack 2002 ; Lipton 1974). In that same vein, Engerman and Sokoloff's distributional approach to institutions has further expanded the existing literature, arguing that unequal distribution of landholdings in Latin America has had a direct negative effect on the public provision of education (Engerman and Sokoloff 1997, 2005). Similarly, other studies on the late nineteenth and early twentieth-century United States have also found negative associations between land inequality and the rise of mass public education (Easterly 2007 ; Go and Lindert 2010 ; Ramcharan 2010 ; Vollrath 2013). In addition, Cinnirella and Hornung (2016) have shown that extreme landownership concentration in the nineteenth-century Prussia was negatively related to school enrollment rates, while Tapia and Martinez-Galarraga (2015) have identified a significant negative relationship between the fraction of farm labourers and literacy levels in the mid-nineteenth-century Spain. Furthermore, Goni (2013) and Lindert (2004) have indicated that high levels of land ownership concentration in the nineteenth-century England and Wales appeared to be positively related to underfunded public education, whereas Chaudhary (2009) has demonstrated that uneven distribution of lands in nineteenth-century British India had negative impacts on the provision of public education.

1.2.2 Theoretical Background: Capital-Skill Complementarity Hypothesis

In a much more detailed analysis, Galor, Moav and Vollrath (GMV) have provided further evidence supporting a negative linkage between uneven distribution of landownership and the spread of mass public education (Galor, Moav and Vollrath 2009). Following the GMV's analysis, the society's transitional passage from agrarian to modern industrial modes of production expanded and deepened the class conflict between owners of capital and land; two factors of production that were characterized by different complementarities with human skills (Galor and Moav 2006). On the one hand, rising capitalists had increased incentives to support and promote mass public education, mainly because the productivity of physical capital in manufacturing activities was increased by increasing inputs of human skills (Galor, Moav, and Vollrath 2009). On the other hand, landowning elites did not benefit so much from the massive expansion of the public school system because of the low level of complementarity between agricultural labour and human capital development (Acemoglu and Robinson 2000 ; Galor et al. 2004). Consequently, early capitalists used to strive for a better-educated labor force implementing a series of important educational reforms, while large landowners were much more interested in restraining the social mobility of the rural labor force by limiting outside options (Bourguignon and Verdier 2000 ; Galor 2011 ; Go and Lindert 2010 ; Vollrath 2013). The important role that industrialization played in the emergence of mass public education has been also pointed out by Berman, Bound and Machin (1998), Deininger (2003), Federman and Levine (2005), Goldin and Katz (1998), Hippe and Baten (2012), Jacod (1997), and Ruly (2002). Moreover, Bowles and Gintis (2002), Brockliss and Sheldon (2012), Green (2013) and Lindert (2004, 2000), have claimed that behind the rise of the modern educational systems was the capitalist class need to better control working-class children (social control hypothesis). Finally, the role of the public schools as agents of social reproduction (hidden curriculum theory) has been also examined by Apple (2001), Drebeben (1967), Gaffield (1986), Jackson (1968), Parsons (1959) and Willis (1976).

1.3 The Greek Case

1.3.1 From the Ottoman “chifliks” to the first large-scale redistribution of lands

Among medieval historians it is commonly known that as a whole, the economic, social, and political structure of medieval and early modern Greece has differed widely from the Western European feudalism of the same period (Geanakoplos 1984 ; Mouzelis 1983, 1990 ; Ricks and Magdalino 1998 ; Milios 1999). For instance, both the Byzantine and the Ottoman land tenure systems, were strictly characterized by the existence of large state-owned landholdings, while some small independent peasants’ communities were still visible throughout Greek territories until the late eleventh century (Bartusis 2012 ; Hathaway 2008 ; Islamoglu-Inan 1987 ; Kaser 2011 ; Laiou 2002). Additionally, even the Byzantine and the Ottoman land-grant institutions (“pronoias” and “timars”)¹³, were both lifetime, evocable and not transferable or hereditary (Imber 2002 ; Papademetriou 2015 ; Papastathes 1998). By the late tenth and early eleventh centuries, however, some of the free small peasants within Greek areas began to sell their lands to powerful people, giving up their independence and thus becoming serfs on large landed estates (Kaser 2011 ; Setton 1976). This trend went forward till the late sixteenth century, when the decline of the power of Ottoman Empire led to the transformation of the “timar” and “miri” lands ¹⁴ to a system of latifundia, the so-called zıyıciftlics ¹⁵ (Mouzelis 1978). Contrary to previous landownership institutions, these large inheritable “chiftlik” properties could be leased or transferred to private stewards and effective owners, who steadily became a new class of landlords known as the “chiftlik-sahibi”

¹³Pronoia system was a system of granting dedicated streams of state income to individuals and institutions in the late Eastern Roman Empire. Similarly, the timar system was the basic military institution in the classical period of the Ottoman Empire.

¹⁴Miri lands (the land of the prince or the governor) were lands that had been held in the name of the Ottoman sultan.

¹⁵Chiftlik was a system of private property in land in the Ottoman Empire.

¹⁶ (Karakasidou 2009 ; McGonan 1981).

Indeed, the early nineteenth century found the vast majority of the Greek population to work as agricultural workers, while most of the Greek peasant families were still landless (Koliopoulos and Veremis 2010). Nevertheless, after the Greek War of Independence (1821-1832) a total of over 10.000.000 square metres of land ¹⁷, which before belonged to the Ottoman State, Muslim individuals and charitable institutions, became an issue of major importance on the part of the Greeks (Mouzelis 1976). As the First National Assembly of Epidaurus declared (1822), all ex-Turkish lands had to be radically transported into state lands under the direct control of the Greek state (Strong 1842). Thus, in the years following the Greek Independence, Ioannis Kapodistrias, the first governor of the Greek state (1828-1831), as well as the Bavarian King Otto (1832-1862), have both tried to impose a framework of necessary reforms in order to promote land redistribution and ensure the protection of small landowner's rights. In that sense, a law was passed in 1830 granting a plot of 1 stremma (1,000 square metres) to all Greeks so they could build a house with a garden and yard (Tzinieri 2015). In the same direction, King Otto's land reform (the so-called Donation law of 1853) has also helped thousands of small and poor Greek farmers by extending low-cost loans (Aroni-Tsichli 2002). According to this law, all family heads (also included war widows) were entitled to buy land in public auction by using a promissory note of 2,000 drachma nominal value granted to them by the government, payable in 36 annuities, each equal to 6% (Franghiadis 1990). Furthermore, no one could obtain more than four hectares of national land (Gallant 2015). In practice, however, these reforms were often blocked by the powerful landowning elites or they met with silent indifference from the part of Greek peasants (Frary 2015). It is worth mentioning that no more than 35,000 hectares of planted and cultivated lands had been effectively distributed until 1871 (Franghiadis 1990). However, a series of important socio-economic and political transformations took place in the

¹⁶Ciftlik-sahibi (farm owner).

¹⁷National estates (ethnikes gaies).

early nineteenth-century Greece, such as the Revolution of the 3rd September (1843)¹⁸, the establishment of Greece's first constitution (1844), the Revolution of 1862¹⁹, and the dethronement of King Otto at the same year, leading to the first large-scale redistribution of national lands in 1871. Contrary to all previous attempts, the main emphasis of 1871 Law was to provide land to landless and to allow those who owned only a small amount of land to expand their holdings (Gallant 2015). Learning from the mistakes of the earlier scheme, the land parcels were not purchased through auctions, in which the prices could rise outside of the range that peasants could pay, but instead government assessors set the prices (Franghiadis 1990 ; Gallant 2015). The outcomes of this reform can be summarized as follows: 265,000 hectares of the former Turkish land were distributed into 357,217 individual plots, which given the fact that the population of the countryside was no more than 254,000 families in 1879, suggests that almost all Greek farmers became owners of land (Franghiadis 1993 ; Gritsopoulos 1955 ; Hadjimichalis 1986 ; Mouzelis 1976 ; Petmezas 1991).

1.3.2 Mass Public Education Expansion

Besides changes in the country's production profile through the reinforcement of small-scale family farming, the Greek Revolution (1821-1830) has also brought significant changes to Greece's educational system. Before the Greek Independence, local elementary schools in Greece were operated, organized, and controlled by the Greek Orthodox Church, under a self-ruling institution that had been granted by the Sultan, the so-called "millet"²⁰ (Braude 1982 ; Hatzopoulos 1991 ; Mackridge 2009 ; Zervas 2017). Although after the Revolution of 1821, the newly founded Greek state had already proclaimed free elementary education for

¹⁸The 3 September 1843 Revolution was an uprising by the Hellenic Army in Athens, supported by large sections of the people, against the autocratic rule of King Otto.

¹⁹The 23 October 1862 Revolution was a popular insurrection which led to the overthrow of King Otto of Greece.

²⁰Millet was a state-organized administrative system referred to non-Muslim minorities in the Ottoman Empire.

all Greek citizens (First National Assembly of Epidaurus, 1822), however, there were essentially no modern schools in Greece since the end of the 1830s (Antoniou 2002 ; Zervas 2016). It was only after the King Otto's educational reform (1834-1836), the so-called Bavarian Plan, when Greece's education system was fairly re-established, leading to a massive expansion in the numbers of schools and students enrolled in primary and secondary education (Antoniou 2002 ; Bouzakis 2009). By 1834, the Primary and Communal Education Law came into force in Greece, establishing compulsory public education for all children from five to twelve years of age (Bouzakis 2005). Additionally, the Pedagogical Institute of Athens was founded in the same year, with the mission of preparing new teachers for entering elementary schools throughout the country (Bouzakis 2011 ; Zervas 2017). As a result, public elementary schools in Greece grew even more in number and enrollments during the second half of the nineteenth century, with more than a quarter of all peasant children, and almost half of all boys to finally attend school (Tsoukalas 1977).

1.4 Data Analysis and Descriptive Statistics

In order to provide some of the first evidence for the existence of a positive and significant relationship between people's access to land and literacy development in the late nineteenth-century Greece, a totally new dataset has been constructed based on information obtained from the 1870²¹ and 1879²² Greek Population Censuses. This specific time period has been chosen for the following reasons: (1) data on literacy levels are not available in the Greek Censuses prior to 1870; (2) the first large-scale redistribution of lands in modern Greece has taken place within the above period (1871); (3) specific data referred to class relations in agricultural production are not available after the 1879 Census; and (4) the period 1870-1879 remained unaffected by major social, political, and economic changes occurred in Greece, such as the annexation of the new provinces (1881, 1913, 1920 and 1923)²³, the collapse of the Greek currant economy (1890), the Trikoupis's financial default (1893)²⁴, the Greco-Ottoman War (1897)²⁵, the Goudi Coup (1909)²⁶, and the arrival of the Asia Minor Greek refugees (1922)²⁷. In fact, my newly dataset contains various socioeconomic and demographic indicators, such as literacy development, student attainment, access to land, stuck in agriculture, marriage patterns, family size, sex ratio, urbanization, ethnic

²¹Digitalized from the Greek Parliament Library, as the publication has not been located in the ELSTAT Library.

²²The source is the University of Crete Digital Library ("Anemi" webpage).

²³1881: Thessaly and the Arta. 1913: Crete, the Northern Aegean Islands, most of Epirus and Macedonia. 1920: Western Thrace.

²⁴The global economic crisis in the 1890s affected the economy of Greece severely, and in 1893 the Greek State had to stop servicing its foreign debt. Part of the problem was the lack of diversity of Greek agricultural production, which was focused on raisins and currants (especially flavourful raisins, grown exclusively in the area around Corinth) for export.

²⁵The Greco-Turkish War of 1897, also called the Thirty Days' War and known in Greece as the Black '97, was a war fought between the Kingdom of Greece and the Ottoman Empire. Its immediate cause was the question over the status of the Ottoman province of Crete, whose Greek majority long desired union with Greece.

²⁶The Goudi coup was a military coup that took place in Greece on the night of 28 August 1909, starting at the barracks in Goudi, a neighbourhood on the eastern outskirts of Athens. The coup itself was the result of simmering tensions in Greek society, which reeled under the effects of the disastrous Greco-Turkish War of 1897, financial troubles, a lack of necessary reforms and disillusionment with the established political system.

²⁷Greeks who fled from Asia Minor after the 1922 Asia Minor Catastrophe.

differences, religious affiliation, etc., covering 350 Greek municipalities for the years 1870 and 1879. Tables 1.1 and 1.2 present the definitions of the variables and some descriptive statistics, respectively.

Table 1.1 Variables & Definitions

1. Literacy Development:

Total Literacy (%) = Literate People / Total Population

Male Literacy (%) = Literate Males / Total Male Population

Female Literacy (%) = Literate Females / Total Female Population

Gender Gap in Literacy = Literate Males / Literate Females

2. Student Attainment:

Total Student Attainment (%) = Total Number of Students / Total Population

Male Student Attainment (%) = Male Students / Total Male Population

Female Student Attainment (%) = Female Students / Total Female Population

3. Landownership Patterns

Access to Land (%) = Landowners / Total Agricultural Population

4. Delayed Industrialization:

Stuck in Agriculture = People Working in Agricultural Activities / People Working in Modern Occupations

5. Marriage Patterns

Married-Single ratio (total population) = Married People / Single People

Married-Single ratio (male population) = Married Males / Single Males

Married-Single ratio (female population) = Married Females / Single Females

6. Women's Social Position:

Student Participation = Female Students / Male Students

Teaching Participation = Female Teachers / Male Teachers

Labour Force Participation = Female Workers / Male Workers

7. Other Factors :

Sex Ratio = Males / Females

Urbanization (%) = Municipal Population / Total Population

Non Greeks (%) = Non Greeks / Total Population

Family Size = Total Population / Number of Families

Workers (%) = Number of Workers / Total Labour Force

Merchants (%) = Number of Merchants / Total Labour Force

Priests (%) = Number of Priests / Total Population

Table 1.2 Descriptive Statistics (municipal level)

	1870					1879				
	Mean	Max.	Min.	St. Dev.	Obs.	Mean	Max.	Min.	St. Dev.	Obs.
1. Literacy Development										
Total Literacy (%)	14.42%	46.49%	1.99%	0.08	350	16.32%	50.50%	0.71%	0.08	350
Male Literacy (%)	25.04%	77.68%	3.27%	0.11	350	27.78%	66.09%	1.37%	0.12	350
Female Literacy (%)	3.61%	42.53%	0.00%	0.06	350	4.21%	39.40%	0.00%	0.06	350
Gender Gap in Literacy	38.67	367.00	0.61	59.14	350	36.75	635.50	0.74	61.41	350
2. Student Attainment										
Total Student Attainment (%)	4.63%	17.93%	0.41%	0.02	350	4.45%	24.34%	0.03%	0.02	350
Male Student Attainment (%)	8.18%	23.52%	0.69%	0.04	350	7.79%	31.95%	0.06%	0.04	350
Female Student Attainment (%)	1.08%	13.60%	0.00%	0.01	350	0.97%	18.92%	0.00%	0.01	350
3. Landownership Patterns										
Access to Land (%)	14.53%	95.48%	0.00%	0.17	350	14.92%	93.16%	0.00%	0.18	350
4. Delayed Industrialization										
Stuck in Agriculture	16.44	219.50	0.01	25.53	350	12.92	317.50	0.02	29.01	350
5. Marriage Patterns										
Married-Single ratio (total population)	0.58	0.92	0.25	0.07	350	0.58	1.30	0.37	0.09	350
Married-Single ratio (male population)	0.53	0.88	0.16	0.07	350	0.53	1.28	0.21	0.09	350
Married-Single ratio (female population)	0.66	2.02	0.43	0.11	350	0.66	1.16	0.33	0.09	350
6. Women's Social Position										
Female Student Participation	0.11	0.78	0.00	0.16	350	0.09	0.83	0.00	0.15	350
Female Teacher Participation	0.16	7.00	0.00	0.45	350	0.14	12.00	0.00	0.72	350
Female Labour Participation	0.89	90.05	0.00	6.84	350	0.25	16.5	0.00	1.38	350
7. Other Factors										
Sex Ratio	1.03	1.88	0.52	0.12	350	1.06	2.44	0.51	0.14	350
Urbanization (%)	0.28%	3.35%	0.02%	0.00	350	0.28%	4.31%	0.02%	0.00	350
Non-Greeks (%)	0.88%	31.70%	0.00%	0.02	350	1.13%	36.59%	0.00%	0.03	350
Family Size	4.35	20.35	0.91	1.60	350	4.97	10.25	1.87	1.07	350
Workers (%)	5.76%	62.94%	0.00%	0.09	350	9.35%	73.58%	0.00%	0.11	350
Merchants (%)	3.68%	25.89%	0.00%	0.04	350	6.27%	37.01%	0.00%	0.06	350
Priests (%)	0.49%	3.10%	0.00%	0.00	350	0.51%	3.51%	0.00%	0.00	350

1.4.1 Literacy Development

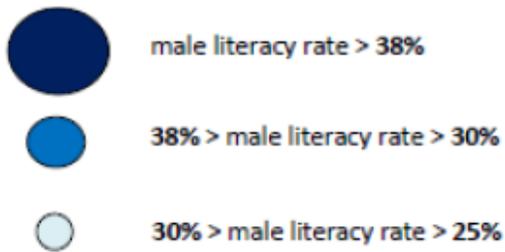
Literacy development, the main dependent variable in this study, has been measured in the following ways: 1. Total Literacy (%) = (Literate People / Total Population) ; 2. Male Literacy (%) = (Literate Males / Total Male Population) ; 3. Female Literacy (%) = (Literate Females / Total Female Population) ; and 4. Gender Gap in Literacy = (Literate Males / Literate Females). As **Table 1.2** shows, literacy levels in the late nineteenth-century Greece have shown a remarkable increase from 1870 to 1879. More specifically, total literacy has risen by 1.90%, male literacy by 2.74%, and female literacy by only 0.60%. Moreover, during the same period, the **gender gap in literacy** has been significantly reduced by 1.92 units, even though it still remained relatively high in favour of men. However, some noticeable **regional and gender differences** in literacy levels throughout Greek territories can be observed in **Maps 1.1-1.8**. In 1870, the highest male literacy rates were reported in Attica (46.52%), Kynouria (39.54%), Kalamata (38.47%), Aigio (38.40%) and Nafplio (38.26%), while the lowest male literacy rates appeared in Istiaia (12.08%), Valtos (12.98%), Livadeia (13.94%) and Megalopoli (14.33%). In the same year, the highest levels of female literacy were found in Hydra-Troizinia (22.49%), Attica (19.08%), Patra (12.71%) and Nafplio (12.50%), whereas the lowest female literacy levels were observed in Megalopoli (0.60%), Istiaia (0.74%), Evrytania (0.89%), Dorida (0.43%), Oitylo (0.45%), Valtos (0.46%) and Vonitsa (0.58%). In 1879, Attica (48.22%), Elis (44.51%), Aigina (41.97%), Nafplio (41.95%), Kynouria (41.18%) and Kalamata (40.81%) were the regions with the highest male literacy rates, while the lowest male literacy rates were found in Megalopoli (13.58%), Pylos (16.10%), Istiaia (16.12%), Thebes (17.41%), Kalavryta (18.18%), Epidavros (18.98%) and Valtos (19.16%). That same year, Attica (26.46%), Hydra-Troizinia (16.28%), Spetses-Ermioni (15.40%), Nafplio (13.51%) and Aigina (13.28%) had the highest rates of female literacy, while the lowest female literacy rates were seen in Megalopoli (0.23%), Sparta (0.26%) and Dorida (0.36%).

Summarizing these results, we can say that literacy rates in Greece have been importantly increased over the period 1870-1879 for both sexes. In general, Attica (Central Greece) and the Southern Greek areas (North-Western and South-Eastern Peloponnese) had the highest levels of male literacy, while the lowest male literacy rates were observed in Central Greece and Central Peloponnese. For females, Attica (Central Greece) and the Saronic Islands reported the highest literacy rates, whereas the lowest female literacy rates were found in Central Greece and Central and Southern Peloponnese.

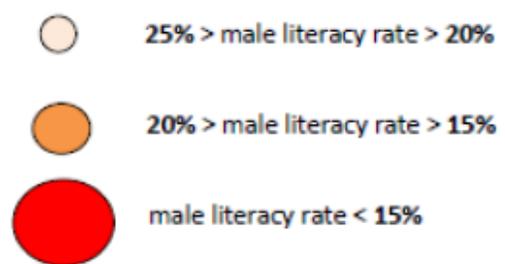
Male Literacy, 1870 & 1879 (provincial level)



Map 1.1: Highest Male Literacy Rates (1870)



Map 1.2: Lowest Male Literacy Rates (1870)



Map 1.3: Highest Male Literacy Rates (1879)

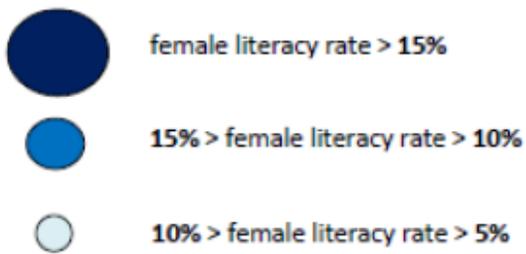


Map 1.4: Lowest Male Literacy Rates (1879)

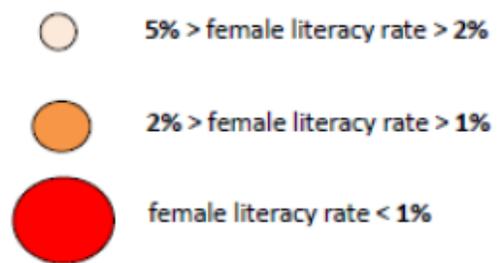
Female Literacy, 1870 & 1879 (provincial level)



Map 1.5: Highest Female Literacy Rates (1870)



Map 1.6: Lowest Female Literacy Rates (1870)



Map 1.7: Highest Female Literacy Rates (1879)

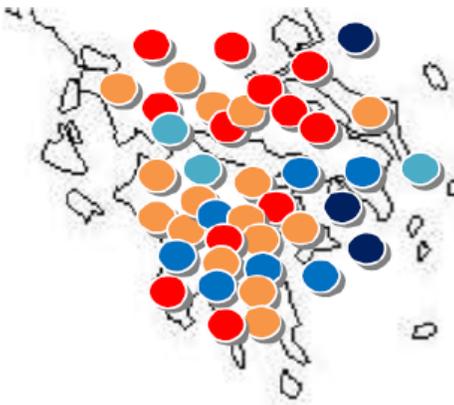


Map 1.8: Lowest Female Literacy Rates (1879)

1.4.2 People's Access to Land

Although the Greek Population Censuses of 1870 and 1879 contain information on many different aspects of population characteristics, they do not include any specific information on the size-distribution of agricultural landholdings per district. Thus, the more adequate way of measuring people's access to land was to use the ratio of **landowners to the total agricultural population**. In short, low values of this ratio imply greater concentration of landownership (land inequality), while higher values indicate a more equal distribution of landholdings. In fact, as we see in **Table 1.2**, people's access to land in Greece has been slightly increased by 0.39% between 1870 and 1879. However, looking the data at the provincial-level, we can easily see the co-existence of two highly diversified patterns of landownership throughout Greek territories (see **Maps 1.9-1.11**). More specifically, most of the Central Greek areas have been characterized by high levels of land ownership concentration (access to land <10%) for the whole period 1861-1879. There were, however, some noticeable exceptions, such as Attica, Megara, Messolonghi, Aegina (island), and Skopelos (island), enjoying a far more egalitarian land ownership pattern. On the contrary, the vast majority of Southern Greek areas (Peloponnese) have been shown to be associated with higher levels of access to land compared to Central areas. Even more importantly, most of Southern areas have been almost completely transformed over the period 1861-1879, from areas with high levels of land inequality to areas with a more equitable distribution of lands (see Patra, Elis, Nafplio, Corinthos, Gytheio, Pylos, Messini, Olympia, Sparta and Oitylo). By the late 1870s, only a limited number of the Southern Greek areas were still associated with high levels of land ownership concentration (see Argos, Kalavryta, Epidavros, Megalopoli and Mantinia).

