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Long-Run Relatıonshıp between Economıc Freedom and Income Inequalıty: Evidence from G-7 Countrıes

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Abstract: This paper examines the long run relationship between economic freedoms and income inequality in G-7 countries over the 2000– 2015 period. The World Economic Freedom Index (EFW) that created by the Fraser Institute is one of the methods of measuring economic freedoms in a country. The EFW consists of five sub-indices: size of the government, legal system and property rights, sound money, freedom to trade internationaly and regulations. According to the results of this study, EFW increases income inequality in G-7 countries. However, all of the areas of economic freedom do not affect income inequality in the same direction. While freedoms in government size and legal system areas has increased the income inequality; freedoms in free trade to internationally, sound money and regulation areas reduce income inequality.

Keywords: G-7 Countries, Economic Freedom, IncomeInequality, Coointegration

Ekonomik Özgürlük ve Gelir Eşitsizliği Arasındaki Uzun Dönemli İlişki: G-7 Ülkelerinden Kanıtlar

Öz: *Bu çalışma,2000 – 2015 dönemi boyunca G-7 ülkelerinde ekonomik özgürlükler ile gelir eşitsizliği arasındaki uzun dönemli ilişkiyi incelemektedir. Fraser Enstitüsü tarafından oluşturulan Dünya Ekonomik Özgürlük endeksi (EFW), bir ülkedeki ekonomik özgürlükleri ölçmenin yöntemlerinden biridir. EFW; hükümet büyüklüğü, hukuki sistemve mülkiyet hakları, güçlü para, serbest dış ticaret ve regülasyonlar olmak üzere beş alt endeksten oluşmaktadır. Bu çalışmanın sonuçlarına göre G-7 ülkelerinde EFW gelir eşitsizliğini artırmaktadır. Ne var ki, ekonomik özgürlük alanlarının hepsi gelir eşitsizliğini aynı yönde etkilememektedir. Hükümet büyüklüğü ve hukuksal sistem endeksleri ile gelir eşitsizliği arasında pozitif bir ilişki varken, serbest dış ticaret, güçlü para ve regülasyon endeksleri ile gelir eşitsizliği arasında negatif bir ilişkinin olduğu sonucuna varılmıştır.*

Anahtar Kelimeler: *G-7 Ülkeleri, Ekonomik Özgürlük, Gelir Eşitsizliği, Eşbütünleşme*

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GENİŞLETİLMİŞ ÖZET

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Çalışmanın Amacı: Bu çalışmanın amacı G-7 ülkelerinde ekonomik özgürlükler ile gelir eşitsizliği arasındaki ilişkiyi ampirik olarak ortaya koymaktır.

Araştırma Soruları: Ekonomik özgürlükler nelerdir? Ekonomik özgürlükler ile gelir eşitsizliği arasında bir ilişki var mıdır? Devletin ekonomik özgürlükler üzerinde etkisi var mıdır? G-7 ülkelerinde ekonomik özgürlük alanları ile gelir eşitsizliği arasında nasıl bir ilişki vardır? Her bir ekonomik özgürlük alanı gelir eşitsizliğini aynı yönde mi etkiler?