People's Access to Land, 1861-1879 (provincial level)



Map 1.9: Peoples' Access to Land
1861



Map 1.10: Peoples' Access to Land
1870



Map 1.11: Peoples' Access to Land
1879

-  people's access to land < 5%
-  10% > people's access to land > 5%
-  15% > people's access to land > 10%
-  30% > people's access to land > 15%
-  people's access to land > 30%

1.4.3 Stuck in Agriculture, Marriage Patterns and Other Factors

An area's tend to remain **stuck in agriculture** is another variable has been used in my analysis in order to investigate whether or not the prevalence of traditional agriculture over modern occupations had negative effects on literacy development in the late nineteenth-century Greece. This effect was captured using the ratio of people employed in traditional agricultural activities (landowners, farmers and livestock keepers) to people engaged in modern professions (owners of manufacturing firms, male/female workers and merchants). Results from **Table 1.2** have shown that stuck in agriculture in Greece was remarkably decreased during the period 1870-1879 (-3.52 units). At the same time, workers (%) and merchants (%) both appeared to have a considerable increase from 1870 to 1879 (+3.59% and +2.59%, respectively). Moreover, **Table 1.2** has reported trends in **marriage patterns** in the late nineteenth-century Greece. Although there were no significant differences in marriage rates from 1870 to 1879, however, some significant gender differences are observed. More specifically, married women had significantly outnumbered married men in both 1870 and 1879. Furthermore, all the gender indices were used to examine **women's social position** in the late nineteenth-century Greece, such as the ratio of female to male students, the ratio of female to male teachers, and the ratio of female to male workers, have been found to be decreased in the period 1870-1879, indicating increasing gender inequalities within Greek society. Finally, student attainment ratios have been shown a small decrease, non-Greek population appeared to have a significant increase, while factors such as sex ratio, family size, and priests have been all shown a slight increase over time.

1.4.4 Correlation Analysis

A preliminary analysis of my municipal-level data provides some support for the existence of a positive relation between people's access to land and literacy levels in the late nineteenth-century Greece (see **Figures 1.1** and **1.3**). In addition, **Figures 1.2** and **1.4** illustrate a strong negative association between stuck in agriculture (delayed industrialization) and literacy rates. More precisely, the correlation coefficients between literacy rates and various other variables have employed in my study are presented in **Table 1.3**. These findings have shown that factors such as access to land, workers, merchants, urbanization, student attainment, non-Greek population, widows, and priests, have all been shown to be positively related to literacy rates, while factors such as stuck in agriculture, agricultural labourers, farm size, marriage, family size, and sex ratio, have been found to be negatively correlated with literacy.

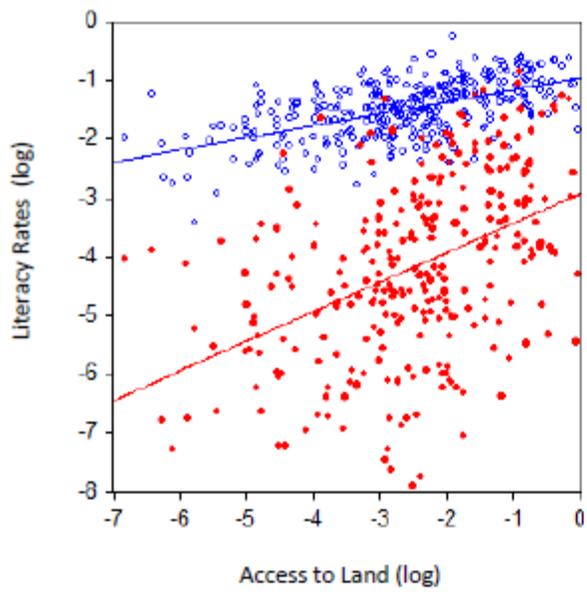


Figure 1.1

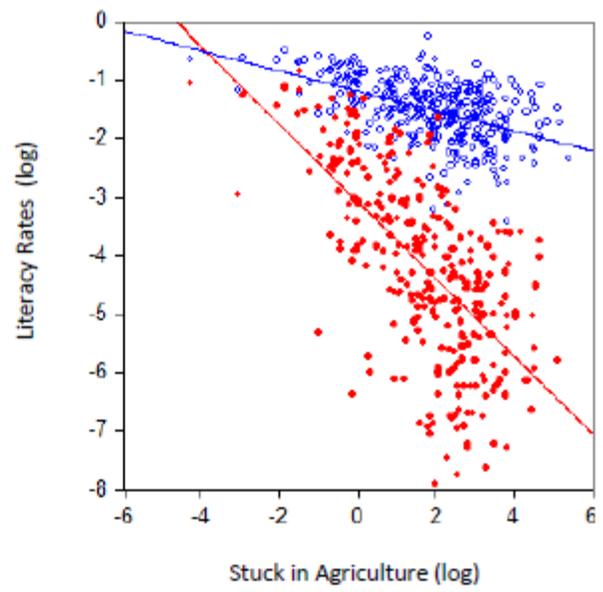


Figure 1.3

- male literacy %
- female literacy %

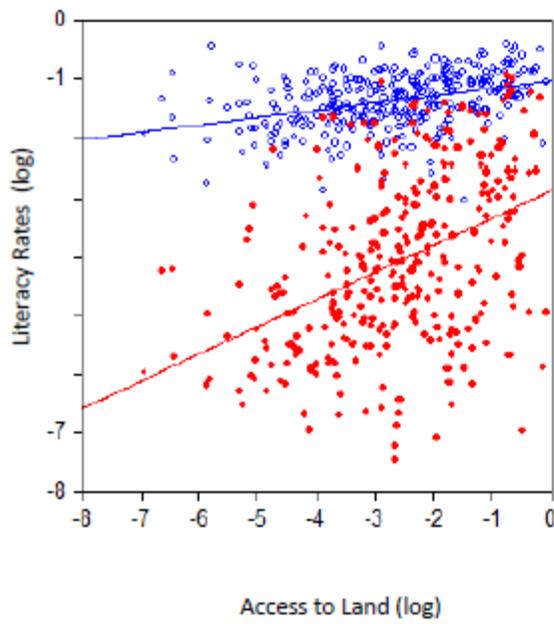


Figure 1.3

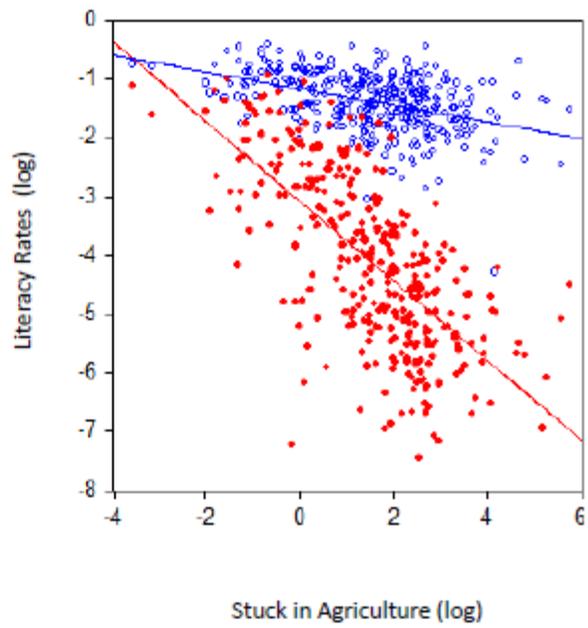


Figure 1.4

- male literacy %
- female literacy %

Table 1.3 Correlation Coefficients (municipal level)

	1870		1879	
	Male Literacy %	Female Literacy %	Male Literacy %	Female Literacy %
Access to Land %	+0.47	+0.38	+0.37	+0.37
Stuck in Agriculture	-0.28	-0.27	-0.19	-0.20
Workers %	+0.34	+0.42	+0.22	+0.35
Merchants %	+0.52	+0.67	+0.54	+0.71
Urbanization %	+0.29	+0.45	+0.25	+0.41
Student Attainment %	+0.67	+0.59	+0.69	+0.68
Non-Greeks %	+0.10	+0.23	+0.09	+0.19
Widows %	+0.31	+0.19	+0.32	+0.24
Agricultural Labourers %	-0.56	-0.72	-0.46	-0.68
Farm Size	-0.30	-0.15	-0.16	-0.17
Married People %	-0.15	-0.11	-0.09	-0.05
Family Size	-0.04	-0.01	-0.05	-0.27
Sex Ratio	-0.25	-0.18	-0.14	-0.23
Priests %	+0.05	+0.11	+0.01	+0.11

1.5 Model Building

1.5.1 Cross-Sectional Estimates

In order to statistically test the significance of the relations presented above, the following ordinary least squares (OLS) cross-sectional regression model has been estimated using heteroskedasticity- and autocorrelation-consistent (HAC) standard errors:

$$\text{literacy level (i, t)} = \mathbf{b_0} + \mathbf{b_1} * \text{access to land (i, t)} + \mathbf{b_2} * \text{stuck in agriculture (i, t)} + \mathbf{c} * \mathbf{V}'(\mathbf{i, t}) + \mathbf{e}(\mathbf{i, t}) \quad (1.1)$$

where **literacy level (i,t)** represents the literacy rate in municipality i ($i=1, 2, \dots, 350$) in the year t ($t = 1870$ and 1879 respectively), **b₀** is the constant term, **access to land (i,t)** is the ratio of landowners to the total agricultural population, **b₁** is the effect of access to land on literacy development (we expect $\mathbf{b_1} > 0$), **stuck in agriculture (i,t)** is the ratio of people working in traditional agricultural activities to people working in modern occupations, **b₂** is the effect of stuck in agriculture on literacy (we expect $\mathbf{b_2} < 0$), **V** is a vector of control variables (marriage, family size, sex ratio, non-Greek population, urbanization, female widowhood and priests), **c** is a vector of coefficients measuring the effect of covariates on literacy, and **e (i,t)** is the error term.

1.5.2 Difference-in-Differences Estimates (DiD)

Alternatively, a difference-in-differences (DiD) regression model has been applied in order to explore possible variations in literacy rates between “affected” and “unaffected” Greek municipalities by the 1871 land reform. With respect to the 350 municipalities covered by this study, nearly half of them have been reported to be effectively influenced by the 1871 land reform (treatment group), while the other half have been found to be associated with

lower levels of access to land in the period following the redistribution (control group). In fact, my difference-in-difference regression model can be represented as follows:

$$\text{literacy levels (i,t)} = \mathbf{do} + \mathbf{d1} * \text{reform (i)} + \mathbf{d2} * \text{time (t)} + \mathbf{d3} * [\text{reform (i)} * \text{time (t)}] + \mathbf{w} * \mathbf{Z}'(\mathbf{i,t}) + \mathbf{u (i,t)} \quad (1.2)$$

where **literacy level (i,t)** denotes the literacy rate in municipality i at year t, **do** is the constant term, **reform (i)** is a dummy variable indicating treatment status (it takes the value of 1 when a municipality i had been positively affected by the 1871 land reform, and 0 otherwise), **d1** is the coefficient of the treatment variable representing the differences between reformed and unreformed municipalities at the time before the land redistribution, **time (t)** is a time dummy (it takes the value of 1 in the post-reform period, and 0 otherwise), **d2** represents the time trend in control group, [**reform (i) * time (t)**] is an interaction dummy indicating when time (t)=reform (i)=1 , **d3** is the difference in difference estimate (we expect $d3 > 0$) representing the difference in the changes between the two groups over time, **Z** is a vector of control variables, **w** is a vector of coefficients measuring the impact of each covariate on literacy development, and **u (i,t)** is the error term.

1.5.3 Binary Probit Models

Finally, binary probit models have been estimated to analyze the effects of access to land on female participation in education in the late nineteenth-century Greece. In this case, female participation in education (female student attainment and female teacher participation) is a binary choice variable that equals to 1 if women attend school (as students and teachers respectively) in municipality i at time t, and 0 if not. The model is, as follows:

$$\Pr [\text{female participation} = 1 \mid \mathbf{X}] = \mathbf{F}(\mathbf{X}' \mathbf{b}) \quad (1.3).$$

where $\Pr [\text{female participation} = 1 \mid \mathbf{X}]$ is the probability of girls attending school (as students and teachers respectively), \mathbf{F} is the standard normal cumulative distribution function, \mathbf{X} is a set of regressors, and \mathbf{b} is a vector of estimated coefficients.

1.6 Results

My cross-sectional OLS regression estimates (see equation **1.1**) have shown that the coefficients of both access to land and stuck in agriculture have the expected signs (positive and negative, respectively) and are statistically significant in all regressions (see **Tables 1.4 and 1.5**). Columns **(1)** to **(4)** report the effects of access to land and stuck in agriculture on literacy levels (my baseline specification), while columns **(5)** to **(20)** progressively add all the control variables. The positive and significant coefficients of access to land provide strong evidence that more equal patterns of land ownership in late nineteenth-century Greece had played an important role in the spread of literacy. On the other hand, the negative and significant coefficients of stuck in agriculture imply that the supremacy of traditional agricultural activities over modern occupations had significant negative effects on literacy development. These results remain robust even after controlling for various other factors that potentially affect literacy, such as marriage, family size, sex ratio, ethnic differences, urbanization, female widowhood and religion. More specifically, my findings have demonstrated that female marriage was negatively related to female literacy levels, but statistically significant only in 1879, while male marriage was not found to significantly affect men's literacy. Moreover, family size has been found to have negative associations with female literacy (significant in almost all regressions), whereas male literacy has been negatively and significantly affected by family size only in 1870. Sex ratio has been shown to negatively affect male literacy (though not always significantly), while non-Greek population has been found to have positive and significant impacts on female literacy, but only in 1879. Furthermore, urbanization appeared to have a significant positive impact on both male and female literacy rates (in almost all regressions). Lastly, widows had a positive and significant effect on male literacy, while priests were not found to significantly affect male and female literacy rates. It is, however, worth mentioning that the impact of people's access to land on literacy rates has

been reported to be significantly decreased from 1870 to 1879 for both sexes, even though its coefficients remain positive and statistically significant (see **Tables 1.6** and **1.7**). Nevertheless, some noticeable gender differences in the magnitude of the coefficients can be observed. More specifically, the positive effect of access to land on literacy levels was much higher for men than for women in both 1870 and 1879, whereas stuck in agriculture had a stronger negative impact on female literacy as compared to male one.

Additionally, **Table 1.8** reports the difference-in-differences estimates (see equation **1.2**). As we can see, the difference-in-differences coefficient (the main coefficient of interest) is positive and statistically significant but only for men, indicating a degree of gender inequality in the late nineteenth-century Greece. Stuck in agriculture and marriage have been reported to have negative and significant impacts on both male and female literacy rates, while teacher availability and student attainment have been shown to be positively associated with literacy expansion. Sex ratio appeared to negatively influence male literacy, whereas non-Greek population had a positive impact on female literacy, even though both coefficients are not always significant. Lastly, urbanization and southern dummy seemed to have positive effects on literacy rates, but only for men.

The results from the binary probit models (see equation **1.3**) are shown in **Tables 1.9** and **1.10**. We see that the probability of girls attending school, as well as the probability that there was at least one female teacher in a municipality i , were both found to have positive and significant associations with people's access to land, but only in 1870. On the contrary, stuck in agriculture had a negative and significant influence on female participation in education. Moreover, factors such as female marriage, family size and sex ratio had no significant effects on female student attainment, however, they had some significant impacts on female teacher availability. Finally, non-Greeks and urbanization appeared to have positive and significant relationships with female participation in education.

Table 1.4 Cross-Sectional OLS Estimates (Male Literacy & People's Access to Land)

Dependent Variable: Male Literacy		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Access to Land		1870 0.31 350	1879 +0.20*** (0.01)	1870 +0.14*** (0.02)	1879 +0.07*** (0.02)	1870 +0.13*** (0.02)	1879 +0.07*** (0.02)	1870 +0.13*** (0.02)	1879 +0.07*** (0.02)	1870 +0.13*** (0.02)	1879 +0.07*** (0.02)										
Stuck in Agriculture																					
Male Marriages																					
Family Size																					
Sex Ratio																					
Non-Greeks (dummy)																					
Urbanization (dummy)																					
Widows																					
Priests																					
Islands (dummy)																					
Adj. R-Squared		0.31 350	0.13 350	0.37 350	0.19 350	0.36 350	0.19 350	0.36 350	0.19 350	0.37 350	0.19 350	0.37 350	0.19 350	0.38 350	0.20 350	0.41 350	0.26 350	0.42 350	0.26 350	0.44 350	0.26 350

Note: This table presents OLS estimates of equation (1) for the years 1870 and 1879. "Male Literacy" is the dependent variable. "Access to Land" is defined as the ratio of landowners to the total agricultural population. "Stuck in Agriculture" is the ratio of people engaged in traditional agricultural activities (landowners, farmers, and livestock keepers) to people engaged in modern professions (owners of manufacturing firms, workers, and merchants). "Male Marriages" is measured using the married males to single males ratio. "Family Size" is the ratio of total population to total number of families. "Sex ratio" is the ratio of males to females. "Non-Greeks" is a dummy variable that takes the values 1 if a municipality has non-Greek residents and 0 otherwise. "Urbanization" is a dummy variable that takes the value 1 for large municipalities (population > 5000 people) and 0 otherwise. "Widows" is the percentage of widows on the total female population. "Priests" is the percentage of priests in the total population. "Islands" is a dummy variable takes the value of 1 for island-municipalities and 0 otherwise. All regressions are at the municipal level (n=350). All variables are in logarithmic form (except the dummies). Newey-West HAC standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significances: *** p < 0.01; ** p < 0.05; * p < 0.1. Source: Greek Population Censuses of 1870 and 1879.

Table 1.5 Cross-Sectional OLS Estimates (Female Literacy & People's Access to Land)

Dependent Variable: Female Literacy		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
		1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879
Access to Land		+0.50*** (0.05)	+0.46*** (0.05)	+0.16*** (0.04)	+0.10** (0.04)	+0.16*** (0.05)	+0.10** (0.05)	+0.18*** (0.05)	+0.12** (0.05)	+0.19*** (0.05)	+0.12** (0.05)	+0.19*** (0.05)	+0.12** (0.05)	+0.19*** (0.05)	+0.10** (0.05)	+0.20*** (0.05)	+0.14*** (0.05)	+0.20*** (0.06)	+0.14*** (0.05)	+0.21*** (0.05)	+0.15*** (0.05)
Stuck in Agriculture				-0.57*** (0.04)	-0.63*** (0.04)	-0.57*** (0.04)	-0.63*** (0.04)	-0.56*** (0.04)	-0.58*** (0.04)	-0.57*** (0.04)	-0.58*** (0.04)	-0.56*** (0.05)	-0.54*** (0.04)	-0.52*** (0.05)	-0.51*** (0.04)	-0.49*** (0.05)	-0.47*** (0.04)	-0.50*** (0.05)	-0.47*** (0.04)	-0.46*** (0.05)	-0.45*** (0.04)
Female Marriages				-0.16 (0.47)	-1.08** (0.49)	-0.22 (0.49)	-1.34*** (0.51)	-0.22 (0.49)	-1.34*** (0.51)	-0.23 (0.49)	-1.38** (0.54)	-0.21 (0.49)	-1.15** (0.54)	-0.11 (0.51)	-1.06** (0.53)	-0.17 (0.52)	-1.27** (0.51)	-0.22 (0.53)	-1.17** (0.52)	-0.45 (0.49)	-1.28** (0.52)
Family Size				-0.45 (0.31)	-0.99*** (0.35)	-0.45 (0.31)	-0.99*** (0.35)	-0.45 (0.31)	-0.99*** (0.35)	-0.44 (0.31)	-1.05*** (0.39)	-0.45 (0.31)	-1.12*** (0.40)	-0.56* (0.33)	-1.23*** (0.38)	-0.53* (0.32)	-1.58*** (0.30)	-0.55* (0.33)	-1.55*** (0.30)	-0.51 (0.32)	-1.43*** (0.31)
Sex Ratio										+0.45 (0.68)	+0.29 (0.49)	+0.40 (0.71)	+0.04 (0.45)	+0.23 (0.71)	-0.06 (0.45)	+0.20 (0.67)	+0.17 (0.44)	+0.22 (0.67)	-0.89 (0.66)	+0.34 (0.44)	
Non-Greeks (dummy)												+0.07 (0.12)	+0.46*** (0.11)	+0.04 (0.12)	+0.44*** (0.11)	+0.08 (0.11)	+0.47*** (0.11)	+0.08 (0.11)	-0.00 (0.11)	+0.48*** (0.12)	
Urbanization (dummy)														+0.38** (0.17)	+0.35*** (0.13)	+0.39** (0.17)	+0.34** (0.13)	+0.39** (0.17)	+0.43** (0.18)	+0.32** (0.13)	
Widows																+0.35 (0.31)	-0.20 (0.29)	+0.31 (0.32)	+0.49 (0.30)	+0.19 (0.29)	
Priests																		+0.08 (0.11)	-0.05 (0.12)	+0.07 (0.07)	
Islands (dummy)																				+0.79*** (0.16)	+0.27** (0.13)
Adj. R-Squared		0.19	0.18	0.42	0.47	0.42	0.48	0.43	0.50	0.43	0.50	0.42	0.52	0.43	0.53	0.44	0.56	0.44	0.57	0.49	0.57
Obs.		350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Note: This table presents OLS estimates of equation (1) for the years 1870 and 1879. "Female Literacy" is the dependent variable. "Access to Land" is defined as the ratio of landowners to the total agricultural population. "Stuck in Agriculture" is the ratio of people engaged in traditional agricultural activities (landowners, farmers, and livestock keepers) to people engaged in modern professions (owners of manufacturing firms, workers, and merchants). "Female Marriages" is measured using the married males to single males ratio. "Family Size" is the ratio of total population to total number of families. "Sex ratio" is the ratio of males to females. "Non-Greeks" is a dummy variable that takes the values 1 if a municipality has non-Greek residents and 0 otherwise. "Urbanization" is a dummy variable that takes the value 1 for large municipalities (population > 5000 people) and 0 otherwise. "Widows" is the percentage of widows on the total female population. "Priests" is the percentage of priests in the total population. "Islands" is a dummy variable that takes the value of 1 for island municipalities and 0 otherwise. All regressions are at the municipal level (n=350). All variables are in logarithmic form (except the dummies). Newey-West HAC standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01; ** p < 0.05; * p < 0.1.

Source: Greek Population Censuses of 1870 and 1879.

Table 1.6 Literacy Rates & People's Access to Land (OLS Estimates - Standardized Coefficients)

	Dependent Variable: Literacy Levels (1870)																			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Access to Land	+0.55***	+0.44***	+0.40***	+0.14***	+0.40***	+0.14***	+0.40***	+0.15***	+0.38***	+0.16***	+0.38***	+0.16***	+0.38***	+0.17***	+0.35***	+0.18***	+0.36***	+0.17***	+0.36***	+0.18***
Stuck in Agriculture		-0.29***	-0.29***	-0.56***	-0.29***	-0.56***	-0.27***	-0.55***	-0.26***	-0.55***	-0.27***	-0.54***	-0.22***	-0.50***	-0.22***	-0.49***	-0.22***	-0.49***	-0.21***	-0.45***
Marriages			-0.00	-0.01	-0.00	-0.01	-0.00	-0.01	-0.03	-0.02	-0.03	-0.01	-0.10	-0.01	+0.01	-0.01	+0.01	-0.01	+0.00	-0.04
Family Size							-0.07**	-0.08	-0.07**	-0.08	-0.07**	-0.08	-0.10***	-0.10*	-0.10***	-0.10*	-0.10***	-0.10*	-0.10**	-0.09
Sex Ratio									-0.09	+0.03	-0.09	+0.03	-0.10*	+0.02	-0.10**	+0.01	-0.10*	-0.02	-0.08	+0.07
Non-Greeks (dummy)									-0.03	+0.02	-0.03	+0.02	-0.05	+0.01	-0.05	+0.02	-0.06	+0.08	-0.07*	-0.00
Urbanization (dummy)													+0.14***	+0.10**	+0.16***	+0.11*	+0.16***	+0.11**	+0.16***	+0.12**
Widows															+0.17***	+0.05	+0.17**	+0.05	+0.18***	+0.08
Priests																	+0.02	+0.03	+0.00	-0.02
Islands (dummy)																			+0.07	+0.24***

Note: This table presents OLS estimates of equation (1) for the year 1870. "Literacy Level" is the dependent variable. "Access to Land" is defined as the ratio of landowners to the total agricultural population. "Stuck in Agriculture" is the ratio of people engaged in traditional agricultural activities (landowners, farmers, and livestock keepers) to people engaged in modern professions (owners of manufacturing firms, workers, and merchants). "Marriages" is measured using the married people to single people ratio (for males and females, respectively). "Family Size" is the ratio of total population to total number of families. "Sex ratio" is the ratio of males to females. "Non-Greeks" is a dummy variable that takes the values 1 if a municipality has non-Greek residents and 0 otherwise. "Urbanization" is a dummy variable that takes the value 1 for large municipalities (population > 5000 people) and 0 otherwise. "Widows" is the percentage of widows on the total female population. "Priests" is the percentage of priests in the total population. "Islands" is a dummy variable that takes the value of 1 for island-municipalities and 0 otherwise. All regressions are at the municipal level (n=350). All variables are in logarithmic form (except the dummies). For simplicity, the intercept is not reported. Significance: *** p < 0.01; ** p < 0.05; * p < 0.1.

Source: Greek Population Censuses of 1870 and 1879.

Table 1.7 Literacy Rates & People's Access to Land (OLS Estimates - Standardized Coefficients)

	Dependent Variable: Literacy Levels (1870)																			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Access to Land	+0.55***	+0.44***	+0.40***	+0.14***	+0.40***	+0.14***	+0.40***	+0.15***	+0.38***	+0.16***	+0.38***	+0.16***	+0.38***	+0.17***	+0.35***	+0.18***	+0.36***	+0.17***	+0.36***	+0.18***
Stuck in Agriculture		-0.29***	-0.29***	-0.56***	-0.29***	-0.56***	-0.27***	-0.55***	-0.26***	-0.55***	-0.27***	-0.54***	-0.22***	-0.50***	-0.22***	-0.49***	-0.22***	-0.49***	-0.21***	-0.45***
Marriages			-0.00	-0.01	-0.03	-0.02	-0.00	-0.01	-0.03	-0.02	-0.03	-0.01	-0.10	-0.01	+0.01	-0.01	+0.01	-0.01	+0.00	-0.04
Family Size					-0.07**	-0.08	-0.07**	-0.08	-0.07**	-0.08	-0.07**	-0.08	-0.10***	-0.10*	-0.10***	-0.10*	-0.10***	-0.10*	-0.10**	-0.09
Sex Ratio					-0.09	+0.03	-0.09	+0.03	-0.09	+0.03	-0.09	+0.03	-0.10*	+0.02	-0.10**	+0.01	-0.10*	-0.10*	-0.08	+0.07
Non-Greeks (dummy)									-0.03	+0.02	-0.03	+0.02	-0.05	+0.01	-0.05	+0.02	-0.06	+0.08	-0.07*	-0.00
Urbanization (dummy)													+0.14***	+0.10**	+0.16***	+0.11*	+0.16***	+0.11**	+0.16***	+0.12**
Widows															+0.17***	+0.05	+0.17**	+0.05	+0.18***	+0.08
Priests																	+0.02	+0.03	+0.00	-0.02
Islands (dummy)																			+0.07	+0.24***

Note: This table presents OLS estimates of equation (1) for the year 1870. "Literacy Level" is the dependent variable. "Access to Land" is defined as the ratio of landowners to the total agricultural population. "Stuck in Agriculture" is the ratio of people engaged in traditional agricultural activities (landowners, farmers, and livestock keepers) to people engaged in modern professions (owners of manufacturing firms, workers, and merchants). "Marriages" is measured using the married people to single people ratio (for males and females, respectively). "Family Size" is the ratio of total population to total number of families. "Sex ratio" is the ratio of males to females. "Non-Greeks" is a dummy variable that takes the values 1 if a municipality has non-Greek residents and 0 otherwise. "Urbanization" is a dummy variable that takes the value 1 for large municipalities (population > 5000 people) and 0 otherwise. "Widows" is the percentage of widows on the total female population. "Priests" is the percentage of priests in the total population. "Islands" is a dummy variable that takes the value of 1 for island-municipalities and 0 otherwise. All regressions are at the municipal level (n=350). All variables are in logarithmic form (except the dummies). For simplicity, the intercept is not reported. Significance: *** p < 0.01; ** p < 0.05; * p < 0.1.

Source: Greek Population Censuses of 1870 and 1879.

Table 1.8 Difference-in-Differences Estimates (Literacy Rates & People's Access to Land)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females
reform	-0.14*** (0.05)	-0.22 (0.17)	-0.14*** (0.04)	-0.15 (0.13)	-0.14*** (0.04)	-0.14 (0.13)	-0.13*** (0.04)	-0.14 (0.13)	-0.13*** (0.04)	-0.14 (0.13)	-0.14*** (0.04)	-0.15 (0.12)	-0.15*** (0.04)	-0.15 (0.12)	-0.13*** (0.03)	-0.10 (0.11)	-0.13*** (0.03)	-0.10 (0.11)
time	+0.02 (0.05)	+0.08 (0.17)	+0.00 (0.04)	+0.00 (0.12)	+0.02 (0.04)	+0.00 (0.12)	+0.02 (0.04)	+0.00 (0.12)	+0.02 (0.04)	+0.00 (0.12)	+0.02 (0.04)	+0.00 (0.12)	+0.05 (0.04)	-0.00 (0.12)	+0.10** (0.04)	+0.28*** (0.10)	+0.09** (0.04)	+0.28*** (0.10)
time * reform	+0.18** (0.07)	+0.05 (0.24)	+0.14** (0.06)	-0.06 (0.18)	+0.14** (0.06)	-0.07 (0.18)	+0.14** (0.06)	-0.07 (0.18)	+0.14** (0.06)	-0.03 (0.18)	+0.13** (0.06)	-0.03 (0.18)	+0.13** (0.06)	+0.07 (0.18)	+0.10* (0.05)	+0.09 (0.15)	+0.11** (0.05)	+0.09 (0.15)
stuck in agriculture			-0.15*** (0.01)	-0.67*** (0.03)	-0.15*** (0.01)	-0.67*** (0.03)	-0.14*** (0.01)	-0.66*** (0.03)	-0.14*** (0.01)	-0.64*** (0.03)	-0.14*** (0.01)	-0.63*** (0.03)	-0.10*** (0.01)	-0.54*** (0.03)	-0.05*** (0.01)	-0.16*** (0.03)	-0.06*** (0.01)	-0.16*** (0.03)
marriage			-0.18* (0.09)	-0.71** (0.33)	-0.23** (0.09)	-0.70** (0.33)	-0.23** (0.09)	-0.70** (0.33)	+0.24** (0.09)	-0.59* (0.34)	-0.21** (0.09)	-0.57* (0.34)	-0.19** (0.09)	-0.50 (0.33)	-0.18** (0.08)	-0.52* (0.27)	-0.17** (0.08)	-0.50* (0.27)
sex ratio			-0.41*** (0.13)	-0.14 (0.35)	-0.40*** (0.13)	-0.28 (0.35)	-0.45*** (0.13)	-0.14 (0.35)	-0.40*** (0.13)	-0.28 (0.35)	-0.45*** (0.13)	-0.31 (0.36)	-0.43*** (0.13)	-0.19 (0.36)	-0.06 (0.12)	-0.20 (0.28)	-0.08 (0.12)	-0.22 (0.28)
non-Greeks (dummy)						+0.25*** (0.03)	-0.02 (0.03)			+0.25*** (0.03)	-0.03 (0.03)			+0.24** (0.09)	-0.02 (0.03)			+0.13 (0.08)
urbanization											+0.05** (0.02)	+0.00 (0.07)	+0.08** (0.02)	+0.01 (0.08)	+0.06*** (0.02)	+0.00 (0.06)	+0.05*** (0.02)	+0.00 (0.06)
teachers											-0.18*** (0.02)	-0.18*** (0.02)	-0.18*** (0.02)	-0.52*** (0.07)	+0.13*** (0.02)	+0.20*** (0.06)	+0.13*** (0.02)	+0.20*** (0.06)
students															+0.36*** (0.02)	+0.61*** (0.03)	+0.35*** (0.02)	+0.61*** (0.03)
southern dummy																	+0.07** (0.03)	+0.03 (0.08)
R-squared	0.02	0.00	0.24	0.44	0.25	0.44	0.26	0.44	0.26	0.45	0.26	0.45	0.32	0.49	0.48	0.70	0.48	0.70
R-squared (adj.)	0.02	0.00	0.24	0.44	0.24	0.44	0.25	0.44	0.25	0.44	0.25	0.44	0.31	0.48	0.47	0.69	0.47	0.69
Obs.	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700

Note: This table presents difference-in-differences estimates of equation (2) for the years 1870 and 1879. Literacy is the dependent variable. Reform is a dummy variable indicating treatment status (it takes the value of 1 when a municipality had been effectively affected by the 1871 land reform). Time is a dummy variable that takes the value of 1 for the post-reform period and 0 otherwise. Time * Reform is an interaction dummy indicating when time(t)=reform(t)=1. Stuck in agriculture is the ratio of people engaged in agricultural activities (landowners, farmers, and people working with livestock) to people engaged in modern occupations (owners of manufacturing firms, workers, and merchants). Marriage is measured using the married-single ratio (for males and females, respectively). Sex ratio is the ratio of males to females. Non-Greeks is a dummy variable that takes the value 1 if municipality has non-Greek residents and 0 otherwise. Urbanization is the ratio of municipal population to the total population. Teachers is the availability of teachers. Students is the student attainment. Southern Dummy is a dummy variable that takes the value of 1 for southern Greek municipalities. All regressions are at the municipal level. All variables are in logarithmic form (except the dummies). Standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01 ; ** p < 0.05 ; * p < 0.1.

Source: Greek Population Census of 1871 and 1879.

Table 1.9 School Female Participation (dummy variable) & People's Access to Land

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879
Access to Land	+0.41*** (0.05)	+0.29*** (0.05)	+0.20*** (0.06)	+0.07 (0.06)	+0.19*** (0.06)	+0.07 (0.06)	+0.20*** (0.06)	+0.08 (0.06)	+0.21*** (0.07)	+0.08 (0.06)	+0.21*** (0.07)	+0.07 (0.06)	+0.22*** (0.07)	+0.04 (0.06)	+0.22*** (0.07)	+0.04 (0.06)
Stuck in Agriculture			-0.46*** (0.06)	-0.54*** (0.08)	-0.46*** (0.07)	-0.54*** (0.08)	-0.45*** (0.07)	-0.54*** (0.09)	-0.46*** (0.07)	-0.54*** (0.09)	-0.45*** (0.07)	-0.51*** (0.09)	-0.41*** (0.08)	-0.48*** (0.09)	-0.41*** (0.08)	-0.49*** (0.09)
Female Marriages				-0.91 (0.58)	-0.28 (0.57)	-0.82 (0.59)	-0.82 (0.59)	+0.00 (0.62)	-0.85 (0.60)	+0.00 (0.64)	-0.82 (0.59)	+0.14 (0.67)	-0.83 (0.62)	+0.26 (0.66)	-0.83 (0.63)	+0.32 (0.65)
Family Size						-0.20 (0.32)	-0.20 (0.32)	+0.58 (0.38)	-0.21 (0.32)	+0.58 (0.41)	-0.22 (0.31)	+0.54 (0.42)	-0.46 (0.30)	+0.26 (0.42)	-0.46 (0.30)	+0.22 (0.43)
Sex Ratio								+0.40 (0.72)	+0.40 (0.72)	-0.01 (0.90)	+0.28 (0.72)	-0.34 (0.92)	+0.19 (0.72)	-0.33 (0.91)	+0.19 (0.73)	-0.38 (0.90)
Non-Greeks (dummy)											+0.11 (0.14)	+0.38** (0.17)	+0.07 (0.15)	+0.37** (0.17)	+0.07 (0.15)	+0.37** (0.18)
Urbanization (dummy)													+0.89*** (0.25)	+0.83*** (0.21)	+0.89*** (0.25)	+0.81*** (0.21)
Islands (dummy)															+0.00 (0.18)	-0.12 (0.19)
McFadden R-Squared	0.12	0.18	0.22	0.21	0.23	0.21	0.23	0.21	0.23	0.21	0.24	0.22	0.27	0.26	0.27	0.26
Obs.	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Note: This Table presents probit regression estimates of equation (3). School Female Participation is a binary dummy variable that takes a value of 1 when girls attend elementary school and 0 otherwise. Access to Land is the ratio of landowners to the total agricultural population. Stuck in Agriculture is the ratio of people engaged in traditional agricultural activities to people engaged in modern professions. Female Marriage is the ratio of married females to single females. Family Size is the ratio of total population to the total number of families. Sex Ratio is the ratio of males to females. Non-Greeks is a dummy variable that takes the value 1 if a municipality has non-Greek residents and 0 otherwise. Urbanization is a dummy variable that takes the value 1 for large municipalities (population > 5,000 people) and 0 otherwise. Island Dummy takes the value 1 for island-municipalities and 0 otherwise. All regressions are at the municipal level (i=350 Greek municipalities). All variables are in logarithmic form (except the dummies). Standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01, ** p < 0.05, * p < 0.1. Sources: Greek Population Census of 1871 and 1879.

Table 1.10 Female Teacher Participation (dummy variable) & People's Access to Land

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879	1870	1879
Access to Land	+0.44*** (0.07)	+0.39*** (0.06)	+0.15** (0.07)	+0.13* (0.07)	+0.14** (0.07)	+0.13* (0.07)	+0.12*** (0.07)	+0.08 (0.07)	+0.14* (0.08)	+0.09 (0.07)	+0.15* (0.08)	+0.09 (0.07)	+0.16** (0.08)	+0.06 (0.08)	+0.15* (0.08)	+0.05 (0.08)
Stuck in Agriculture			-0.57*** (0.08)	-0.61*** (0.07)	-0.57*** (0.08)	-0.62*** (0.07)	-0.60*** (0.08)	-0.69*** (0.09)	-0.63*** (0.08)	-0.76*** (0.10)	-0.58*** (0.08)	-0.73*** (0.10)	-0.54*** (0.09)	-0.71*** (0.10)	-0.57*** (0.09)	-0.72*** (0.10)
Female Marriages			-0.23 (0.60)	-1.33** (0.55)	-0.23 (0.60)	-1.33** (0.55)	-0.10 (0.59)	-1.42** (0.59)	-0.16 (0.60)	-1.76*** (0.60)	-0.02 (0.57)	-1.58** (0.59)	+0.07 (0.59)	-1.65** (0.63)	+0.22 (0.59)	-1.60** (0.62)
Family Size							-0.36 (0.29)	+0.87** (0.38)	-0.40 (0.29)	-0.46 (0.40)	-0.41 (0.27)	-0.40 (0.40)	-0.68** (0.28)	-0.00 (0.41)	-0.71** (0.29)	-0.07 (0.42)
Sex Ratio									+1.19* (0.75)	+2.21*** (0.75)	+0.79 (0.75)	+1.98** (0.78)	+0.53 (0.70)	+1.96** (0.75)	+0.20 (0.73)	+1.92** (0.76)
Non-Greeks (dummy)											+0.45*** (0.15)	+0.40** (0.18)	+0.43** (0.16)	+0.35* (0.19)	+0.45*** (0.16)	+0.37** (0.19)
Urbanization (dummy)													+0.86*** (0.20)	+1.04*** (0.19)	+0.86*** (0.20)	+1.03*** (0.19)
Islands (dummy)															-0.32 (0.19)	-0.11 (0.21)
McFadden R-Squared	0.13	0.11	0.29	0.29	0.29	0.30	0.31	0.31	0.31	0.33	0.33	0.34	0.37	0.41	0.38	0.41
Obs.	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Note: This Table presents probit regression estimates of equation (3). School Female Participation is a binary dummy variable that takes a value of 1 when there is at least one female teacher in the municipality and 0 otherwise. Access to Land is the ratio of landowners to the total agricultural population. Stuck in Agriculture is the ratio of people engaged in traditional agricultural activities to people engaged in modern professions. Female Marriage is the ratio of married females to single females. Family Size is the ratio of total population to the total number of families. Sex Ratio is the ratio of males to females. Non-Greeks is a dummy variable that takes the value 1 if a municipality has non-Greek residents and 0 otherwise. Urbanization is a dummy variable that takes the value 1 for large municipalities (population > 5,000 people) and 0 otherwise. Island Dummy takes the value 1 for island-municipalities and 0 otherwise. All regressions are at the municipal level (N=350 Greek municipalities). All variables are in logarithmic form (except the dummies). Standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01; ** p < 0.05; * p < 0.1.

Sources: Greek Population Census of 1871 and 1879.

1.7 Conclusion

The present paper represents a first empirical attempt to explore possible linkages between people's access to land and literacy development in the late nineteenth-century Greece, using information obtained from the 1870 and 1879 Greek Population Censuses. My newly created dataset contains various socioeconomic and demographic indicators, such as literacy levels, student attainment, teacher availability, access to land, stuck in agriculture, marital status, family size, sex ratio, urbanization, ethnic differences and religious affiliation, covering 350 Greek municipalities for the years 1870 and 1879. In fact, my empirical estimates seem consistent with previous findings in the literature, indicating a positive and significant relationship between access to land and literacy rates in late nineteenth-century Greece. On the contrary, the supremacy of traditional agriculture over modern professions (stuck in agriculture) has been found to be negatively related to literacy. These results remain robust even after controlling for other variables that potentially affect literacy development. However, the effect of people's access to land on literacy expansion has been significantly reduced from 1870 to 1879, while some noticeable gender differences in the magnitude of coefficients have been observed. My estimates have also reported significant negative associations between marriage and literacy rates, while family size has been identified as another important factor that adversely affected literacy. Moreover, urbanization, teacher availability and student attainment, were all found to have positive effects on literacy levels. Furthermore, sex ratio had a negative, though not always significant, relationship with male literacy, whereas non-Greek population appeared to have positive impacts on female literacy. Lastly, widows were found to be positively related to male literacy rates, while religious affiliation seemed to have no significant impact on literacy.

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Chapter 2

Women's Labour Force Participation and Increasing Divorce Rates:

Evidence from the Early-Twentieth-Century Greece.

Tryfonas Lemontzoglou

University of Siena

Department of Economics and Statistics

trifonaslemon@gmail.com

Abstract

The rise of modern capitalism in the late eighteenth and early nineteenth centuries brought significant changes in almost every aspect of social life, offering women the opportunity to enter the paid labour force and diminishing traditional sex role stereotypes. However, increasing women's labour force participation has further limited women's economic dependence on men, significantly lowering exit costs from marriage. In the same line of thought, Becker's neoclassical theory of marriage has provided a deeper insight into the possible links between female employment and marital instability, arguing that the gains to marriage are greatest when men specialize in paid work, while women specialize in unpaid household activities. Within this framework, the case of early twentieth-century Greece remains largely unexplored in the literature, even though it represents an interesting case of a highly diversified structure of family relations characterized by early marriages, low divorce rates and an even lower level of births outside marriage. This paper attempts to fill this gap by providing some of the first evidence of a possible relationship between women's labour force participation and female divorce rates in the early twentieth-century Greece. After analyzing provincial-level data from the 1907 and 1920 Greek Population Censuses, I found a positive association between female employment and marital instability, however, this effect is not always clear and straightforward. More specifically, total female employment and female participation in modern occupations have been found to be positively associated with female divorce rates, but statistically significant only in 1907. On the other hand, female employment in traditional agricultural activities had no significant impact on marriage dissolution. Other factors, such as early-age at marriage, women's educational level, availability of single men, urbanization, ethnic differences, men's occupational status and religion, have been also taken into consideration.

JEL Codes: N34, J12, J82, K15.

Key Words: divorce, economic independence, female labour force participation, gender division of labour, industrialization.

2.1 Introduction

According to Marx, social changes are always characterized not only by new material productive forces, but also by new relations of production, as well as new forms of consciousness, religion, philosophy, ethics, etc. (Marx and Engels 2010 [1845]). In that context, industrial revolution slowly but steadily undermined the importance of family as the main unit of production, replacing large extended families with small nuclear ones as better suited to modern industrial life's demands (Anderson 1971 ; Goode 1963 ; Greenfield 1961 ; Ruggles 2012). At the same time, increasing social mobility from rural to urban areas further weakened traditional family ties, with new industrial workers having only a very little feeling of sense of place or community identity (Accampo 1989 ; U.S. Department of Agriculture 1979). Furthermore, modern industrial societies entirely redefined the traditional view of marriage, leading to fewer and later marriages and diminishing social stigma attached to divorce (Beck and Gernshein 2002 ; Goode 1993 ; Ruggles 1997 ; Spagnoli 1983 ; Yorburg 2002). Even more importantly, the related literature has often reported increased women's labour force participation as one of the main factors behind rising marital instability, supporting the so-called economic independence hypothesis (Brines and Joyner 1999 ; Castles and Flood 1993 ; Hobson 1990 ; Kalmijn and Poortman 2006 ; Ruggles 1997 ; Schoen et al. 2002 ; Trussell et al. 1992). Most of these studies based on Becker's theory of marriage, suggesting that a strictly traditional sex-role division of labour within the household results in more stable marriages. Following Becker's point of view, the gains from marriage are maximized when men specialize in the paid labour market, while women specialize in unpaid household tasks. Consequently, any deviation from the traditional gender role attitudes decreases the risk of divorce, leading to easier and more frequent divorces (Becker 1977, 1981).

On the other hand, however, the effect of female employment on marital instability is not always clear and straightforward. For instance, a significant number of studies have provided some contradictory evidence, pointing out that women's labour participation may have pos-

itive effects on marital stability (Heckert et al. 1998 ; Ono 1998 ; Oppenheimer 1997). Another interesting case has been also reported by Goode (1993), arguing that some fundamental traditional societies have been found to be associated with high rates of divorce. Moreover, Jones (1994) and Hirschman and Teerawichitchainan (2003) have observed a rapid decline in divorce rates in some Islamic Asian countries during the period of modernization. In fact, in order to better explain variations in divorce rates among countries and regions, several other important factors have to be taken into consideration, such as marriage age (Wolfinger 2003), occupational status (Chester 1977 ; Lichtenberger 1909 ; U.S Bureau of Labor 1897), urbanization (Gautier, Svarer and Teulings 2005), women’s educational level (Blossfeld et al. 1995 ; Houseknecht and Spanire 1980 ; Levinger 1976), ethnic and racial differences (Bean and Tienda 1987 ; Norton and Moorman 1987 ; Oropesa et al. 1994), men’s social status (Ono 1998 ; South and Lloyd 1995), and religion (Daley et al. 2010 ; Lehrer and Chiswick 1993 ; Swenson 2008).

Within the above framework, the case of early modern Greece remains almost completely unexplored at the empirical level, and thus, the primary aim of the present paper is to fill this gap by exploring the possible effects of female employment on female divorce rates in the early twentieth-century Greece. My newly created cross-section dataset contains various indicators, such as divorce rates, marriage age, women’s educational level, availability of single men, urbanization, ethnic differences, men’s social status, and religion, covering sixty-six Greek provinces for the years 1907 and 1920. During that period, Greece was a relatively poor agricultural and deeply religious country characterized by high levels of gender inequality in every aspect of social life (Papastefanaki 2006 ; Petmezas 2008 ; Thanailaki 2018). More specifically, the vast majority of Greek women were still illiterate and were often pressured by parents to marry at a very early age (Yiangou et al. 2016). Moreover, without any clear and modern legal framework of divorce in Greece since the 1920s, divorce rates were very limited, while the very few divorced women were often stigmatized as “efkoles”

(of loose morals) (Lazaridis 2009). Further, most of Greek women were totally restrained from participating in the labour market, even if unofficially, they provided essential non-paid labour, especially in agricultural activities (Bugra and Ozkan 2012).

Indeed, my empirical results (OLS, 2SLS and 3SLS estimates) confirm previous findings in the literature, indicating a positive and significant association between female employment and marital instability. However, this effect is not always clear and straightforward. More specifically, total female employment and female participation in modern occupations (manufacturing, trade/commerce, self-employment and the public sector) has been found to have positive and significant effects on female divorce rates in 1907, but such effects became insignificant after the implementation of 1920 Divorce Law. On the contrary, female participation in traditional agricultural activities (agriculture, livestock production and fishing-hunting) has been found to have no significant effect on marriage dissolution. In addition, early-age marriage for women was found to be positively associated with female divorce rates (though not always significantly), while gender gap in literacy has had negative and significant impacts on female divorces. Furthermore, ethnic and religious differences (non-Greeks, Muslim and Catholic populations) have been all found to positively and significantly affect marital instability. Lastly, other factors, such as availability of single men and urbanization, have reported positive relationships with female divorce rates.