Literatür Araştırması: Ekonomik özgürlükler ile gelir eşitsizliği arasındaki ilişkiler özellikle 1990'lı yılların sonlarından itibaren yapılmaktadır. Ekonomik özgürlükler ile gelir eşitsizliği arasındaki ilişkiyi inceleyen çalışmalarda birbirleriyle çelişen sonuçlar ortaya çıkmıştır. Bu bağlamda literatürde ekonomik özgürlükler ile gelir eşitsizliği arasında nasıl bir ilişki olduğu belirsizdir. Konu ile ilgili ilk çalışmalardan biri 1999 yılında Berggren tarafından yapılmıştır. Ekonomik özgürlük ile gelir eşitsizliği arasındaki ilişkinin teorik temellerini oluşturan Berggren'e göre ekonomik özgürlük endeksini oluşturan alt bileşenlerin gelir eşitsizliği üzerinde birbirinden farklı etkiler yapmasından dolayı ekonomik özgürlük ile gelir eşitsizliği arasındaki ilişki teorik olarak belirgin değildir. Gelir eşitsizliği ile Ekonomik özgürlükler endeksini oluşturan bileşenlerin gelir eşitsizliği üzerinde farklı etkiler yaptığına dair bulgular yapılan ampirik çalışmalarda da ortay çıkmıştır. Bergh ve Nilson (2010) gelir eşitsizliği ile ekonomik özgürlükler arasında pozitif bir ilişkinin olduğu, yalnız bu ilişkinin yüksek gelirli ülkelerde daha güçlü olduğunu bulmuşlardır. Bazı çalışmalarda gelişmenin ilk döneminde genişleyen ekonomik özgürlüğe bağlı olarak artan ekonomik büyümenin gelir eşitsizliğini artırdığı, yalnız belli bir gelişme döneminden sonra gelir eşitsizliğini azalttığı şeklinde bulgular elde edilmiştir (Bennett ve Vedder, 2013). Bu çalışmalardan farklı olarak Carter (2006) ekonomik özgürlükler ile gelir eşitsizlikler arasında kısa dönemde negatif, uzun dönemde ise pozitif bir ilişkinin olduğunu ortaya koymuştur. Perez-Moreno ve Angulo-Guerreno (2016) de AB üyesi ülkelerinde ekonomik özgürlüklerin gelir eşitsizliğini artırdığı sonucuna varmıştır.

Yöntem: Bu çalışmada G-7 ülkelerinin 2000-2015 dönemine ait yıllık veriler kullanılarak ekonomik özgürlükler ile gelir eşitsizliği arasındaki ilişki incelenmiştir. Bu bağlamda Dünya Ekonomik Özgürlük Endeksi (EFW) ve alt bileşenlerinden her birinin net gini katsayısı üzerindeki etkisi ayrı modeller çerçevesinde panel veri modeli çerçevesinde analiz edilmiştir. Ekonomik özgürlükler ile ilgili veriler Fraser Enstitüsü'nden, net gini katsayıları ise Standardized World IncomeInequality Database (SWIID, v7.1)'den alınmıştır. Ekonometrik analizde öncelikle serilerin durağanlıkları panel birim kök testleri ile araştırılmıştır. Düzeyde birim kök içeren tüm seriler birinci farklarında durağanlaşmıştır. Bu bulgulara bağlı olarak yapılan Pedroni eşbütünleşme testi değişkenler arasında uzun dönemli bir ilişkinin olduğunu ortaya koymuştur.

Pedroni eşbütünleşme testinden sonra Panel ARDL/PMG yöntemi kullanılarak değişkenler arasındaki uzun dönemli ilişkinin yönü ve gücü belirlenmiştir.

Sonuç ve Değerlendirme: Bu çalışma 2000-2015 dönemi boyunca G-7 ülkelerinde ekonomik özgürlükler ile gelir eşitsizliği arasındaki ilişkiyi incelemektedir. Çalışmada ortaya çıkan en önemli sonuçlardan biri gelir eşitsizliği ile ekonomik özgürlükler arasında pozitif bir ilişkinin olmasıdır. Ekonomik özgürlük endeksinin değeri arttıkça gini katsayısı da artmaktadır. Ekonomik özgürlük endeksini oluşturan farklı özgürlük alanları ile gelir eşitsizliği arasındaki ilişki incelendiğinde birbirinden farklı sonuçların ortaya çıktığı görülmektedir. Piyasa ekonomisi kurallarının geçerliliğini gösteren hükümet büyüklüğü endeksi ile gelir eşitsizliği arasında pozitif bir ilişki söz konusudur. Bu bağlamda daha yüksek bir ekonomik özgürlük anlamına gelen düşük kamu harcamaları ve düşük marjinal vergi oranları gelir eşitsizliğinin artmasına neden olmaktadır. Bu durum sosyal devlet yaklaşımının gelir eşitsizliğini azaltıcı rolüne vurgu yapmaktadır. G-7 ülkelerini oluşturan Avrupa ülkeleriyle karşılaştırıldığında ABD'nin bu alandaki özgürlük endeksinin yüksek olması ABD'de gelir eşitsizliğinin daha yüksek olmasının nedenleri arasında sayılmaktadır. Gelir eşitsizliğini artıran bir başka özgürlük alanı hukuki sistem ve mülkiyet hakları endeksidir. Bu sonuç teorik bazı argümanlarca desteklenmiş olsa da ampirik çalışmalarla örtüşmemektedir.

Diğer ekonomik özgürlük alanlarını temsil eden güçlü para, serbest dış ticaret ve regülasyon endeksleri ile gelir eşitsizliği arasında negatif bir ilişki söz konusudur. Fiyat istikrarının olmadığı ekonomilerde gelir eşitsizliğinin artacağı yönünde literatürde ortaya konulan teorik yaklaşımlar ve ampirik sonuçlar güçlü para endeksiyle gelir eşitsizliği arasındaki bu ilişkiyi desteklemektedir. Diğer taraftan serbest dış ticaret ile gelir eşitsizliği arasındaki ilişkinin teorik temellerini oluşturan Hecksher-Ohlin bu çalışmada ortaya çıkan sonuçları desteklemese de son dönemli bazı çalışmalar serbest ticaretin gelişmiş ülkelerde gelir eşitsizliğini düşürdüğünü göstermektedir. Kredi, işgücü ve iş hayatına dair deregülasyonlar ile gelir eşitsizliği arasındaki negatif ilişki ise bazı teorik argümanlarca desteklenmiş olsa da ampirik çalışmaların çoğu tersi sonuçlar ortaya koymaktadır.

Ortaya çıkan sonuçlar bize şunları önermektedir: gelir eşitsizliğinin azalması için; kamu ekonomisine daha çok ağırlık verilmeli, gelire ve özellikle iktisadi bağlamından kopuk bir şekilde değeri artan servetlere artan oranlı vergiler etkin bir şekilde uygulanmalı, serbest ticaretin önündeki engeller kaldırılmalı, fiyat istikrarı sağlanmalıdır.

Introductıon

The income inequality within the countries has been increasing since the 1980s. In this period, economic freedoms also increased. The fact that economic freedoms and the increase in income inequality took place during the same period, cause intense debate about the relationship between the two

developments. Does anyone really benefit from economic freedom at an equal level, or do economic freedoms increase in spite of income inequality? What is the impact of the state on economic freedom and income inequality? In the studies aiming to answer all these questions, their results are not enough for a common opinion.

Indices related to economic freedoms are published annually by the Fraser Institute in 1996 and then by the Heritage Institute from 2000 onwards. In the indexes created by both institutions, economic freedom is based on individual choice, protection of private property and free market concepts. In many studies, the World Economic Freedom Index (EFW) is used, whichcreated by the Fraser Institute. The EFW index is composed of five areas of freedom. Namely government size, legal structure and protection of property rights, sound money, free foreign trade and market regulations. Each of the areas of economic freedom can have different effects on income inequality. Furthermore, the effect of a change in any freedom field on income inequality can be different in two countries. For example, when compared to the Anglo-Saxon countries, income inequality due to free foreign trade is relatively low in continental European countries. This is attributed to egalitarian policies and strong labor market institutions in the countries of continental Europe (Graafland and Lous, 20017: 2073). The arguments for the role of the state in continental Europe are also expressed by Alverado et al. (2018). Therefore, the regulations and economic policies implemented to reduce income inequality may affect the areas of economic freedom in different directions. As a result, the value of the EFW index may increase or decrease. One of the areas of economic freedom, which has a low value, can reduce income inequality and another may raise it. Therefore, a high EFW value in a country does not mean that income inequality will be high or low. This uncertainty is also reflected in empirical studies examining the relationship between economic freedom and income inequality. Therefore, although the sub-indices constituting the EFW index and their components are not direct causes of changes in income distribution, the long-term relationship between each of freedom field and income inequality must be empirically demonstrated.