* * *

2.2 Literature Review

Industrial revolution has been widely regarded by many scholars as a great turning point in women's labour history, completely changing the traditional sexual division of labor, social roles and ethical norms (Clark 1982[1919] ; Davis 1984 ; Durkheim 1960[1893] ; Engels 1969[1845] ; Goode 1993 ; Pinchbeck 1930 ; Rau and Roncek 1987 ; Shorter 1973 ; Szafran 1992 ; Valenze 1995). During that period, increasing social mobility from agricultural villages to industrial cities further weakened traditional family ties (Accampo 1989 ; Kerr et al. 1960 ; Parsons 1955 ; Ruggles 2012), while small nuclear families gradually replaced large extended ones (Anderson 1971 ; Goode 1963 ; Greenfield 1961 ; Janney 2010 ; Le Play 1982). Furthermore, individualism has emerged as a core value of the new capitalist ideology (Hollinger and Haller 1990 ; Mott and Moore 1979 ; Riley 1991 ; Thornton 1989), people became less religious (Mainment and Mackerras 1998 ; Marbel 2003 ; Petrakis 2014), and marriage became a much less attractive option among partners (Beck and Gernsheim 2002 ; Harkonen 2013 ; Lesthaeghe 1995 ; Mills 2000 ; Mitterauer and Sieder 1983 ; Wu 2000 ; Yorburg 2002). Besides changes in family structure, women's labour force participation was remarkably increased during the industrial era, mainly driven by the heavily skewed gender ratios in favour of women (Lee 1995 ; Meade and Wiesner-Hanks 2004 ; Nielsen 1994 ; Nielsen and Alderson 1995). This demographic anomaly can be explained by the massive male emigration waves (Abadan-Unat 1977 ; Gabaccia and Iacovetta 2002 ; Greenwood and McDowell 1999 ; Tumbe 2014) and the notably higher proportion of war casualties among men (Braybon 2013 ; O'Brien 2009 ; Taylor-Allen 2008). According to other scholars, the huge wage gap between men and women was another possible explanation of why female labourers were much more preferable than men (Berg 1993 ; Burnette 1997 ; Goldin and Sokoloff 1982 ; Humphries and Weisdorf 2013 ; Hutton 2001).

At the same time, however, that women's sharply increased participation into the labour market has been often reported in the literature as one of the most important factors contributing to the rise in marriage dissolutions (Amato and James 2010 ; Bergman 1986 ; Bremmer and Kesselring 2004 ; Cherlin 1992 ; Degler 1980 ; Greenstein 1995 ; Jalovaara 2003 ; Kalmijn et al. 2007 ; McCrate 1992 ; Nunley 2012 ; Ozcan and Breen 2012 ; Poortman and Kalmijn 2002 ; Preston and Richards 1975 ; Ruggles 1997 ; Sayer and Bianchi 2000 ; Schoen et al. 2002 ; Spitze and South 1985). Most of these studies based on the so-called Becker's role specialization hypothesis, suggesting that the gains to marriage are greatest when the male spouse concentrates on paid employment, while the female spouse runs the household and raises children (Becker 1973, 1981, 1998 ; Becker et al. 1977). Hence, any decrease in the traditional specialization between men and women decreases gains from marriage, leading to more frequent divorces (Becker 1974, 1981 ; Becker et al. 1977 ; Espenshade 1985 ; Parsons 1940).

In the opposite direction, a large number of other studies have provided some evidence for the existence of an inverse relationship between female employment and marital instability, arguing that an increase in family income from any source can improve family's overall quality of life, reducing the risk of dissolution (Heckert et al. 1998 ; Ono 1998 ; Oppenheimer 1995, 1997 ; Raz-Yurovich 2012 ; Ross and Sawhill 1975 ; Stevenson and Wolfers 2007). In fact, empirical findings on the hypothesized relationship between female employment and marital instability are not always clear or straightforward and for this reason many other factors that potentially affect marital instability have to be taken into consideration. According to Glenn and Supancic (1984), Lichtenberger (1909, 1963), McCoy and Aamodt (2010), and Rosow and Daniel (1972), occupational status has been considered as another important factor explaining variations in divorces rates across countries and regions. Moreover, some other studies have mentioned the role that modernization and urbanization played in increasing divorce rates (Breault and Kposowa 1987 ; Burgess, Locke and Thomes

1963 ; Calhoun 1945 ; Fischer 1982 ; Gautier, Svarer and Teulings 2005 ; Jalovaara 2001 ; Ogburn and Nimkoff 1955 ; Peters 1986 ; Schultz 1984, 1980). On the contrary, small and medium-size cities or agricultural villages have been found to be much more traditional with regard to family values, maintaining old ethical norms, gender stereotypes and high social conservatism, and thus keeping divorces at a relatively low level (Daley et al. 2010 ; Das Gupta et al. 2000 ; Nazio 2008). Similarly, Call and Heaton (1997), Filsinger and Wilson (1984), Lehrer and Chiswick (1993) and Sullivan (2001) have claimed that moral norms and values derived from strictly religious beliefs have been shown to stabilize marriages. Furthermore, significant ethnic and racial differences among populations have been also reported as positively associated with divorce rates (Bean and Tienda 1987 ; Bulanda and Brown 2007 ; Frisbie et al. 1980 ; Glenn and Supancic (1984) ; Norton and Moorman 1987 ; Oropesa et al. 1994). Finally, women's educational level has been highlighted by many other scholars as another factor contributing to increasing marital instability (Blossfeld et al. 1995 ; De Rose 1992 ; Houseknecht and Spanier 1980 ; Kalmijn et al. 2004 ; Lvinger 1979) ; Poortman and Kalmijn 2002).

2.3 The Greek Context

Historically, early modern Greece has been found to be associated with a very diversified structure of family relations characterized by early-age marriages, low level of divorce, and an even lower level of children born outside of marriage (Ditch et al. 1996 ; Drew et al. 1998 ; Eurostat 2012 ; Gordeev 2008 ; Hatzichristou 1999 ; Lay 2011 ; Mignone 2008 ; Ritzer 2004 ; Rothenbacher 2002 ; Symeonidou 2002). Similar trends have also been observed in other Mediterranean countries, such as Italy, Spain and Cyprus (Hantrais Letablier 1996 ; Kaufmann et al. 2002 ; Perrett 2005). However, in comparison with other Europeans, Greeks have been found as the most strongly attached to, and supportive of, the institution of the family (Commission for European Communities 1993 ; Doumani-Christea 1989), and not surprisingly, the traditional nationalist triptych “Patris, Thriskeia, Oikogeneia” (Fatherland, Religion, Family) is still one of the most familiar and influential slogans in modern and contemporary Greece (De Groot and Morgan 2014).

Even if Greek women actively participated in the Greek War of Independence (1821-1828), their huge efforts during the revolutionary years were never fully recognized by the newly Greek state (Cook 2006 ; Elshtain 2005 ; Leontidou and Ammer 1992). Thus, the beginning of the early twentieth century was found Greek women to be totally restrained from participating the whole public sphere, including politics, education, social activities, and even the marketplace (Takari 1978 ; Varikas 1997). In the more extreme cases, especially in small rural areas, Greek women were often seen as wicked or born bad, being useful only for giving births, raising children and working in home-based activities (Allen 1979 ; Blum 1970 ; Daraki 1995 ; Durham 1971 ; Moshou 1990). Moreover, romantic love wasn't an essential prerequisite for the traditional Greek marriage, which was mainly based on economic negotiations between parents (proxenio²⁸) (Kivisto 1989 ; Kourvetaris 1997). The

²⁸proxenio or prikosymfona (arranged marriage) was the most preferred way of negotiating a marriage between the households of the bride and the groom.

very core of these financial arrangements was the institution of dowry (*prika*²⁹), without which a marriage agreement could not be reached (Allen 1979 ; Kivisto 1989). Cash, live-stock, motor vehicles, land, animals and buildings was the heavy price bride's family had to pay (Skouteri-Didaskalou 1991 ; Sutton 2000). Within this framework, young women in early twentieth-century Greece were often seen as a good tool for men to join the upper classes through a successful arrangement of marriage (Gavrielides 1976).

Additionally, until the 1920s, the legal framework for divorce in Greece was still based on laws dating from the Byzantine era (Justinian's civil code)³⁰, and thus divorce was a very limited right, especially among women (Chloros 1978 ; Dodaro 2014 ; Koutsouradis 2002). More specifically, since the end of the eighteenth century, adultery was the only reason for divorce, and spouses who were divorced for any other cause were excommunicated, without having the right to remarry (Dodaro 2014 ; Konstantopoulou 2000). In 1920, however, a new divorce law (Law no. 2228/1920) came into force in Greece, expanding the legal grounds for divorce into two categories: absolute causes (adultery, bigamy, threat against the life of the spouse, malicious abandonment for two years and strong alienation of affections) and relative causes (absence, sexual impotence, mental alienation and leprosy) (Koutsouradis 2002). Thus, without any legal framework of divorce in Greece prior to 1920 (Law No.2228/1920), the very few divorced Greek women were often stigmatized as evil-doers or "efkoles" (of loose morals), not being allowed to live in their own home or participate in social activities, and they usually experienced unfriendly behaviour from others (Lazaridis 2009 ; Tzanaki 2007 ; Varika 1987). However, there were some very few exceptions under which Greek women enjoyed a higher social status and greater freedom. The Ionian Islands, for instance, which never subjected to Ottoman occupation (Mango 2002) or the Cyclades Islands, which fared somewhat better under Ottoman rule than did mainland Greece (Freely 2010), have both

²⁹*proika* (dowry) was the bride's parents offer to ensure marriage and family continuation.

³⁰Justinian's civil code is the modern name for a collection of fundamental works in jurisprudence, issued from 529 to 534 by order of Justinian I, Eastern Roman Emperor.

experienced a more egalitarian gender regime (Petronoti 1980 ; Stanford Finopoulos 1984 ; Thanailaki 2018).

2.4 Variables and Descriptive Statistics

In order to provide some of the first empirical evidence supporting the hypothesized relationship between female employment and rising marital instability in the early twentieth century Greece, a newly cross-section dataset has been constructed based on information obtained from the 1907 and 1920 Greek Population Censuses ³¹. This dataset contains various indicators capable of measuring factors such as marital status, sexual division of labour, educational level, availability of single men, urbanization, ethnic and religious differences, etc., covering sixty-six provinces of Greece for the years 1907 and 1920. This specific time period was chosen for the two following reasons: first, because the Greek censuses prior to 1907 (1861, 1870, and 1879) do not include data on divorce and women's labour force participation ; and secondly, because the year 1920 was an important turning point for the civil status of women in Greece, offering the first modern legal framework for divorce (Law No.2228/1920). The main dependent variable in my analysis, **female divorce**, is measured by the ratio of divorced females to the total female population (**crude divorce rate**). However, this measure can be strongly affected by the age and marital composition of the population (Amato and James 2010), and thus the female divorce-to-marriage ratio (**refined divorce rate**) is alternatively used to obtain more accurate and reliable estimates. **Female employment**, my key independent variable, is measured using the proportions of female workers to the total working population in each occupation category. Moreover, following previous related studies, several other indicators, such as **early-age at marriage**, **women's educational level**, **availability of single men**, **urbanization**, **ethnic/racial differences**, and **religion**, are also taken into consideration. The definitions of the variables are shown in **Table 2.1**, while **Tables 2.2-2.4** show the main descriptive statistics.

³¹source: Hellenic Statistical Authority.

Table 2.1 Definitions of the Variables

1. Divorced Women:

Female Divorce Rate (crude) = Divorced Females / Total Female Population

Female Divorce Rate (refined) = Divorced Females / Married Females

2. Married Women:

Female Marriage Rate = Married Females / Total Female Population

Married-to-Single Females = Married Females / Single Females

Early Marriages for Women = Married Females (age<20) / Married Females

3. Women's Educational Level

Female Literacy = Literate Females / Total Female Population

Gender Gap in Literacy = Literate Males / Literate Females

4. Female Widowhood

Widow's rate = Widows / Total Female Population

5. Female Labour Force Participation:

Manufacturing = Females in Manufacturing / Total Labour Force in Manufacturing

Self-Employment = Self-Employed Women / Total Number of Self-Employed People

Trade-Commerce = Females in Trade-Commerce / Total Labour Force in Trade-Commerce

Public Sector = Females in the Public Sector / Total Labour Force in the Public Sector

Agriculture = Females in Agriculture / Total Labour Force in Agriculture

Livestock = Females in Livestock / Total Labour Force in Livestock

Fishing-Hunting = Females in Fishing-Hunting / Total Labour Force in Fishing-Hunting

Servant Duties = Female Servants / Total Number of Servants

6. Availability of Single Men

Single Men = Single Males / Married Males

7. Men's Occupational Status

Men's Modernization = Males in Modern Professions / Males in Traditional Agricultural Activities

8. Urbanization:

Urbanization = Provincial Population / Total Population

9. Ethnic Differences

Non Greeks = Non Greek Population / Total Population

10. Religion

Catholics = Catholics / Total Population

Muslims = Muslims / Total Population

Results reported below (see **Table 2.2**) clearly show the existence of some noticeable gender differences in divorce, marriage, and widowhood patterns in early twentieth-century Greece. As we see, Greek women have had higher rates of divorce compared to Greek men in both 1907 and 1920. These results have also shown that marriage in early twentieth-century Greece was much more common among women than men, especially when comparing early-age marriage rates. Another noteworthy result in **Table 2.2** is the fact that widows significantly outnumbered widowers (by nearly three to one) over the period 1907-1920. However, looking at trends over time, we can see that divorce rates have importantly increased from 1907 to 1920, marriage rates have shown a slight decline, while widowhood rates have decreased for both sexes over the same period of time. As regards women's labour force participation in the early twentieth-century Greece (see **Table 2.3**), textile industry (manufacturing subcategory) and servant's duties have been reported as the only two occupational categories where women outperformed men. Manufacturing activities and self-employment were also marked by high levels of women's participation, while some remarkable rates of women's employment have been also observed in religious organizations, livestock production and agriculture. On the contrary, fishing/hunting, commerce/trade and the public

sector were found to be accompanied by the lowest female labor force participation rates. Finally, **Table 2.4** has shown that literacy rates in the early twentieth-century Greece have been significantly increased for both sexes, whereas gender gap in literacy has been found to be importantly decreased over the same period. Moreover, sex ratio has shown a slight decrease from 1907 to 1920, army employees, non-Greeks and Catholics appeared to have a significant reduction, while Muslims have shown a slight increase.

Table 2.2 Marital Status (descriptive statistics)

	1907					1920				
	mean	max	min	std.dev.	obs.	mean	max	min	std.dev.	obs.
Marital Status										
Divorced Females (%)	0.0684%	0.3931%	0.0000%	0.0006	66	0.0809%	0.4767%	0.0132%	0.0007	66
Divorce-to-Marriage rt. (fem.)	0.0019	0.0111	0.0000	0.0018	66	0.0023	0.0140	0.0003	0.0023	66
Divorced Males (%)	0.0568%	0.2376%	0.000%	0.0004	66	0,0786%	0.4436%	0.0102%	0.0006	66
Divorce-to-Marriage rt. (mal.)	0.0016	0.0070	0.0000	0.0014	66	0.0023	0.0129	0.0002	0.0020	66
Married Females (%)	35.72%	39.99%	32.49%	0.01	66	34.77%	38.06%	32.38%	0.01	66
Married Females < 20 (%)	3.18%	7.55%	1.33%	0.01	66	0.60%	1.69%	0.00%	0.00	66
Married-to-Single rt. (fem.)	0.66	0.79	0.57	0.04	66	0.63	0.77	0.55	0.04	66
Married Males (%)	34.45%	37.93%	29.33%	0.01	66	34,12%	38.43%	28.49%	0.02	66
Married Males < 20 (%)	0.52%	1.54%	0.00%	0.00	66	0.28%	1.53%	0.00%	0.00	66
Married-to-Single rt. (mal.)	0.55	0.64	0.43	0.05	66	0.54	0.67	0.40	0.05	66
Widows (%)	10.54%	16.99%	7.40%	0.01	66	10.48%	15.01%	7.50%	0.01	66
Widowers (%)	3.25%	5.77%	1.94%	0.00	66	3.19%	5.56%	1.48%	0.00	66

Table 2.3 Female Labour Force Participation (descriptive statistics)

	1907					1920				
	mean	max	min	std.dev.	obs.	mean	max	min	std.dev.	obs.
Female Employment	4.779%	12.232%	1.071%	0.028	66	11.047%	28.256%	3.494%	0.052	66
Modern Occupations	8.202%	24.614%	1.869%	0.050	66	12.954%	31.574%	4.789%	0.051	66
Manufacturing	10.902%	39.972%	1.616%	0.078	66	17.002%	44.493%	4.084%	0.078	66
Textiles	68.770%	100.000%	0.000%	0.326	66	68.343%	92.307%	35.678%	0.155	66
Self-Employment	16.954%	34.146%	3.141%	0.059	66	18.091%	42.105%	1.750%	0.084	66
Commerce/Trade	1.272%	15.488%	0.000%	0.026	66	2.418%	6.557%	0.343%	0.012	66
Municipal/Public Employees	0.642%	4.545%	0.000%	0.009	66	5.914%	21.084%	0.000%	0.047	66
Agricultural Activities	2.207%	10.133%	0.000%	0.020	66	9.750%	32.022%	0.823%	0.066	66
Livestock Production	4.537%	38.888%	0.000%	0.077	66	12.281%	62.264%	0.000%	0.124	66
Agriculture	1.983%	10.127%	0.000%	0.021	66	9.857%	31.681%	0.850%	0.065	66
Fishing/Hunting	0.172%	3.482%	0.000%	0.006	66	0.810%	10.000%	0.000%	0.018	66
Females in Religious Org.	8.517%	90.804%	0.000%	0.140	66	12.918%	69.406%	0.000%	0.148	66
Female Servants	55.368%	90.476%	9.183%	0.198	66	68.770%	97.500%	27.848%	0.153	66

Table 2.4 Other Important Factors (descriptive statistics)

	1907					1920				
	mean	max	min	std.dev.	obs.	mean	max	min	std.dev.	obs.
Other Factors										
Male Literacy (%)	48.059%	65.353%	25.905%	0.079	66	58.114%	72.521%	36.123%	0.067	66
Female Literacy (%)	16.004%	43.265%	4.176%	0.096	66	27.184%	52.915%	9.794%	0.110	66
Literacy Gap	4.001	11.429	0.907	2.120	66	2.329	5.317	0.668	0.934	66
Stuck in Agriculture	1.765	4.436	0.135	1.012	66	2.559	5.202	0.214	1.314	66
Sex Ratio	0.998	1.234	0.764	0.110	66	0.936	1.215	0.718	0.111	66
Army (%)	0.611%	6.354%	0.087%	0.010	66	0.384%	4.118%	0.085%	0.005	66
Non Greeks (%)	1.335%	6.492%	0.01%	0.015	66	0.535%	6.087%	0.000%	0.009	66
Catholics (%)	0.953%	30.805%	0.000%	0.043	66	0.837%	28.322%	0.000%	0.040	66
Muslims (%)	0.140%	2.079%	0.000%	0.003	66	0.208%	4.846%	0.000%	0.006	66

2.4.1 Female Divorce Rates By Different Geographical Areas

Maps 2.1-2.4 below present the highest and lowest female divorce rates (per 1,000 married females) in Greece before and after the implementation of the new 1920 Divorce Law. More specifically, Attica (Central Greece), some of the Cycladic Islands (Syros and Tinos), Skopelos (Sporades Island), Euboea (Aegean Island), some of the Ionian Islands (Corfu and Zante), Hydra (Argo-Saronic Island), Patra (Southern Greece), Kalamata (Southern Greece), Dorida (Central Greece) and Volos (Central Greece), have reported the highest female divorce rates in Greece over the period 1907-1920, while the lowest female divorce rates were found in Central Greece (Karditsa, Evrytania, Vomokos and Parnassida) and in some parts of Southern Greece (Megalopoli, Gortynia, Epidavros and Pylos). In addition, **Figures 2.1** and **2.2** show the differences in female divorce rates between 1907 and 1920. As we see, more than half (around 66%) of the Greek provinces have been reported to have higher female divorce rates after the implementation of Divorce Law (**Figure 2.1**), while the rest (34%) of them appeared to have lower levels of female divorce in 1920 compared

to 1907 levels (**Figure 2.2**). More specifically, Attica (Central Greece) and the Islands of Hydra, Euboea, Corfu, Zante, Paxi and Andros, experienced the highest increases in female divorce rates between 1907 and 1920, whereas the largest part of Central Greece (Dorida, Tyrnavos, Evrytania, Domokos, Thebes, Parnassida, Valtos, Nafpactia, and Agia), a part of the Cyclades Islands (Tinos and Syros), and Aegina (Argo-Saronic Island), were found to be associated with the most significant reductions in female divorce rates the period 1907-1920.



Map 2.1 Highest Female Divorce Rates



Map 2.2 Lowest Female Divorce Rates

1907



Map 2.3 Highest Female Divorce Rates



Map 2.4 Lowest Female Divorce Rates

1920

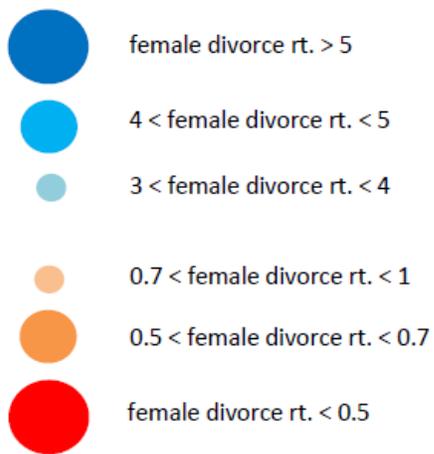


Figure 2.1 Differences in Female Divorce Rates between 1907 and 1920 (provincial level)

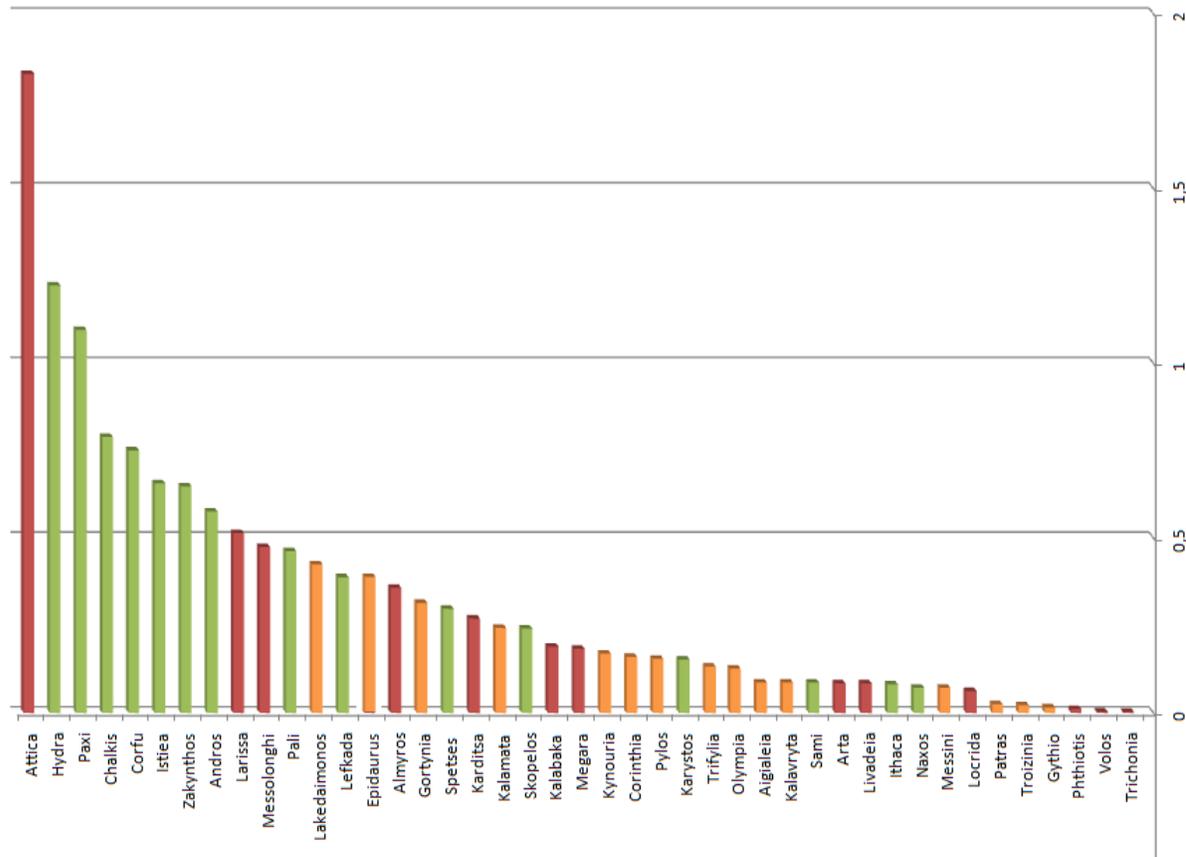
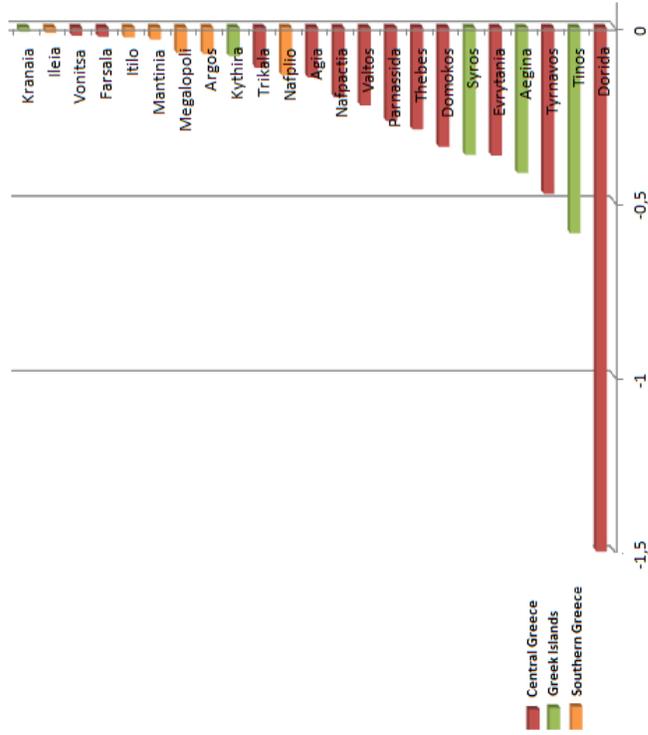


Figure 2.2 Differences in Female Divorce Rates between 1907 and 1920 (provincial level)



2.4.2 Correlation Analysis

As a first step in exploring the potential linkages between female employment and female divorce rates in the early twentieth-century Greece, the relevant correlation coefficients are presented in **Table 2.5**. My results imply that female labour force participation in modern occupations has been found to be positively correlated with female divorce rates in both 1907 and 1920. On the contrary, female participation in traditional agricultural activities has been found to be negatively associated with female divorce rates for the whole period from 1907 to 1920. A deeper insight into the effects of each occupational category on female divorces has shown that female participation rates in self-employment, servant's duties and the public sector were positively correlated with female divorce rates over the period 1907-1920, while female participation rates in agriculture and livestock production were found to be negatively related to female divorces over the same period of time. However, although total female employment and female participation in manufacturing activities have both reported positive relationships with female divorces in 1907, they both appeared to have a small negative correlation with female divorce rates after the implementation of the new divorce law (1920). Another interesting result is the positive correlation between female participation in religious organizations and female divorce rates. Similar to the above analysis, **Table 2.6** presents the correlation coefficients between female divorce rates and other important socioeconomic and demographic factors. Women's early age at marriage was found positively related to female divorce rates, while early marriage for men was negatively correlated with female divorces. Further, factors such as availability of single men, and men's modern occupational status, have been found to be positively correlated with female divorce rates. Finally, literacy development (male and female literacy rates), ethnic and religious differences (non-Greeks, Muslims and Catholics), and urbanization, were all found to be positively associated with female divorces. The different effects that females in modern occupations and females in agricultural activities have had on female divorce rates can also be seen in **Figures 2.3-2.6**.

Table 2.5 Correlation Coefficients

	1907		1920	
	Female Divorce (crude ratio)	Female Divorce (refined ratio)	Female Divorce (crude ratio)	Female Divorce (refined ratio)
Female Employment (%)	+0.30	+0.31	-0.04	-0.03
Females in Modern Occupations (%)	+0.17	+0.18	+0.06	+0.07
Females in Manufacturing (%)	+0.17	+0.18	-0.03	-0.02
Females in Self-Employment (%)	+0.32	+0.33	+0.39	+0.38
Females in Trade/Commerce (%)	0.00	0.00	+0.31	+0.31
Females in the Public Sector (%)	+0.17	+0.17	+0.30	+0.30
Females in Agricultural Activities (%)	-0.14	-0.14	-0.29	-0.28
Females in Agriculture (%)	-0.12	-0.12	-0.27	-0.26
Females in Livestock (%)	-0.17	-0.18	-0.15	-0.15
Females in Fishing/Hunting (%)	-0.06	-0.06	+0.15	+0.14
Female Servants (%)	+0.20	+0.21	+0.29	+0.29
Females in Religious Org. (%)	+0.39	+0.40	+0.32	+0.31

Table 2.6 Correlation Coefficients (2)

	1907		1920	
	Female Divorce (crude ratio)	Female Divorce (refined ratio)	Female Divorce (crude ratio)	Female Divorce (refined ratio)
Married Females <20 (%)	+0.16	+0.15	+0.41	+0.41
Married Males <20 (%)	-0.10	-0.11	-0.01	-0.00
Single-to-Married Males	+0.22	+0.24	+0.23	+0.24
Female Literacy (%)	+0.55	+0.56	+0.53	+0.53
Male Literacy (%)	+0.15	+0.16	+0.08	+0.08
Literacy Gap	-0.34	-0.34	-0.38	-0.38
Men's Occupational Status	+0.55	+0.55	+0.74	+0.74
Non Greeks (%)	+0.50	+0.50	+0.74	+0.75
Catholics (%)	+0.50	+0.51	+0.28	+0.28
Muslims (%)	+0.03	+0.02	+0.03	+0.03
Urbanization (%)	+0.37	+0.37	+0.59	+0.59

Figure 2.3

● divorce rates
● divorce-to-marriage rates

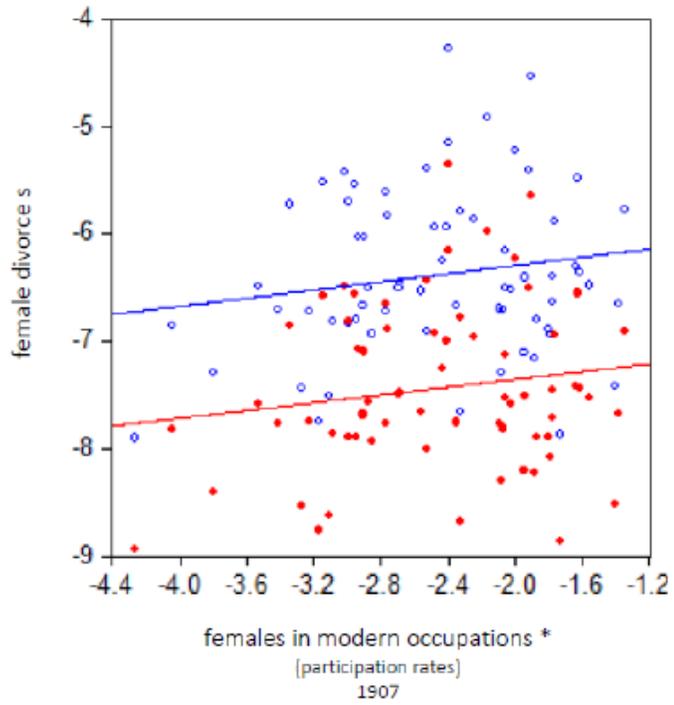
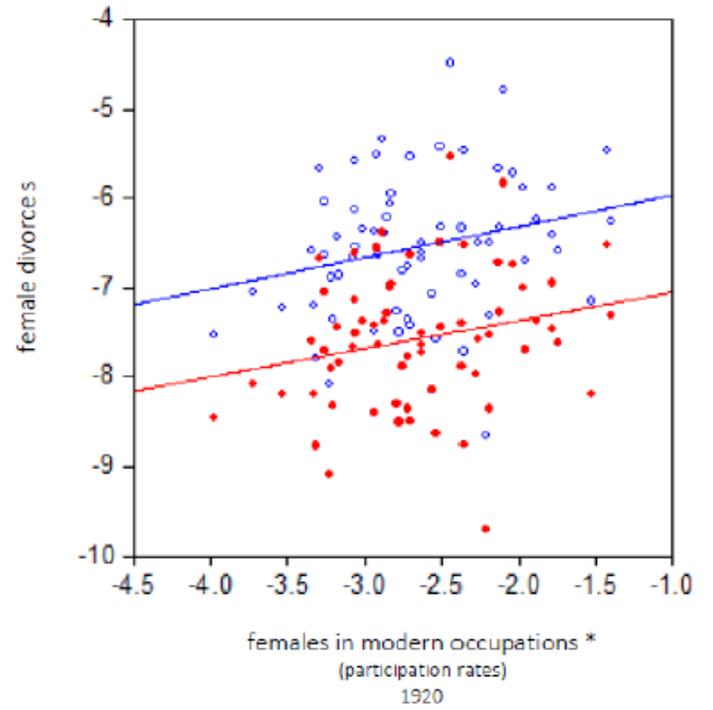


Figure 2.4

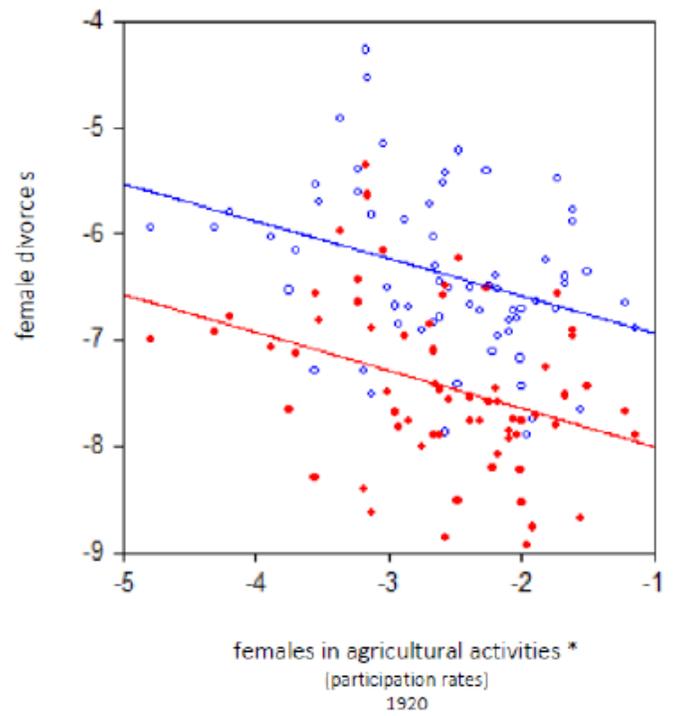
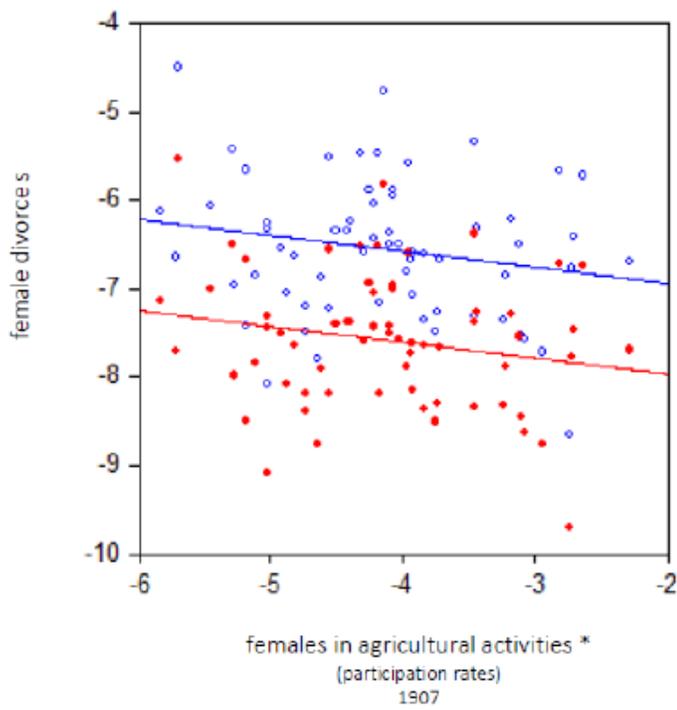


*modern occupations include: manufacturing activities, commerce & trade, self-employment and public sector employees

Figure 2.5

● divorce rates
● divorce-to-marriage rates

Figure 2.6



* agricultural activities include: agriculture & forestry, livestock production, fishing & hunting

2.5 Model Building

In order to test the statistical significance of the relations presented above, an ordinary least squares (OLS) regression model has been estimated using heteroskedasticity and autocorrelation consistent (HAC) standard errors. In fact, my regression model can be written as follows:

$$\text{female divorce rate (i, t)} = \mathbf{b_0} + \mathbf{b_1} * \text{female employment (i, t)} + \mathbf{c} * \mathbf{V}' (\mathbf{i, t}) + \mathbf{e (i, t)} \quad (2.1)$$

where **female divorce rate (i,t)** is the district female refined divorce rate in region i ($i=1,2,\dots,66$) at year t ($t=1907$, and 1920), **b₀** is the constant term, **female employment (i,t)** is the female labour force participation rate, **b₁** is the effect of women's occupational status on female divorces (the coefficient of interest), **V** is a vector of control variables including **early-age marriage for women, gender gap in literacy, availability of single men, urbanization, men's occupational status, ethnic/racial differences** (non Greeks), and **religion** (Catholics and Muslims), **c** is a vector of coefficients representing the effects of control variables on female divorce, and **e(i,t)** the error term. **Regional dummies** have been also taken into consideration.

Alternatively, in order to address potential endogeneity problems, 2SLS and 3SLS estimates have been also calculated. More specifically, sex ratio, people working in army and religious organizations and widows were used as instrumental variables under the hypothesis that they do not affect female divorce rates directly, but only indirectly through their effects on female labour force participation.

2.6 Results

My empirical results (OLS, 2SLS and 3SLS estimates) have provided some evidence on the relationship between women's labour force participation and increased marital instability in the early twentieth-century Greece (see **Tables 2.7-2.10**). These findings seem to be consistent with previous studies, supporting the so-called Becker's economic independence hypothesis. However, the sign and the magnitude of the effects of female employment on female divorce rates have varied significantly over time and among different occupational groups. More specifically, women's total employment and female participation in modern professions (manufacturing, self-employment, commerce-trade and the public sector) have been shown to have a positive and significant impact on female divorce rates, but only in 1907. On the contrary, female participation in traditional agricultural activities (agriculture, livestock production and fishing-hunting) was found to have no significant impact on female divorce rates. At the same time, early-age marriages for women, as well as gender inequalities in literacy, were found to be both negatively correlated with female divorce rates, whereas availability of single men and urbanization have had positive but non always significant relationships with female divorces. Moreover, ethnic/racial and religious differences (non-Greeks, Catholics and Muslims) were found to have positive and significant impacts on female divorce rates. Lastly, island dummy had positive coefficients in all regressions, but not always significant.

Table 2.7: OLS Estimates ,1907 (HAC Standard Errors)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Female Employment % (all occupations)	+0.36** (0.14)	+0.25* (0.13)	+0.43*** (0.07)	+0.41*** (0.10)	-	-	-	-	-	-	-	-
Female Employment % (modern occupations)	-	-	-	-	+0.34** (0.13)	+0.26* (0.13)	+0.41*** (0.07)	+0.39** (0.12)	-	-	-	-
Female Employment % (agricultural activities)	-	-	-	-	-	-	-	-	-0.18 (0.10)	-0.03 (0.10)	+0.14** (0.07)	+0.06 (0.09)
Early-Age Marriage %	-	+0.49** (0.22)	+0.39** (0.15)	+0.36* (0.19)	-	+0.54** (0.22)	+0.43** (0.18)	+0.40* (0.21)	-	+0.40 (0.25)	+0.35* (0.21)	+0.34 (0.24)
Gender Gap in Literacy	-	-0.57** (0.22)	-0.25* (0.15)	-0.19 (0.19)	-	-0.60*** (0.20)	-0.37*** (0.13)	-0.30* (0.17)	-	-0.65*** (0.20)	-0.43** (0.17)	-0.39* (0.21)
Availability of Single Men	-	+1.11 (0.72)	+1.31** (0.51)	+0.69 (0.69)	-	+0.82 (0.77)	+0.86 (0.62)	+0.24 (0.79)	-	+1.16 (0.90)	+1.55** (0.67)	+1.00 (0.83)
Urbanization (dummy)	-	+0.09 (0.17)	+0.17 (0.12)	+0.09 (0.17)	-	+0.09 (0.17)	+0.17 (0.11)	+0.08 (0.16)	-	+0.09 (0.16)	+0.19 (0.13)	+0.11 (0.17)
Muslims - Catholics %	-	-	+0.18*** (0.02)	-	-	-	+0.17*** (0.02)	-	-	-	+0.18*** (0.03)	-
Non Greeks %	-	-	-	+0.15*** (0.05)	-	-	-	+0.15** (0.06)	-	-	-	+0.12** (0.06)
Island_regional_dummy	-	-	+0.24 (0.15)	+0.43*** (0.14)	-	-	+0.14 (0.15)	+0.33** (0.14)	-	-	+0.19 (0.18)	+0.36* (0.19)
Adjusted R-Squared	0.06	0.23	0.59	0.33	0.04	0.23	0.57	0.32	0.02	0.17	0.50	0.23

Note: This table presents OLS estimates of equation (1) for the year 1907. Female Divorce Rate (refined) is the dependent variable. Female Employment is the main independent variable. All regressions are at the provincial level (n=66). All variables are in logarithmic form (except the dummies). New-ey-West HAC standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01 ; ** p < 0.05 ; * p < 0.1.

Sources: 1907 Greek Population Census.

Table 2.8 : OLS Estimates ,1920 (HAC Standard Errors)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Female Employment % (all occupations)	-0.24* (0.13)	-0.03 (0.15)	+0.46** (0.17)	+0.28 (0.17)	-	-	-	-	-	-	-	-
Female Employment % (modern occupations)	-	-	-	-	-0.04 (0.25)	+0.15 (0.27)	+0.43** (0.20)	+0.32 (0.24)	-	-	-	-
Female Employment % (agricultural activities)	-	-	-	-	-	-	-	-	-0.35*** (0.08)	-0.14 (0.10)	+0.17 (0.13)	+0.06 (0.12)
Early-Age Marriage %	-	+0.47*** (0.16)	+0.21 (0.15)	+0.14 (0.14)	-	+0.47*** (0.15)	+0.20 (0.16)	+0.13 (0.14)	-	+0.42** (0.17)	+0.27 (0.19)	+0.17 (0.17)
Gender Gap in Literacy	-	-1.16*** (0.22)	-0.61** (0.23)	-0.53** (0.20)	-	-1.19*** (0.21)	-0.68*** (0.23)	-0.58*** (0.19)	-	-1.07*** (0.24)	-0.70** (0.28)	-0.57** (0.23)
Availability of Single Men	-	+0.54 (0.95)	+1.69** (0.77)	+1.20 (0.73)	-	+0.51 (0.96)	+1.40* (0.71)	+1.01 (0.70)	-	+0.54 (0.89)	+1.58* (0.80)	+1.10 (0.73)
Urbanization (dummy)	-	+0.13 (0.17)	+0.20 (0.12)	+0.17 (0.15)	-	+0.11 (0.17)	+0.22 (0.14)	+0.17 (0.15)	-	+0.16 (0.17)	+0.21 (0.14)	+0.18 (0.16)
Muslims - Catholics %	-	-	+0.16*** (0.03)	-	-	-	+0.15*** (0.03)	-	-	-	+0.16*** (0.03)	-
Non Greeks %	-	-	-	+0.22*** (0.06)	-	-	-	+0.21*** (0.05)	-	-	-	+0.21*** (0.07)
Island_regional_dummy	-	-	+0.62*** (0.20)	+0.69*** (0.20)	-	-	+0.47** (0.20)	+0.61*** (0.19)	-	-	+0.56** (0.23)	+0.62*** (0.20)
Adjusted R-Squared	0.00	0.36	0.55	0.51	0.00	0.31	0.53	0.51	0.10	0.32	0.50	0.48

Note: This table presents OLS estimates of equation (1) for the year 1920. Female Divorce Rate (refined) is the dependent variable. Female Employment is the main independent variable. All regressions are at the provincial level (n=66). All variables are in logarithmic form (except the dummies). Newey-West HAC standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01 ; ** p < 0.05 ; * p < 0.1.

Source: 1920 Greek Population Census.

Table 2.9 2SLS & 3SLS, 1907

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	
Female Employment % (all occupations)	+0.58* (0.34)	+0.58* (0.34)	+0.56** (0.25)	+0.56** (0.25)	+0.78* (0.46)	+0.68 (0.45)	+1.00** (0.50)	+1.00** (0.50)	+0.69** (0.30)	+0.70*** (0.30)	+0.97* (0.59)	+0.87 (0.58)	-0.40 (0.26)	-0.40 (0.26)	+0.33 (0.33)	+0.34 (0.33)	+0.40 (0.41)	+0.41 (0.41)	
Female Employment % (modern occupations)																			
Female Employment % (agricultural activities)																			
Early-Age Marriage %			+0.42** (0.20)	+0.38* (0.19)	+0.42 (0.26)	+0.34 (0.25)			+0.54** (0.23)	+0.45** (0.22)	+0.55* (0.31)	+0.41 (0.29)			+0.47 (0.31)	+0.39 (0.30)	+0.57 (0.39)	+0.40 (0.38)	
Gender Gap in Literacy			-0.19 (0.18)	-0.20 (0.18)	-0.00 (0.29)	-0.11 (0.28)			-0.32* (0.16)	-0.31** (0.15)	-0.15 (0.24)	-0.21 (0.23)			-0.43** (0.17)	-0.38** (0.16)	-0.39* (0.21)	-0.32 (0.20)	
Availability of Single Men			+1.28* (0.67)	+1.36** (0.66)	+0.50 (0.93)	+0.81 (0.90)			+0.51 (0.80)	+0.86 (0.78)	-0.71 (1.37)	+0.30 (1.30)			+1.83** (0.91)	+1.81** (0.90)	+1.45 (1.14)	+1.43 (1.10)	
Urbanization (dummy)			+0.17 (0.12)	+0.18 (0.12)	+0.09 (0.16)	+0.12 (0.15)			+0.16 (0.13)	+0.18 (0.12)	+0.05 (0.17)	+0.11 (0.16)			+0.21 (0.14)	+0.19 (0.13)	+0.14 (0.18)	+0.11 (0.17)	
Muslims - Catholics %			+0.18*** (0.03)	+0.18*** (0.03)					+0.18*** (0.03)	+0.18*** (0.03)					-0.20*** (0.05)	+0.20*** (0.05)			
Non Greeks %					+0.19*** (0.07)	+0.16** (0.06)					+0.21** (0.08)	+0.16** (0.07)					+0.16** (0.08)	+0.16** (0.07)	
Island_regions_dummy			+0.27 (0.18)	+0.24 (0.18)	+0.52** (0.25)	+0.49* (0.24)			+0.14 (0.18)	+0.13 (0.17)	+0.33 (0.24)	+0.32 (0.22)			+0.26 (0.23)	+0.21 (0.22)	+0.51 (0.31)	+0.42 (0.30)	
Adjusted R-Squared	0.03	0.03	0.58	0.58	0.27	0.29	-0.17	-0.17	0.54	0.53	0.17	0.20	-0.03	-0.03	0.46	0.45	0.12	0.10	

Note: This table presents 2SLS & 3SLS estimates of equation (1) for the year 1907. Female Divorce Rate (refined) is the dependent variable. Female Employment is the main independent variable. Sex Ratio, People Working in Army & Religious Organizations, and Widows are used as instruments for women's employment.

All regressions are at the provincial level (n=66). All variables are in logarithmic form (except the dummies). Robust standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: ***p < 0.01; **p < 0.05; *p < 0.1.

Sources: 1907 Greek Population Census.