This study examines the long-term relationship between economic freedoms and income inequality during the period of 2000-2015 in the G-7 countries. For this purpose, a panel data model wascreated in which income inequality is dependent variable, EFW and its components are independent variables. The data of EFW and its components were obtained from Fraser Institute and the gini coefficient that used for income inequality was obtained from The Standardized World Income Inequality Database (SWIID) version 7 which created by Frederic Solt (Solt, 2016). In addition, unemployment rates and women's labor force participation rates (FLFP) are considered as control variables and World Bank data is used for both variables. In this study, cointegration test was applied to determine the long term relationship between

economic freedoms and income inequality and Pooled MeanGroup (PMG) method was used to measure the power of this relationship. While the results show that there is a positive relationship between EFW index and income inequality, it is seen that the relationship between each of freedom field and income inequality is differentiated.

In the following sections, after the theoretical framework for the relationship between income inequality and economic freedoms, the empirical studies on the subject will be examined. In the fourth chapter, the relationship between dependent and independent variables will be analyzed empirically. The last section consists of the results of the study.

1. Theoretical Framework

Classical economics theory is essentially based on the idea of minimum government intervention, full competition and protection and promotion of private property. In other words, classical economic theory is based on the laissez-faire approach, which advocates the freedom of individuals in their economic decisions. In this context, economic freedom constitutes the essence of the market economy.

Gwartney et al., Which constitutes the Economic Freedom Index, defines economic freedom as a situation in which private property is protected and individuals have the freedom to use, change or give others their property (Gwartney et al., 1996: 12). According to this definition, economic freedom is based on individual choice, protection of private property and free market concepts. The Fraser Institute publishes the Economic Freedom of the World (EFW) index since 1996. The EFW index is designed to measure the degree to which countries' institutions and policies are compatible with economic freedom. According to the Fraser Institute, a country must maintain and extend economic freedoms in order to have a high economic freedom index. In order to achieve this, it is very important to provide the necessary environment for freedoms. For this, governments need to do something, as well as there are things to avoid. In this context, governments have to establish a legal system that will ensure private ownership and voluntary change. But governments should also avoid actions that restrict personal choice, interfere with voluntary change and restrict access to markets. Economic freedom decreases when personal preference, voluntary exchange and a competitive market are used instead of public choice, high taxes, government spending and restrictive regulations. (Gwartney et al., 2018: 2).

The EFW, formed by the Fraser Institute, consists of five sub-indices that can take values between zero and ten. While the index value is close to zero, the level of economic freedom is low; on the contrary, if the index value reaches to ten this shows that the degree of economic freedom is high. In the following sections, the theoretical foundations of the relationship between economic freedom areas and income inequality will be briefly mentioned.

1.1. Size of Government

The first component of EFW measures the effectiveness of the public economy. The value of this index is determined by the amount of public expenditure, taxation practices and the number of state-owned enterprises. As the share of public consumption expenditures, transfers and subsidies in GDP and the number of state-owned enterprises increase, the value of the government size index will decrease. On the other hand, the progressive tax rates reduce the value of the index, on the contrary the regressive taxes effect the opposite.

General public expenditures, transfers, subsidies and progressive taxes are among the welfare state practices that affect the income distribution and, more specifically, reduce income inequality. In this context, it is accepted that there is a positive relationship between government size index and income inequality in the literature. Barro (2000) argues that the expected negative relationship between income inequality and redistribution is essentially based on the assumption that "the distribution of political power is more egalitarian than the distribution of economic power" (Barro, 2000: 7). Bennett and Vedder (2013) draw attention to a different channel where redistribution can increase income inequality. According to the authors, some people who are dependent on state aid or transfer expenditures can give up working over time. This means that their average income will remain constant. On the other hand, those who prefer to work will increase income inequality by gaining more income over time. Thus, Bennett and Vedder (2013) state that the accuracy of an assumption that "redistribution by the state serves as an inequality reducing policy mechanism" is not certain (Bennett and Vedder, 2013: 44).