Table 2.10 2SLS & 3SLS, 1920

	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	2SLS	3SLS	
Female Employment % (all occupations)	-2.13** (0.81)	+2.31** (0.81)	+0.10 (0.28)	-0.11 (0.28)	+0.04 (0.15)	-0.10 (0.37)	-1.35* (0.68)	-1.35** (0.68)	+0.19 (0.39)	+0.14 (0.38)	+0.19 (0.45)	+0.20 (0.45)	-1.11*** (0.30)	-1.11*** (0.30)	-0.02 (0.22)	-0.13 (0.21)	-0.10 (0.22)	-0.19 (0.22)	
Female Employment % (modern occupations)																			
Female Employment % (agricultural activities)																			
Early-Age Marriage %			+0.23 (0.15)	+0.20 (0.14)	+0.16 (0.15)	+0.15 (0.15)			+0.22 (0.15)	+0.21 (0.15)	+0.14 (0.15)	+0.14 (0.15)			+0.24 (0.16)	+0.22 (0.15)	+0.15 (0.16)	+0.15 (0.15)	
Gender Gap in Literacy			-0.65*** (0.22)	-0.64*** (0.21)	-0.56** (0.22)	-0.55** (0.22)			-0.68*** (0.22)	-0.67*** (0.21)	-0.57** (0.22)	-0.56** (0.22)			-0.66*** (0.23)	-0.66*** (0.22)	-0.54** (0.23)	-0.57** (0.22)	
Availability of Single Men			+1.49* (0.81)	+1.21 (0.78)	+1.08 (0.82)	+0.93 (0.80)			+1.42* (0.79)	+1.34** (0.78)	+1.03 (0.79)	+0.98 (0.79)			+1.41* (0.84)	+1.05 (0.81)	+1.00 (0.83)	+0.72 (0.80)	
Urbanization (dummy)			+0.23 (0.14)	+0.23 (0.14)	+0.19 (0.14)	+0.19 (0.14)			+0.24 (0.14)	+0.22 (0.14)	+0.18 (0.14)	+0.17 (0.14)			+0.25 (0.15)	+0.26* (0.15)	+0.21 (0.15)	+0.21 (0.15)	
Muslims - Catholics %			+0.15*** (0.03)	+0.14*** (0.03)	+0.20*** (0.06)	+0.19*** (0.06)			+0.14*** (0.03)	+0.14*** (0.03)	+0.21*** (0.06)	+0.21*** (0.05)			+0.14*** (0.04)	+0.14*** (0.04)	+0.18*** (0.06)	+0.17*** (0.06)	
Non Greeks %																			
Island_regional_dummy			+0.49*** (0.22)	+0.53** (0.22)	+0.60** (0.24)	+0.63*** (0.24)			+0.46** (0.20)	+0.47** (0.19)	+0.60*** (0.20)	+0.61*** (0.20)			+0.44* (0.25)	+0.46* (0.24)	+0.53** (0.24)	+0.56*** (0.23)	
Adjusted R-Squared	-1.32	-1.32	0.51	0.43	0.49	0.45	-0.45	-0.45	0.51	0.50	0.50	0.50	-0.46	-0.46	0.47	0.42	0.46	0.43	

Note: This table presents 2SLS & 3SLS estimates of equation (1) for the year 1920. Female Divorce Rate (efinef) is the dependent variable. Female Employment is the main independent variable. Sex Ratio, People Working in Army & Religious Organizations, and Widows are used as instruments for women's employment. All regressions are at the provincial level (n=66). All variables are in logarithmic form (except the dummies). Robust standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01; ** p < 0.05; * p < 0.1. Source: 1920 Great Population Census.

2.7 Conclusion

The present paper represents the first empirical investigation of the relationship between women's employment and increasing marital instability in the early twentieth-century Greece, using provincial-level data from the 1907 and 1920 Greek Population Censuses. For the purpose of my analysis, a new dataset has been created, including various socioeconomic and demographic indicators, such as divorce rates, age at marriage, women's educational level, availability of single men, urbanization, ethnic differences, men's social status and religious affiliation. My OLS, 2SLS and 3SLS cross-sectional results seem consistent with previous studies, indicating positive associations between female employment and marital instability (women's economic independence hypothesis). However, the magnitude and sign of the estimated coefficient is not always clear and straightforward. More specifically, women's total employment and female participation in modern occupations appeared to have a positive impact on marital instability, but significant only in 1907. This effect became insignificant after the implementation of the 1920 Divorce Law. On the other hand, female participation in agricultural activities showed no significant impacts on female divorce in both 1907 and 1920. Additionally, factors such as early age at marriage for women and gender gap in literacy, had negative and significant effects on female divorce rates, while availability of single men and urbanization recorded positive linkages with marital instability, though not always statistically significant. Further, non-Greeks, Catholic and Muslim populations have had significant positive impacts on female divorce. Finally, the Greek Islands were found to be positively related to female divorce rates, but not always significant.

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Chapter 3

Births Outside Marriage and Modernization in Early Twentieth-Century Greece:

Evidence from the Natural Movement of Population,
Causes of Death, and Agricultural Censuses, 1921-1938.

Tryfonas Lemontzoglou

University of Siena

Department of Economics and Statistics

trifonaslemon@gmail.com

Abstract

Family relations in early modern Greece have been shown to be greatly diversified compared to other European countries during the same era, characterized by early marriages for women, low divorce rates, and even lower levels of cohabitation and children born outside of marriage. However, the process of modernization that took place in the late nineteenth and early twentieth-century Greece slowly but steadily changed family patterns and behaviours, including a decline in marriage, an increase in marital breakdowns, and a relative rise in non-marital births. Although these trends have been widely reported and discussed in the previous literature, empirical studies examining factors that have contributed to the rise in births outside marriage in the early twentieth-century Greece are still very limited. Thus, the present paper aims to fill this gap by providing some of the first empirical evidence of a positive and significant linkage between non-marital childbearing and modernization process in early twentieth-century Greece. For the purpose of my analysis, a new panel dataset has been constructed based on information obtained from the Natural Movement of Population, Causes of Death, and Agricultural Censuses of Greece, covering thirty-two regions during the period 1921-1938. In fact, my panel estimates imply that women's increased access to divorce and remarriage, as well as agrarian modernity, were both found to be positively associated with births outside marriage in early twentieth-century Greece. On the contrary, early-age marriage for women and married men's stuck in agriculture have been found to adversely affect out-of-wedlock births. Finally, urban Greek areas and the Greek Islands appeared to have some positive effects on "illegitimate" births, while mortality rates were shown to be negatively related to "illegitimacy".

JEL Codes: J12, J13, J16.

Key Words: births outside marriage, early-age marriages, female divorces, marital instability, modernization, women's independence.

3.1 Introduction

Attitudes and behaviours towards family, marriage and divorce in early modern Greece have followed a highly diversified pathway, at least compared to other European countries, particularly characterized by early-age marriage for women, low divorce rates for both sexes, and an even lower rate of births outside of marriage (Gavalas 2008 ; Laslett 1983 ; Papataxiarchis 2012 ; Sant Cassia and Bada 1992). Paradoxically, even though the modern Greek state had already enjoyed its first bourgeois constitution from 1822 ³² (much earlier, for instance, than Germany, Italy or Russia), gender-based stereotypes, prejudice and discrimination remained dominant within Greek society till the late 1960s (Dubisch 1986 ; Lazaridis 2009 ; Thanailaki 2018). It is worthwhile to note that there existed no legal framework for divorce in Greece until the 1920s ³³, civil marriages were not allowed before 1982 ³⁴, and non-marital cohabitation was only legally recognized in 2009 ³⁵.

Although there are many studies discussing the trends towards fertility, mortality, marriage, divorce and remarriage in early modern Greece (Chouliarakis 1973 ; Hionidou 1997, 2006 ; Kotzamanis et al. 1994 ; Kotzamanis 2000 ; Kotzamanis and Androulaki 2009 ; Kotzamanis and Sofianopoulou 2009 ; Peristera and Kostaki 2007 ; Siampos 1990 ; Siampos 1994 ; Valaoras 1936, 1944, 1960, 1969, 1974), however, at the same time, there is a lack of empirical studies analyzing the factors that have contributed to increased levels of births outside marriage in the first half of the twentieth-century Greece. Thus, the present paper attempts to fill this gap, providing some of the first empirical evidence for the existence of a positive and significant relationship between non-marital births and modernization process in the early twentieth-century Greece. For this purpose, a newly panel dataset has been constructed

³²The adoption of the first Greek Constitution took place in Epidaurus during the 1st National Assembly in January 1822.

³³The first legal framework for modern divorce in Greece was enacted by the Law No. 2228/1920.

³⁴The institution of civil marriage in Greece was introduced in 1982 (Law 1250/82) by the Socialist Party (PASOK).

³⁵Greek law 3719/2008 on cohabitation.

based on information obtained from the Natural Movement of Population, Causes of Death, and Agricultural Greek Censuses ³⁶. This new dataset includes various demographic and socioeconomic indicators, such as births, deaths, marriages, divorces, remarriages, agrarian modernity, married men’s occupational status and urbanization, covering thirty-two regions of Greece during the period 1921-1938. More specifically, the main variable of interest to the present study is the proportion of births outside of marriage (**“illegitimate” births**). The implications can arise from studying trends towards “illegitimacy” have been widely underestimated, whereas non-marital births are still viewed by the vast majority of people as a “social problem” associated with family instability, single motherhood, children’s insecurity, abandonment, or even sexual abuse rather than as a new social phenomenon that may reflect the end of the traditional patriarchy and the development of modern and more egalitarian family forms, such as cohabitation. Besides “illegitimacy”, the percentage of divorced women who remarry has been used in my analysis to measure the possible effects of **women’s access to divorce and remarriage** (sex equity legislation) on births outside marriage in early twentieth-century Greece. Additionally, the proportion of women who marry before the age of twenty was also used to quantify the potential impacts of **early-age marriage for women** (parental control over women’s sexuality) on births outside marriage. Furthermore, the possible relation between **agricultural modernity** and non-marital births has been analyzed using the ratio of horses to oxen. **Mortality rates** have been also taken into consideration in order to determine possible linkages between the overall quality of life and out-of-wedlock births. Lastly, the proportion of married males employed in traditional agricultural activities has been used as a way to identify the impact of **married men’s occupational status** on “illegitimate” births. In fact, my panel estimates (pooled and period fixed-effects) confirm my main hypothesis that modernization process had positive and significant effects on births outside marriage in the early twentieth-century Greece. More specifically, women’s greater access to divorce and remarriage, as well as agrarian modernity,

³⁶source: Hellenic Statistical Authority.

have been both shown to be positively related to non-marital births, while mortality rates (low quality of life) were found to be negatively associated with “illegitimacy”. On the contrary, factors such as early-age marriage for women and married men’s stuck in agriculture, have been found to have negative effects on births outside of marriage. Finally, my findings have reported some noticeable region-related differences in non-marital birth rates between Southern, Northern and the Island Greek areas, as well as significant variations between urban and rural Greek districts.

The rest of the paper is organized as follows. **Section 3.2** summarizes related literature. **Section 3.3** describes the data and offers some descriptive statistics. **Section 3.4** analyzes methods and modeling. **Section 3.5** reports the empirical results. Finally, conclusions are drawn in **Section 3.6**.

* * *

3.2 Literature Review

3.2.1 Population History of Early Modern Greece

The demographic history of modern Greece starts in 1828, when the first Greek population census was enacted, followed later by the 1861, 1870, 1879, 1889, 1896, 1907, 1920, and 1928 populations censuses. Some special censuses have been also carried out in Greece in 1865, 1881, 1913, 1920, and 1923, in order to record demographic changes caused by the annexation of new territories (Ionian islands, Northern Aegean Islands, Crete, Macedonia, Epirus and Thrace)³⁷ and the “Minor Asia Disaster”³⁸. At the same time, the compulsory recording of vital events in Greece was established by Royal Decree in 1836³⁹, declaring town mayors as responsible for preparing and submitting annual reports on the vital statistics to the Central Statistical Office in Athens (Strong 1842). In 1856, a new law⁴⁰ has been passed in Greece, threatening sanctions against mayors who neglected their duties as registrars. However, most Greek communities had never effectively put this law into practice (Hionidou 1997). Indeed, a new approach was suggested in 1869, involving the recording of vital events to the registrars both by the family or relatives concerned, and independently by priests (Hionidou 1997). By 1885, the system for collecting annual totals in Greece collapsed, and therefore there are no official publications of vital statistics for the period 1886-1920 (Hionidou 1997). In 1921, the collection of data by the Central Statistical Office from the towns and communities that had continued registration was resumed and statistics were published for the period 1921 to 1938, with gradually improving coverage (Hionidou 1997). With Greece’s entry into the Second World War in 1940, however, the collection of the statistical forms collapsed once again, and did not revive until after 1955 (Hionidou 1997 ; Valaoras 1960, 1980).

³⁷Ionian Islands: 1864, Northern Aegean Islands: 1912, Crete: 1913, Macedonia: 1913, Epirus: 1914, Thrace: 1920.

³⁸Asia Minor Disaster is the name Greeks use for the defeat of the Greek Army in 1922 in the Greco-Turkish War (1919-1922).

³⁹Royal Decree of 20 October 1836.

⁴⁰Royal Decree of 31 October 1856.

Many studies have reported and discussed the trends towards marriage and family relations in early twentieth-century Greece, often referring to the so-called “Mediterranean” model as the most representative for the Greek case, characterized by early-age marriage for women, a large age gap between spouses, and a low percentage of the population that never married at all (Benigno 1989 ; Hajnal 1965 ; Laslett 1983). Even more specifically, a large number of other scholars have drawn attention to the demographic transition occurred in the late nineteenth and early twentieth-centuries Greece, highlighting the country’s population growth, the reduction in fertility and mortality rates, the later and less frequent marriages, and the increase in divorces (Chouliarakes 1973 ; Dimitras 1971 ; Gavalas 2001, 2008 ; Hionidou 1993 , 1995, 2006 ; Kotzamanis and Androulaki 2009 ; Kotzamanis and Sofianopoulou 2009 ; Peristera and Kostaki 2007 ; Siampos 1973 ; Siampos and Valaoras 1969 ; Valaoras 1936, 1960, 1969).

3.2.2 “Illegitimate” Births: Social Problem or Sexual Revolution ?

Even though a large number of studies on “illegitimate” births have been done in many European countries (Baloutzova 2011 ; Blaikie 1993 ; Brandstrom 1996 ; De Langhe and Mechant 2009 ; Durbach 2014 ; Garoarsdottir 2000 ; Horska 1980 ; Knodel 1967 ; Leneman and Mitchison 1987 ; Muir 2017 ; Schumacher et al. 2007 ; Thane 2011 ; Tomasson 1976 ; Van Bavel 2007 ; Van Den Boomen and Puschmann 2018), however, there are still very few empirical studies linking births outside marriage to modernization process that took place in the first half of the twentieth century. At the same time, the existing literature has tended to refer mostly to negative attitudes and behaviours toward non-marital births, often associating the phenomenon of “illegitimacy” with unstable family relations, vulnerability, single motherhood, children’s insecurity, abandonment, poverty, and even if sexual abuse

(Cherlin 2004 ; Cleland 2001 ; Fairchilds 1978 ; Fuchs 1987 ; Oosterveen et al. 1980 ; Reid and Blaikie 2006 ; Revuelta-Eugercios 2013 ; Schumacher et al. 2007 ; Smout 1980 ; Tilly et al. 1976). Unfortunately, this framework has partially underestimated or misunderstood another important aspect lying behind the rise in out-of-wedlock births in the early twentieth century dealing with the emergence of cohabitation and childbearing outside of marriage as alternative family forms to traditional marriage, marking the breakdown of the patriarchal family relations and the end of social control over women's sexuality (Frykman 1975 ; Gietel-Bastel and Verropoulou 2018 ; Lee 1981 ; Shorter 1971, 1975 ; Smout 1976). Thus, following Shorter's sexual revolution hypothesis, the rise of modern capitalism in the late eighteenth and early nineteenth centuries has been considered to be strictly connected with the increase in non-marital births at the same period of time. Shorter's approach to "illegitimacy" also appears to be on the same line with other scholars analyzing the effects of modernization, urbanization, and industrialization on marriage, family, and sexuality (Burgess and Locke 1945 ; Cherlin 1992, 2004 ; Goldin and Sokoloff 1982 ; Goode 1963,1983 ; Greenfield 1961 ; Le Play 1982 ; Lesthaeghe 1995 ; Parsons 1955 ; Ruggles 2012).

3.3 Variables and Trends

In order to provide some of the first empirical evidence linking “illegitimate” births to modernization process that took place in the early twentieth-century Greece, a new panel dataset has been constructed based on information obtained from the Greek Natural Movement of the Population, Causes of Death, and Agricultural Censuses. This dataset contains various demographic indicators, such as births, deaths, marriages, divorces, remarriages, agricultural modernity, land productivity, men’s social status, urbanization, etc., covering thirty-two regions of Greece during the period 1921-1938. **“Illegitimacy”**, the main dependent variable in this study, was calculated using the ratio of “illegitimate” live births to total live births. My independent variables include **women’s access to divorce and remarriage, early-age marriages for women, men’s class preferences on marriage, overall quality of life, agricultural modernity, and urbanization. Regional dummies** have also been taken into consideration. More specifically, the **percentage of divorced women who remarry** has been used as an approximation of **gender equality in legislation**. The higher the value of divorced women who remarry, the lower is expected to be the gender discrimination against women within society, and therefore, a higher level of births outside marriage would probably have emerged. Moreover, the **popularity of alternative to traditional marriage relationship forms** among young adults (cohabitation, premarital sex, extramarital sex, etc.) was measured by using the **proportion of women who marry before age twenty**. A high rate of early-age marriages for women reflects a greater degree of parental control over women’s sexuality, while a relatively lower one is associated with greater women’s independence and sexual freedom, leading to more non-marital births. Additionally, the **ratio of married males engaged in agricultural activities to married males employed as workers** has been used to capture **men’s class preferences on marriage**. As far as the degree of **agrarian modernity** is concerned, the **ratio of horses to oxen** was used in my analysis. More urbanized and modernized areas are expected to be positively related to births outside of marriage. Finally, **mortality** (total, newborn, and maternal

mortality rates) has been used as a way to determine whether or not the **overall quality of life** was linked to “illegitimate” birth rates. A set of **regional dummy variables** has been also constructed to investigate possible geographical variations in “illegitimate” rates among Greek territories. **Tables 3.1** and **3.2** present the definitions and the trends of these variables over time, respectively.

Table 3.1 Definitions of the Variables

1. Birth Rates:

Births Outside Marriage (%) = "Illegitimate" Births / Total Live Births

Total Births (per 1,000 people) = (Total Live Births / Total Population)*1000

2. Death Rates:

Total Deaths (per 1,000 people) = (Deaths / Total Population)*1000

Maternal Mortality (per 1,000 live births) = (Women who Died during Pregnancy / Total Live Births)*1000

Newborn Mortality (per 1,000 live births) = (Children who Died during Birth / Total Live Births)*1000

3. Marriage Rates

Marriage Rate (per 1,000 people) = (Married People / Total Population)*1000

Early-Age Marriages for Women = Women who Married before the Age of 20 / Total Number of Women who Married

4. Women's Right to Divorce and Remarry

Divorced Women who Remarried (%) = Divorced Women who Remarried / Total Number of Women who Married

5. Men's Class Preferences Concerning Marriage:

Married Men's Stuck in Agriculture = Married Men in Agricultural Activities / Married Men in Modern Occupations

6. Agrarian Modernization:

Agrarian Modernization = Horses / Oxen

Table 3.2 Trend Analysis (1921-1938)

	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Fertility																		
“Illegitimate” Births (%)	0.97%	0.90%	1.04%	0.81%	0.91%	0.86%	0.85%	0.83%	1.00%	1.01%	1.12%	1.21%	1.20%	1.23%	1.16%	1.24%	1.19%	1.28%
Crude Birth Rate (per 1,000 people)	23.23	21.53	20.01	19.74	25.85	29.51	28.20	30.37	28.81	30.89	30.80	28.37	28.83	31.35	27.68	27.27	25.88	26.08
Mortality																		
Crude Death Rate (per 1,000 people)	14.79	14.89	16.73	14.13	14.04	13.61	15.58	16.19	17.78	16.00	17.40	17.34	16.44	14.70	14.54	14.61	14.66	12.96
Maternal Mortality (per 1,000 live births)	-	7.49	8.04	8.85	6.65	6.36	6.42	6.77	7.05	5.59	5.58	4.84	3.93	4.48	4.61	4.30	4.05	3.32
Child’s Death on Birth (per 1,000 live births)	14.02	11.60	11.70	14.06	12.75	11.74	11.59	10.39	9.72	9.58	11.09	10.67	9.62	9.30	8.44	8.18	8.69	8.06
- “Illegitimate” Births (%)	4.77%	6.00%	6.25%	6.28%	5.91%	7.18%	6.85%	8.00%	6.11%	8.24%	5.94%	4.62%	5.52%	6.40%	6.45%	4.55%	7.72%	6.54%
- “Legitimate” Births (%)	1.03%	1.14%	0.77%	1.05%	0.93%	1.24%	1.01%	1.07%	0.95%	1.01%	0.98%	1.06%	0.97%	1.36%	1.05%	1.08%	0.85%	0.95%
Crude Marriage Rate (per 1,000 people)	6.08	5.90	7.69	7.35	8.42	7.62	7.33	6.97	7.17	7.04	7.11	6.21	7.06	6.96	6.45	5.44	6.05	6.21
Divorced Women who remarried (%)	0.79%	0.63%	0.39%	0.21%	0.41%	0.33%	0.37%	0.44%	0.49%	0.69%	0.79%	0.85%	0.66%	0.90%	0.82%	0.95%	1.08%	1.06%
Early-Age Marriage for women (%)	1.47%	15.92%	14.18%	14.38%	16.36%	17.41%	18.73%	19.61%	20.96%	20.66%	20.70%	19.66%	18.73%	15.97%	15.40%	15.66%	15.24%	16.79%
Horses to Oxen (agrarian modernization)	0.36	0.48	0.46	0.57	0.58	0.69	0.75	0.79	0.64	1.01	1.00	1.14	1.27	1.38	1.65	1.64	1.97	1.56
Married Men’s Stuck in Agriculture	-	16.63	15.22	15.91	16.63	11.93	16.06	19.62	16.34	16.47	20.56	22.44	27.40	43.99	26.92	18.35	26.92	22.60
Land Productivity																		
- wheat production	75	66	67	50	69	63	68	58	62	47	56	73	99	78	78	64	90	106
- barley production	85	89	81	55	75	69	69	61	67	64	65	83	102	84	85	76	99	108

3.3.1 Births and Deaths

As my empirical results indicate, the “**illegitimate**” **birth rate** in early twentieth-century Greece has shown a remarkable increase over the period 1928-1938 (see **Figure 3.1**). However, as has been illustrated in **Figure 3.2**, some important regional variations in “illegitimate” births throughout Greek territories can be observed by looking at different geographical areas. In general, the Southern Greek areas (Peloponnese) appeared to have significantly higher levels of births outside marriage compared to other Greek areas, while, on the other hand, the Northern Greek areas were found to be associated with the lowest rates of non-marital births for the whole period 1921-1938. At the regional level, Attica-Boeotia (Central Greece) appeared to have the highest level of out-of-wedlock births, followed by two Ionian Islands (Corfu and Zante), Achaean-Elis (Peloponnese), and two Northern Aegean Islands (Lesvos and Samos). Apparently, almost all the other Greek regions had reported very low levels of “illegitimacy”, with the lowest levels have been observed in Northern Greece (Drama, Rodopi, Kozani, Pella, Evros and Serres) (see **Figure 3.3**). A clear picture of the broad spread of non-marital childbearing throughout Greek territories between 1921-1938 can also be seen in **Maps 3.1 - 3.5**.