Similar arguments can also be put forwarded for taxes. Overall, there is a strong belief that progressive taxes reduce income inequality and regressive taxes increase income inequality. The fact that the post-tax gini coefficients are lower than the pre-tax gini coefficients in most countries supports this view. Therefore, taxes are used as an important policy tool in the redistribution of income. However, as Clark and Lawson (2008) stated, there is another approach that suggests that the egalitarian effects of increasing taxes will be lost in the long run due to the self-regulation of the market. Therefore, attention is drawn to the difficulties of using taxes as a tool in the redistribution of income (Clark and Lawson, 2008: 24).

1.2. Legal System and Security of Property Rights

While creating this second dimension of EFW, indicators such as the independence of the judiciary, the impartiality of the courts, the protection of property rights, military intervention in the legal order and policy, the integrity of the legal system, the legal application of contracts and the trust in the police are used. The legal system and the security of property rights primarily aim to determine the validity of the rule of law in a country.

Different arguments have been put forward in the literature on how legal system and property rights affect income inequality. According to one of these arguments, a legal order that protects property rights will lead to an increase in the value of goods. This may lead to income inequality by increasing the wealth of the rich. Another argument suggests the opposite. Accordingly, in countries where property rights are not adequately protected, rich elites will increase their wealth by influencing the legal system. Economic historians Engerman and Sokoloff (2002) argue that a remarkable income inequality continues in societies where a wealthy and elite minority has managed to influence rules, laws and other policies to protect the economic interests of its members and limit the economic opportunities offered to the masses (Engerman and Sokoloff, 2002: 63-83). An improvement in the legal system and consequently the protection of property rights will firstly reduce the inequality by securing the income of the less privileged groups (Bergh and Nilson, 2010: 490). In this context, according to an argument by Graafland and Lous (2017) based on Norberg (2000), the free market decreases inequality in the long run as it protects everyone's private property rights. A high quality legal structure and property security are particularly relevant to the poor. Because, in an economy that does not guarantee private property rights, the poor are more vulnerable than the rich. The lack of respect for private property rights may lead to limiting economic opportunities and thus shifting the economic activity of the poor to the informal economy. In such an environment, only the rich elites have the power and opportunities to engage in profitable economic activities (Graafland and Lous, 2017: 2074).

1.3. Sound Money

The value of the sound money index is determined by inflation rates and fluctuations in money supply. In order for the index value to be high, in addition to price stability in the country, the growth in money supply should not be higher than the growth in real GDP. Moreover, the absence of a restriction on the opening of foreign currency denominated accounts and keeping foreign currency denominated deposits in banks are another factors that increase the value of the index.

In the face of high inflation and price fluctuations, the most vulnerable groups are those who earn fixed income. High inflation causes income inequality by decreasing the real incomes of fixed and low earners, and by increasing the incomes of groups who obtain rent, interest and profit. Therefore, there is a negative relationship between the sound money index and income inequality.

1.4. Freedom to Trade Internationally

This component of EFW includes customs duties, non-tariff barriers, control of the foreign exchange market and restrictions on international capital movements. The low level of tariff and non-tariff barriers in international trade, the absence of any control over the exchange rate market and the free

movement of international capital are the variables that increase the value of the foreign trade index.

The relationship between foreign trade and income inequality is mainly based on the Hecksher-Ohlin theory and Stolper-Samuelson theorem. According to the Hecksher-Ohlin theory, as production in a country is carried out by the abundant factor, with the liberalization of trade between the two countries, the demand for abundant factor increases and the demand for the scarce factor will be reduced. As a result, the income of the factor that is scarce in the country will decrease and the income of the abundant factor will increase (Stolper and Samuelson, 1941: 58-73). The Hecksher-Ohlin theory is based on the assumption that the quantity of skilled labor in the developed countries is abundant and that the amount of unskilled labor in the developing countries is abundant. This theory argue that free foreign trade increases the income inequality in the developed countries and decreases the income inequality in the developing countries. The Hecksher-Ohlin theory assumes that labor and capital are immobile in the international arena and technological development remains constant. According to some recent approaches, which suggest that these assumptions are not valid under current globalization processes, free foreign trade will increase income inequality in both countries by increasing demand for skilled labor (Acemoglu 2003, Goldberg and Pavcnik 2007, Jaumottevd 2013). When evaluated within the framework of theoretical and empirical studies, it is seen that there is an uncertainty in the relationship between free trade and income inequality.