Figure 3.1 Births Outside Marriage

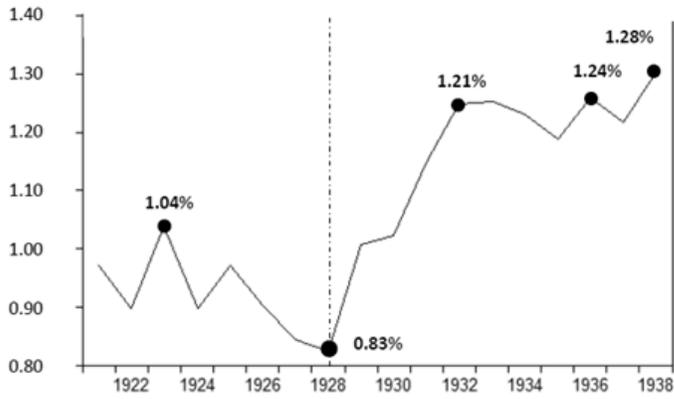


Figure 3.2 Births Outside Marriage (different geographic areas)

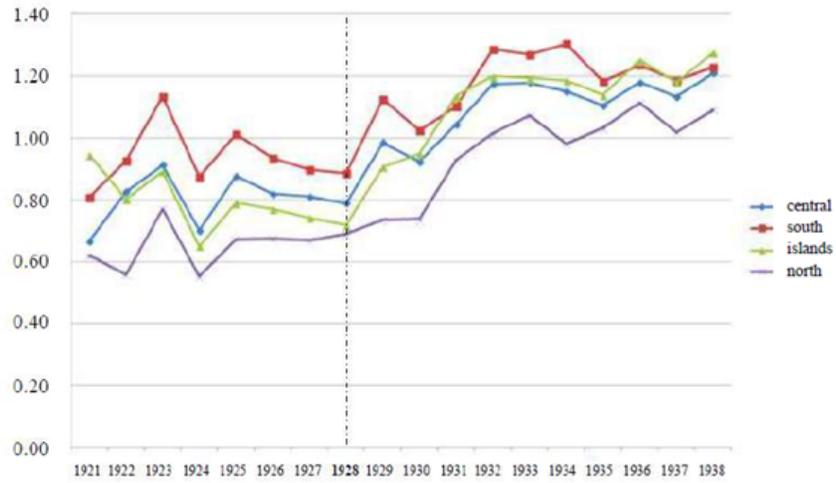
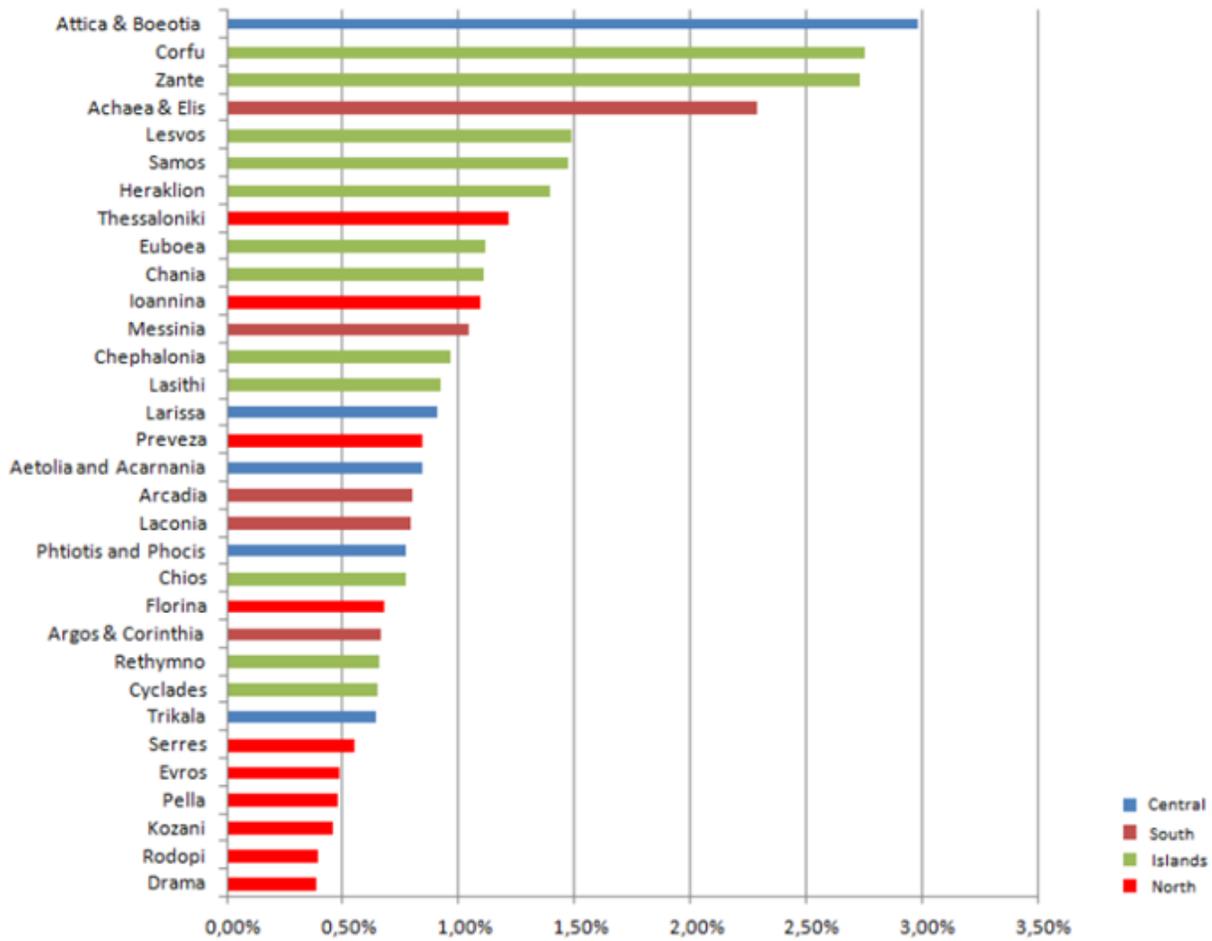


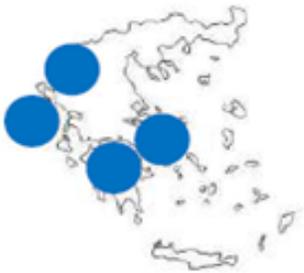
Figure 3.3 Births Outside Marriage (average rates: 1921-1938)



"Illegitimacy" Expansion: 1921-1938

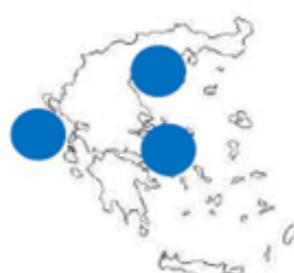
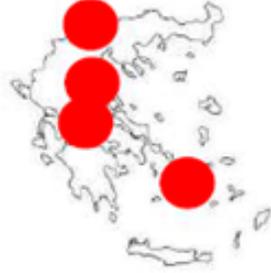
Map 3.1

1921-1925



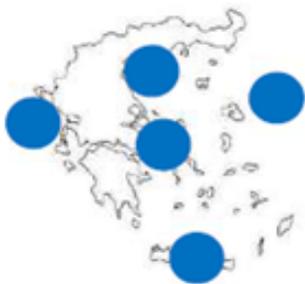
Map 3.2

1925-1928



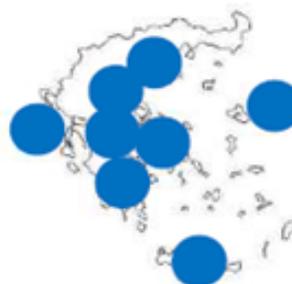
Map 3.3

1928-1931



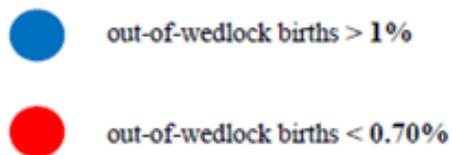
Map 3.4

1931-1934



Map 3.5

1934-1938



Contrary to “illegitimacy”, the **overall fertility rate** in Greece has shown a sharp decline in the second half of the 1930s, even though it has previously had a noticeable recovery the period from 1924 to 1934, actually returning to its pre-war levels (see **Figure 3.4**). Unlike before, here, there were the Northern Greek areas that enjoyed the highest fertility rates, while the Southern areas were characterized by the lowest levels of total birth rates among all Greek areas (see **Figure 3.5**).

Figure 3.4 Crude Birth Rate (per 1,000 people)

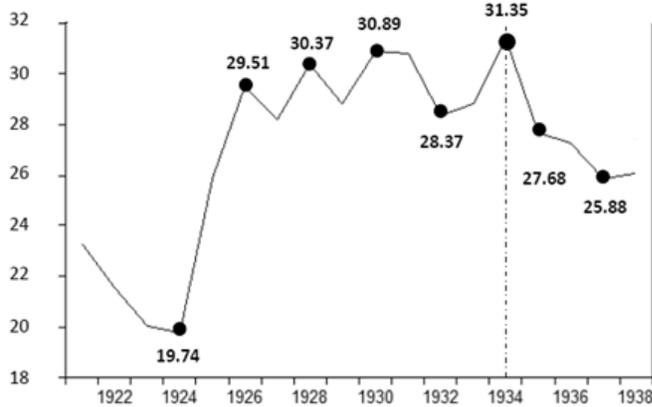
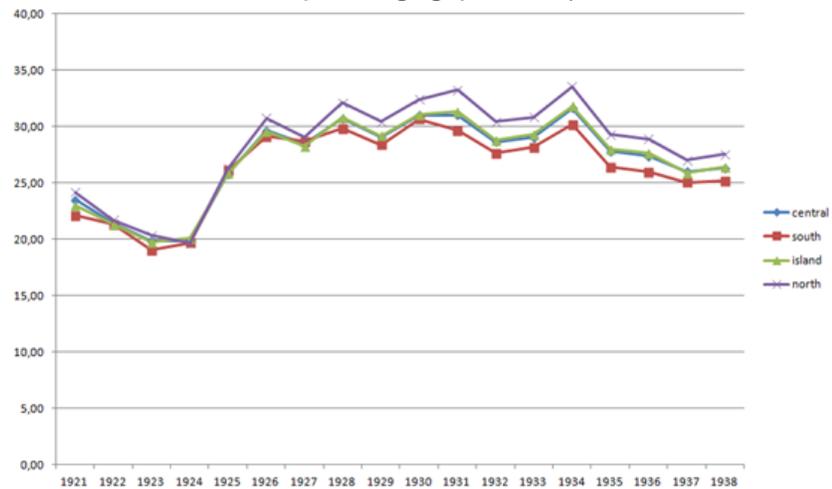


Figure 3.5 Crude Birth Rate (per 1,000 people) (different geographical areas)



Similar to the declining trend in overall fertility, **mortality rate** has been also reported to follow a downward path over the period 1929-1938 (see **Figure 3.6**). The declining trend in mortality in early twentieth-century Greece is even more noticeable when newborn and maternal mortality rates are taken into consideration (see **Figures 3.7** and **3.8**). Another worthwhile result is the large gap between “illegitimate” and legitimate newborn mortality rates for the whole period 1921-1938 (see **Figure 3.9**).

Mortality Rates: 1921-1938

Figure 3.6 Crude Death Rate (per 1,000 people)

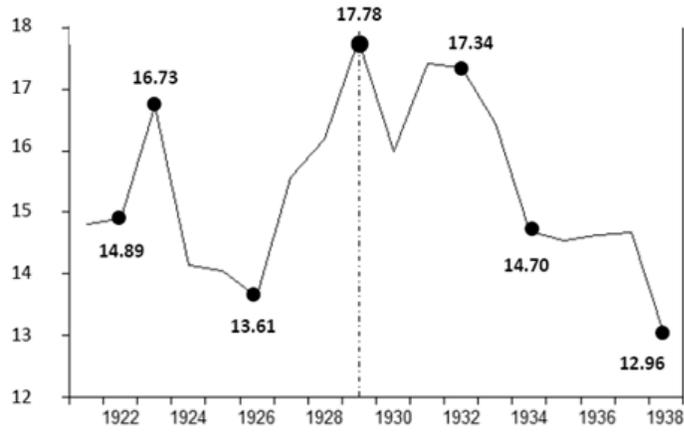


Figure 3.7 Newborn Mortality (per 1,000 live births)

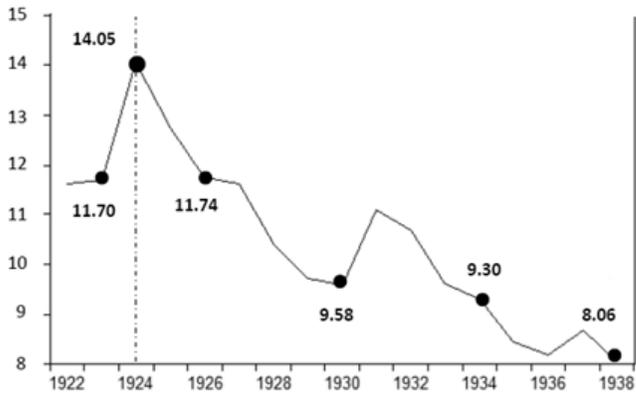


Figure 3.8 Maternal Mortality (per 1,000 live births)

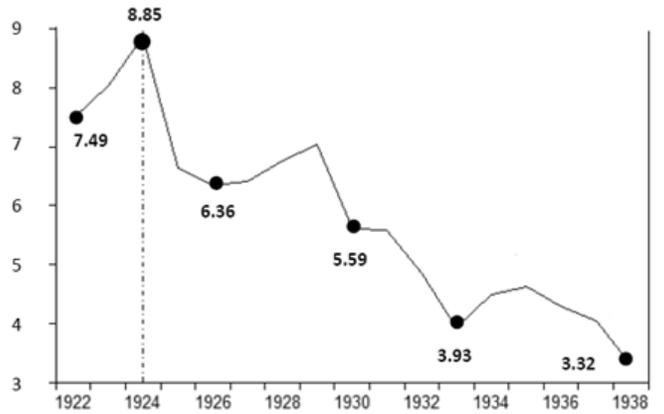
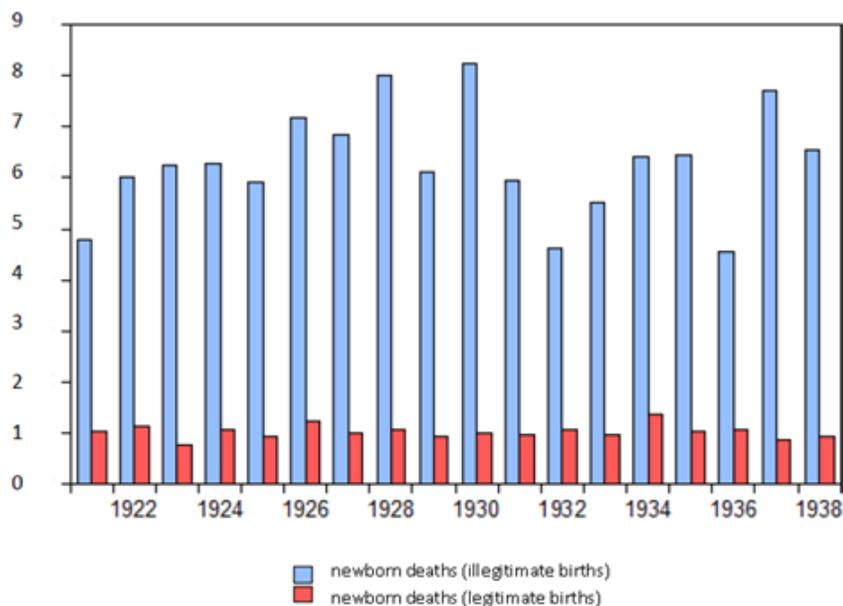


Figure 3.9 Newborn Deaths (%)



3.3.2 Remarriage of Divorced Women and Early-Age Marriages

The process of demographic transition that took place in Greece during the late nineteenth and early twentieth centuries has also brought major changes in marriage patterns and marital behaviours throughout the country. As **Figure 3.10** demonstrates, **marriage rate** has shown a noticeable decline between 1925 and 1936. However, the popularity of the institution of marriage has appeared varying somewhat from place to place (**Figure 3.11**). The lowest marriage rates were found in Crete Island (Chania and Rethymno), some of the Ionian Islands (Corfu and Cephalonia), and Peloponnese (Laconia and Achaea-Elis), whereas most of the Northern Greek areas have been shown to be associated with the highest marriage rates (Thessaloniki, Kozani, Ioannina, Evros and Serres). The drop in the overall rate of marriage in early nineteenth-century Greece was also followed by a significant increase in the proportion of **divorced women who remarried** throughout the whole period from 1924 to 1938 (**Figure 3.12**). The upward trends in women's right to divorce and remarriage at the provincial level are also visible in **Figure 3.13**. In addition, **early-age marriages for**

women after following a gradual upward trend from 1924 to 1929, then declined remarkably since 1934, however, remaining steadily high for the period 1934-1938 (see **Figure 3.14**). According to **Figure 3.15**, the Northern Greek areas had the highest levels of women marrying at early ages, while the lowest levels were observed in the Southern Greece.

3.3.3 Agrarian Modernization

Lastly, **Figures 3.16** and **3.17** present a clear upward trend in agrarian modernity for the whole period from 1921 to 1938, however, the persistence of large regional differences across Greek territories are easily visible. Southern and Central Greek areas seemed to have had a much sharper increase in the levels of agrarian modernity (substitution of oxen for horses) as compared to Northern Greece and the Greek Islands.

Figure 3.10 Crude Marriage Rate (per 1,000 people)

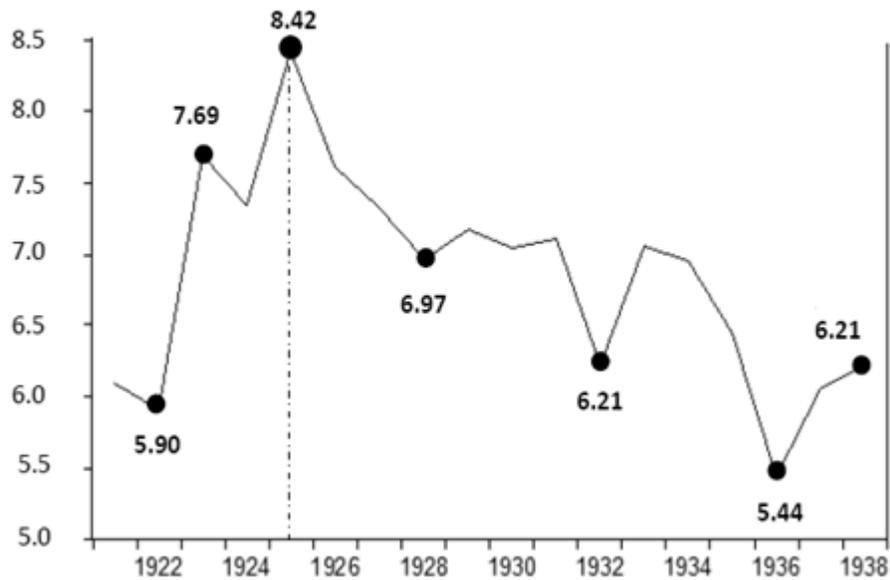


Figure 3.11 Crude Marriage Rates (per 1,000 people)

(average values: 1921-1928, regional level)

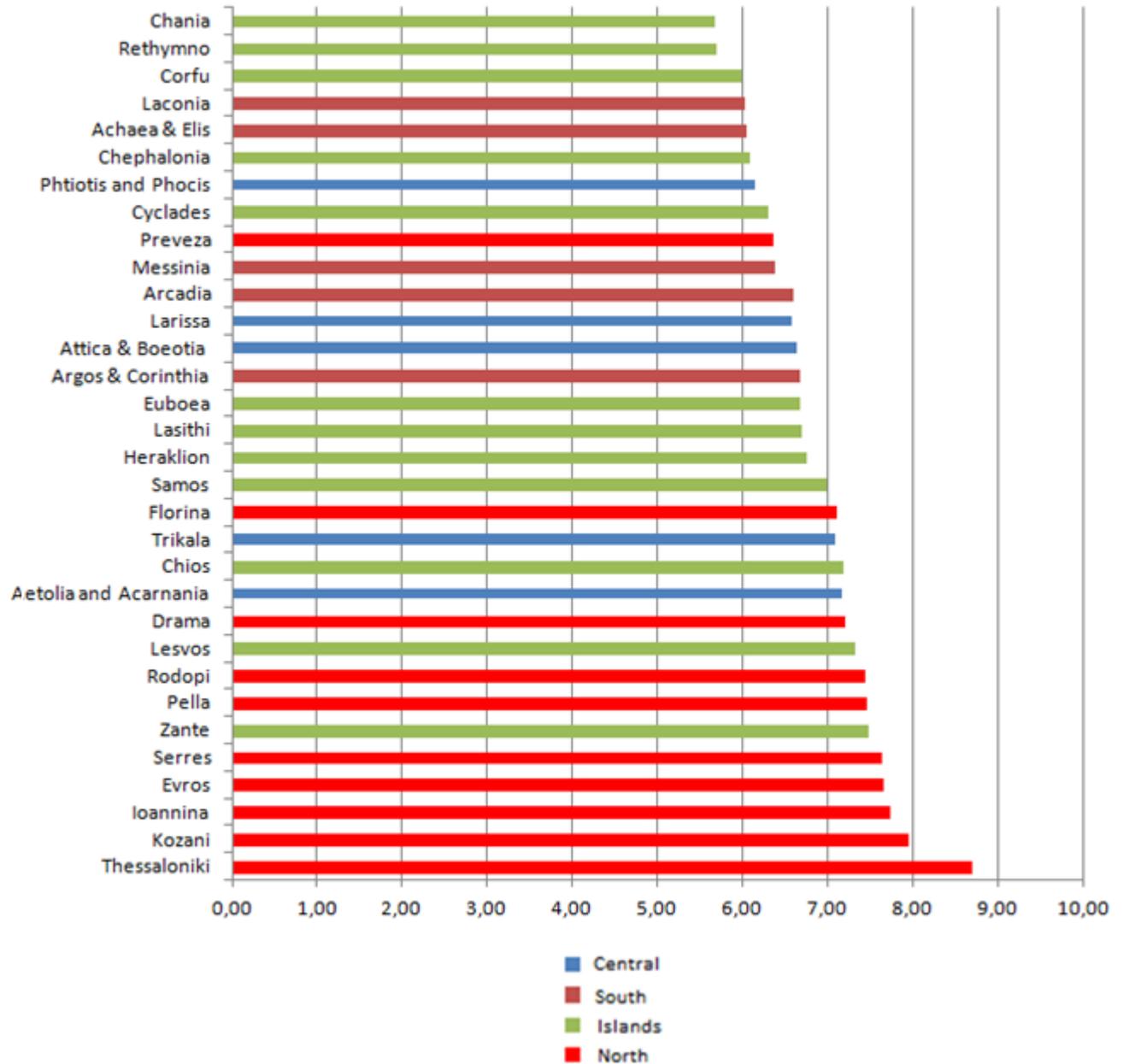


Figure 3.12 Divorced Women who Remarried (%)

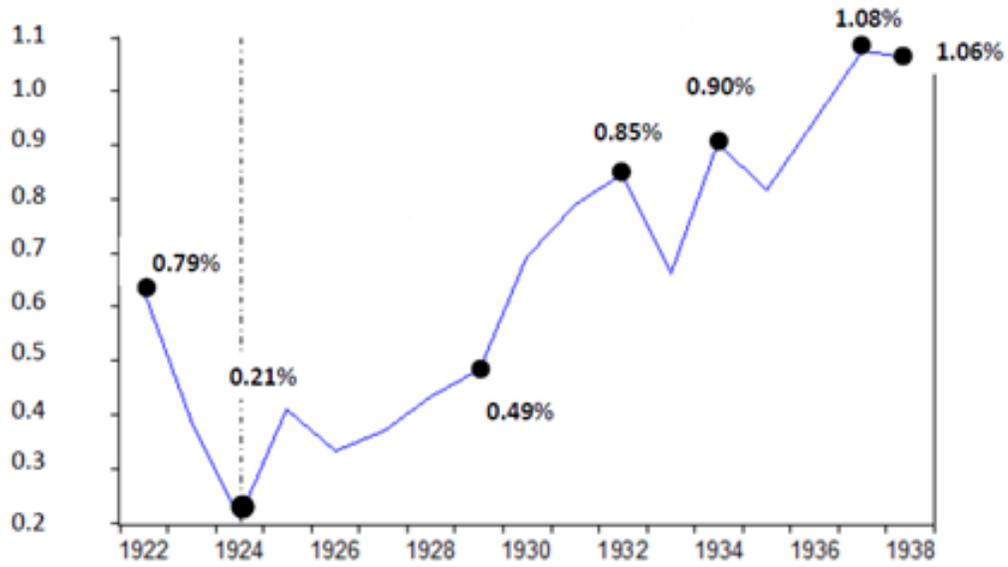


Figure 3.13 Divorced Women who Remarried (%)

(different geographical areas)

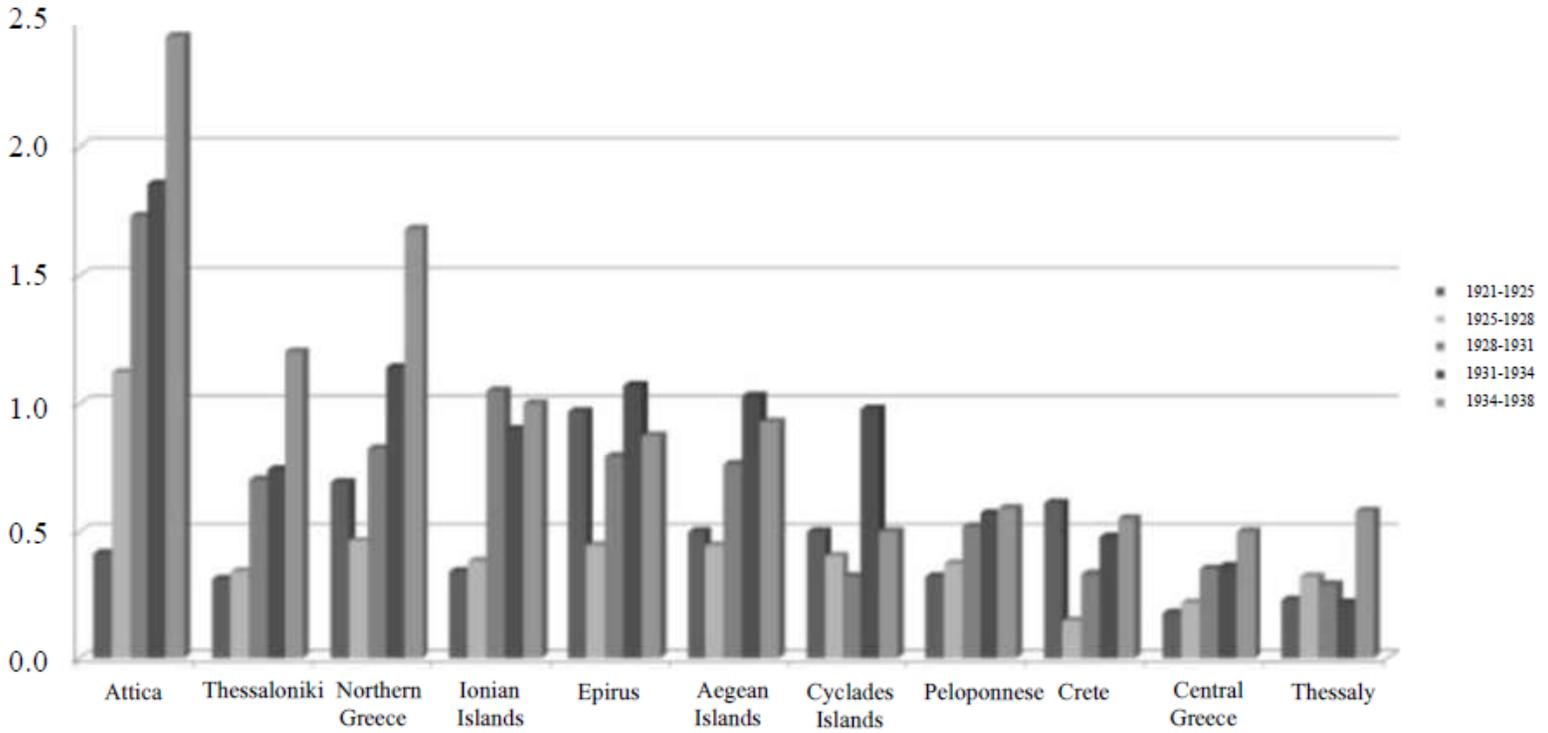


Figure 3.14 Early-Age Marriage for Women (%)

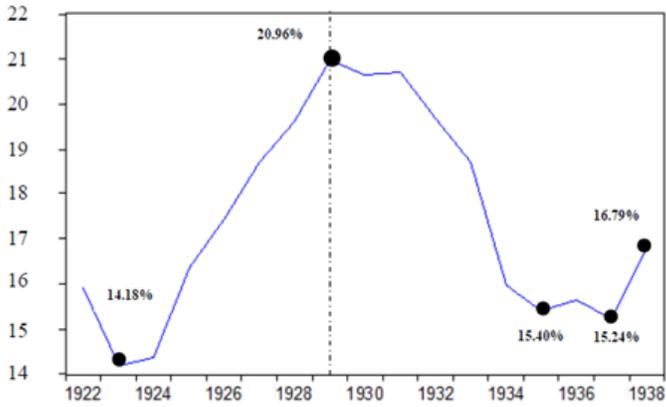


Figure 3.15 Early-Age Marriage for Women (%)

(different geographical areas)

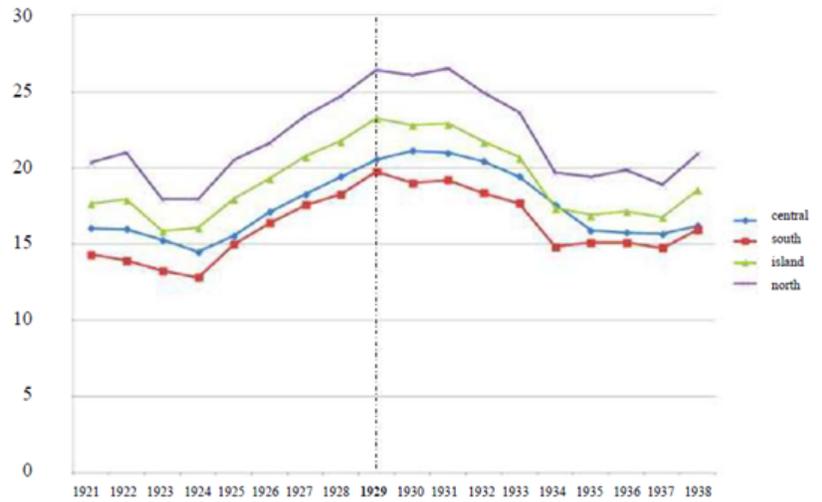


Figure 3.16 Agrarian Modernity

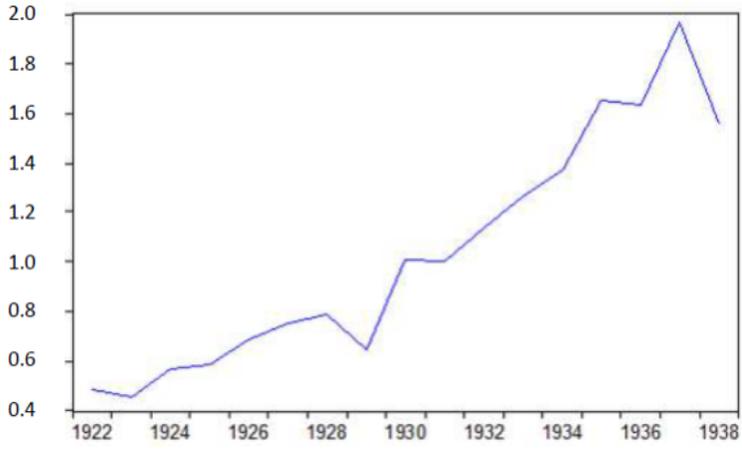
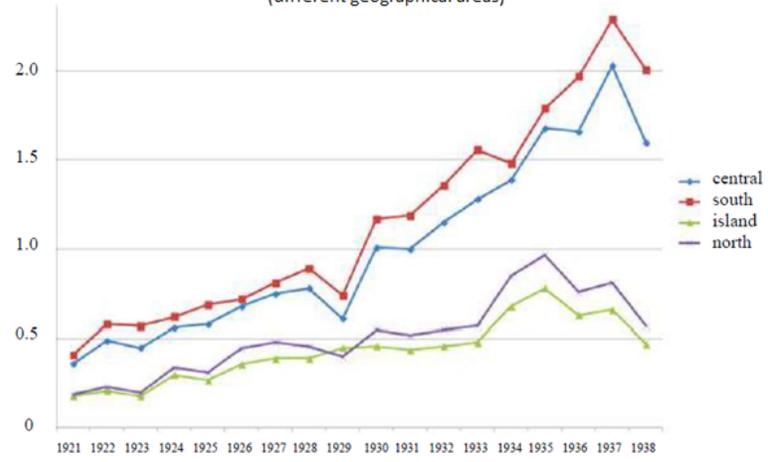


Figure 3.17 Agrarian Modernity
(different geographical areas)



3.4 Model Analysis

3.4.1 Correlation Relationships

As **Figure 3.18** shows, women’s increased access to divorce and remarriage was found to be positively correlated with births outside marriage in early twentieth-century Greece. On the contrary, early-age marriage for women appeared to have a strong negative impact on “illegitimate” births (**Figure 3.19**). Moreover, agrarian modernity was found to be positively related to non-marital births, while men’s stuck in agriculture was negatively linked to “illegitimacy” (**Figures 3.20** and **3.21**, respectively). Further, **Figure 3.22** illustrates a negative relationship between maternal mortality and out-of-wedlock births.

Figure 3.18 Births Outside Marriage & Divorced Women who Remarried

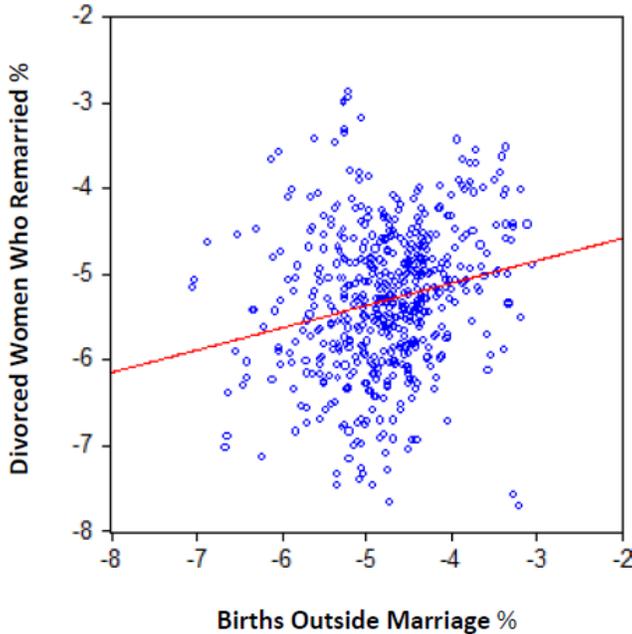


Figure 3.19 Births Outside Marriage & Early-Age Marriage for Women

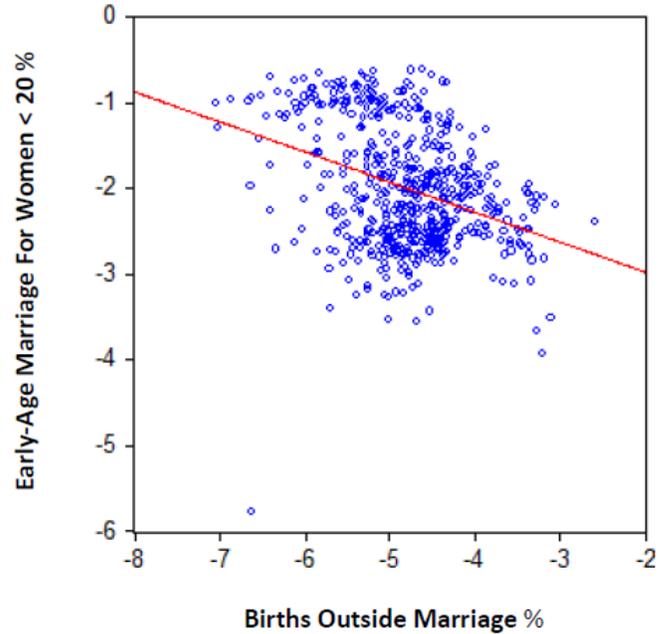


Figure 3.20 Births Outside Marriage & Agrarian Modernity

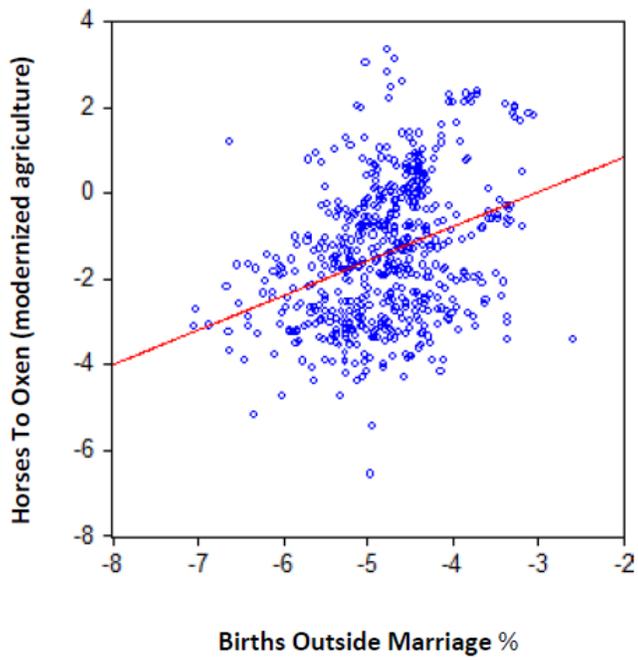


Figure 3.21 Births Outside Marriage & Men's Stuck in Agriculture

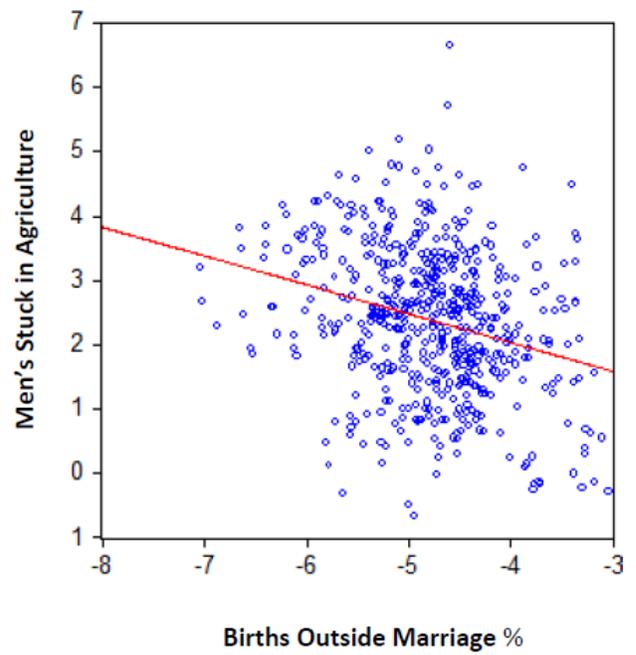
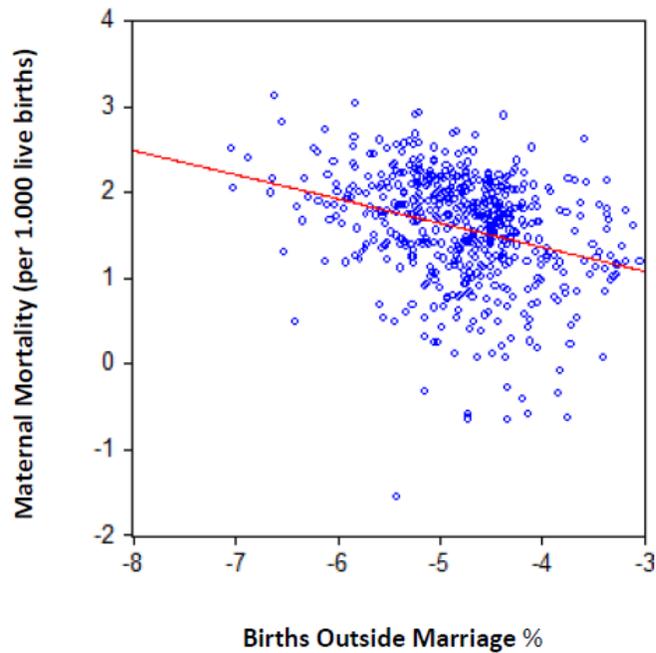


Figure 3.22 Births Outside Marriage & Maternal Mortality



3.4.2 Panel Estimates

In order to provide further evidence for the existence of linkages between births outside marriage and modernity in early twentieth-century Greece, the following panel regression model has been used:

$$\text{births outside marriage (i,t)} = \text{bo} + \text{b1} * \text{divorced women who remarried (i,t)} + \text{b2} * \text{early-age marriage for women (i,t)} + \text{b3} * \text{married men's stuck in agriculture (i,t)} + \text{b4} * \text{agrarian modernity (i,t)} + \text{b5} * \text{mortality (i,t)} + \text{b6} * \text{urbanization (i,t)} + \text{b7} * \text{regional dummy (i,t)} + e(i,t) \quad (3.1)$$

where **births outside marriage (i,t)** represents the percentage of “illegitimate” births in region i ($i=1,2,\dots,32$) at year t ($t = 1921,1922, \dots, 1938$), **bo** is a constant term, **divorced women who remarried (i,t)** is the percentage of divorce women who remarried (capturing women’s rights at divorce and remarriage), **b1** is the effect of women’s access to divorce and remarriage on “illegitimacy” (we expect $b1 > 0$), **early-age marriage for women (i,t)** is the percentage of women who married before age twenty (capturing parental control over young women’s sexuality), **b2** is the effect of early-age marriage for women on non-marital births (we expect $b2 < 0$), **married men’s stuck in agriculture (i,t)** is the ratio of married men engaged in agricultural activities to men employed as workers (capturing men’s class preferences on marriage), **b3** is the effect of married men’s stuck in agriculture on births outside marriage (we expect $b3 < 0$), **agrarian modernity (i,t)** is the ratio of horses to oxen (capturing agrarian modernization), **b4** is the effect of modernized agriculture on out-of-wedlock births (we expect $b4 > 0$), **mortality** denotes death rates, **b5** is the effect of

low quality of life on “illegitimate” births (we expect $b_5 < 0$), **urbanization** is the ratio of regional population to total population, **b6** is the effect of urbanization on “illegitimacy” (we expect $b_6 > 0$), and **e (it)** is the error term. **Regional dummies** are also taken into consideration.

3.5 Results

Table 3.3 presents pooled panel (columns **1-6**) and period fixed-effects estimates (columns **7-10**) of equation (3.1). As we see, the coefficient of women’s rights to divorce and remarriage was found to be positive and statistically significant in all regressions, indicating that greater gender equity deals with divorce and remarriage had positive impacts on “illegitimate” births in early twentieth-century Greece. On the contrary, the coefficient of early-age marriage for women had a negative and statistically significant sign, suggesting that limitations on alternatives to traditional marriage (premarital relations, cohabitation, extramarital sexual relationships, etc.) were negatively associated with out-of-wedlock childbirths. Moreover, agrarian modernity had a positive coefficient, though not always significant in the fixed effects specification, reporting a positive relationship between agricultural modernization and “illegitimacy”. In addition, married men’s stuck in agriculture had a negative and statistically significant sign in almost all regressions, indicating negative associations between married men’s participation in traditional agricultural sector and non-marital births. Furthermore, total deaths and maternal mortality coefficients were both found to be negative in almost all regressions, illustrating negative relationships between low quality of life and births outside marriage. Finally, urbanization had a positive impact on out-of-wedlock births, while the Greek Islands and the Northern Greek areas had a positive and negative impact, respectively, on births outside marriage.

However, significant variations in both the magnitudes and signs of the coefficients are observed when “illegitimate” and legitimate birth rates are taken separately into account (see **Table 3.4**). More specifically, contrary to “illegitimacy”, women’s greater access to divorce and remarriage had negative and significant impacts on legitimate births. On the other hand, early-age marriages for women were found to be positively correlated with births within marriage. Moreover, agrarian modernity and urbanization reported positive associations with both legitimate and “illegitimate” births, but not always significant, while married men’s participation in agricultural activities had a statistically significant and positive impact on childbearing within marriage. Unlike “illegitimate” births, maternal mortality was found to be positively significant with legitimate births, whereas the Greek Islands and the Northern Greek areas had negative and positive impacts, respectively, on marital births.

Table 3.3 Births Outside Marriage & Modernity (panel estimates)

Dependent Variable: Births Outside Marriage

	pooled estimates					period fixed-effects estimates (robust s.e.)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Divorced Women's remarriage	+0.17*** (0.03)	+0.29*** (0.03)	+0.29*** (0.03)	+0.29*** (0.03)	+0.29*** (0.03)	+0.26*** (0.03)	+0.22*** (0.03)	+0.22*** (0.03)	+0.18*** (0.02)	+0.22*** (0.03)
Early-Age Marriage for women	-0.51*** (0.03)	-0.40*** (0.04)	-0.40*** (0.04)	-0.38*** (0.04)	-0.34*** (0.05)	-0.37*** (0.04)	-0.36*** (0.04)	-0.41*** (0.04)	-0.25*** (0.04)	-0.21*** (0.07)
Horses To Oxen (modernized agriculture)		+0.08*** (0.01)	+0.08*** (0.01)	+0.06*** (0.01)	+0.07*** (0.01)	+0.06*** (0.01)	+0.02 (0.01)	+0.01 (0.01)	+0.07*** (0.01)	+0.02 (0.01)
Married Men's Stuck in Agriculture				-0.07*** (0.02)	-0.07*** (0.02)	-0.06*** (0.02)	-0.10*** (0.02)	-0.09*** (0.02)	+0.04 (0.02)	-0.06*** (0.02)
Death Rate					-0.25** (0.12)		-0.29** (0.12)			
Maternal Mortality						-0.21*** (0.03)		-0.09** (0.03)	+0.02 (0.03)	-0.06* (0.04)
Urbanization									+0.37*** (0.05)	+0.06 (0.04)
Island Dummy									+0.78*** (0.06)	
North Dummy										-0.36*** (0.09)
Hausman Test (p-value)							0.00	0.00	0.01	0.00
N	576	576	576	544	544	544	544	544	544	544
Adjusted R-Squared	0.04	0.27	0.29	0.31	0.32	0.35	0.38	0.38	0.51	0.40

Note: This table presents panel estimates (pooled and period fixed effects) of eq. (1) for the period 1921-1938. Births Outside Marriage (%) is the dependent variable. All variables are in logarithmic form (except the dummies). Standard errors are reported in parentheses. For simplicity, the intercept is not reported.

Significance: *** p < 0.01 ; ** p < 0.05 ; * p < 0.1.

Source: Natural Movement of Population, Agricultural and Causes of Death Greek Censuses, 1921-1938.

Table 3.4 Illegitimate/Legitimate Births & Modernity (panel estimates)
 Dependent Variable: Illegitimate/Legitimate Births

	pooled estimates			period fixed-effects estimates (robust s.e.)				
	illegitimate births (per 1,000 people) (1)	legitimate births (per 1,000 people) (2)	(3)	illegitimate births (per 1,000 people) (4)	(5)	(6)	legitimate births (per 1,000 people) (7)	(8)
Divorced Women's remarriage	+0.22*** (0.03)	-0.02** (0.01)	+0.14*** (0.02)	+0.11*** (0.02)	+0.14*** (0.02)	-0.05*** (0.00)	-0.05*** (0.00)	-0.06*** (0.00)
Early-Age Marriage for women	-0.16*** (0.04)	+0.20*** (0.01)	-0.21*** (0.04)	-0.08* (0.04)	-0.13** (0.06)	+0.19*** (0.01)	+0.15*** (0.01)	+0.08*** (0.01)
Horses To Oxen (modernized agriculture)	+0.08*** (0.02)	+0.03*** (0.00)	+0.02 (0.01)	+0.07*** (0.01)	+0.02 (0.01)	+0.01*** (0.00)	-0.00 (0.00)	+0.00 (0.00)
Married Men's Stuck in Agriculture	-0.00 (0.02)	+0.05*** (0.00)	-0.05*** (0.02)	+0.05** (0.02)	-0.04* (0.02)	+0.04*** (0.00)	+0.01* (0.00)	+0.02*** (0.00)
Maternal Mortality	-0.22*** (0.04)	+0.01 (0.01)	-0.08 (0.03)	+0.04 (0.03)	-0.04 (0.03)	+0.05*** (0.01)	+0.02** (0.00)	+0.03*** (0.01)
Urbanization	+0.07 (0.05)	+0.05*** (0.01)	+0.08* (0.04)	+0.34*** (0.05)	+0.09** (0.04)	+0.07*** (0.01)	-0.00 (0.01)	+0.06*** (0.01)
Island Dummy				+0.59*** (0.06)			-0.18*** (0.01)	
North Dummy					-0.12 (0.09)			+0.17*** (0.02)
Hausman Test (p-value)			0.00	0.00	0.00	0.00	0.00	0.00
N	544	544	544	544	544	544	544	544
Adjusted R-Squared	0.25	0.32	0.30	0.42	0.39	0.62	0.68	0.66

Note: This table presents panel estimates (pooled and period fixed effects) of eq. (1) for the period 1921-1938. All variables are in logarithmic form (except the dummies). Standard errors are reported in parentheses. For simplicity, the intercept is not reported. Significance: *** p < 0.01 ; ** p < 0.05 ; * p < 0.1.

Sources: Natural Movement of Population, Agricultural and Causes of Death Greek Censuses, 1921-1938.

3.6 Conclusion

The present study attempts to provide some new insights into the possible linkages between “illegitimate” births and modernization process in early twentieth-century Greece, using information available from the Natural Movement of Population, Causes of Death and Agricultural Greek Censuses. Even though the previous literature has already highlighted the demographic changes that occurred in Greece during the first half of the twentieth century, there are only a limited number of studies analysing the effects of modernization on out-of-wedlock childbearing. Thus, in order to provide some evidence supporting the Shorter’s sexual revolution hypothesis, a new panel dataset has been constructed, including various demographic indicators, such as births (“illegitimate” and legitimate), deaths, marriages, divorces, remarriages, age at marriage, men’s social status, agrarian modernity and urbanization. This dataset covers thirty-two regions of Greece during the period 1921-1938. In fact, my panel estimates suggest that greater women’s access to divorce and remarriage (gender-equity legislation) was found to be positively related to births outside marriage, while early-age marriages for women (parental control over women’s sexuality) and married men’s stuck in agriculture reported negative effects on non-marital births. Moreover, agrarian modernity and urbanization appeared to have positive impacts on out-of-wedlock births, though not always significant, whereas mortality rates (low quality of life) were found to be negatively associated with “illegitimate” births. However, some significant regional differences in “illegitimate” birth rates have been observed between the Northern and the Island Greek areas. Lastly, it is worthwhile to mention that almost all the variables had the opposite effects on births within marriage.

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