1.5. Regulation

The regulations on credit market, labor market and business constitute the main components of this index. The low level of regulations on the market increases the value of the economic freedom index. For example, the high level of private bank deposits, the high share of private sector credits within the total loan and the determination of interest rates by the market forces increase the degree of economic freedom. However, the rules on recruitment and dismissal in the labor market, the application of minimum wage, unionization and bureaucracy are factors that reduce economic freedom.

While some regulations are aimed at protecting consumers and employees, many regulations may also be aimed at protecting the economic interests of certain firms or industries by limiting competition (Bennett ve Nikolaev, 2017:724). In this context, regulations on minimum wage and trade union rights play an active role in increasing average wages by increasing the bargaining power of employees. On the other hand, the rents generated by state-owned monopolies and patent rights regulations may ultimately lead to an increase in income inequality.

For the relationship between income inequality and regulation, Stiglitz stresses the importance of the approaches of regulatory board's managers.

Sector representatives want people who close to them to be appointed to the regulatory bodies. To achieve this, they often use their political influence. Thus, members of the board avoid behavior that does not coincide with the interests of these sectors. In a sense, these behaviors of the regulatory board members may lead to an increase in income inequality (Stiglitz, 2012: 100).

2. Empirical Studies

Studies examining the relationship between economic freedoms and income inequality have conflicting conclusions. In this context, the relationship between economic freedoms and income inequality is uncertain in the literature. There is a strong belief that lower tax rates, which mean broader economic freedom, will increase income inequality and reduce the effectiveness of redistribution policies. However, low-rate taxes can reduce income inequality by increasing the relative income of low-income groups by encouraging economic growth. Therefore, the impact of the components of economic freedom on income inequality is sometimes contrary to expectations.

Berggren, who construct the theoretical foundation of the relationship between economic freedom and income inequality, also made the first empirical studies on the subject in 1990. According to Berggren, the relationship between economic freedom and income inequality is not theoretically apparent, since the components that make up economic freedom have different effects. However, the results of Berggren's empirical study show that continuous and gradual increases in economic freedom reduce income inequality. Accordingly, the positive relationship at low levels of economic freedom is transformed into a negative relationship as the economy expands. Under the assumption that low tax rates increase economic freedom, according to Berggren, the growth effect of low tax rates on the income of the poor is greater than the redistribution effect of these taxes. Therefore, the net impact shows a negative relationship between economic freedom and income inequality (Berggren, 1999: 212-217).

In a panel data study of 39 high-income and low-income countries, Carter (2006) argues that there is a non-linear relationship between income inequality and economic freedom. In contrast to Berggren (2009), Carter (2006) states that there is a negative relationship between economic freedom and income inequality in the short run and is a positive relationship in the long run. In other words, the relationship is negative at low economic freedom levels and positive at high economic freedom levels. Increasing economic freedom may lead to a reduction in income inequality by expanding income-generating opportunities and, on the other hand, to an increase in income inequality by the redistribution of income against the poor. (Carter, 2006: 175). According to the results of Carter (2006), the first effect is dominant at low economic freedom levels and the second effect is more dominant at high economic freedom levels.

Scully (1992), in his work covering 70 countries, argues that in countries where there is political openness, private property is protected, resource

allocation is made by the market and the law is superior, the income is distributed more equitably and the share of middle class in national income is quite high (Scully, 1992: 184). Scully has achieved similar conclusions in his study in 2002 and found a negative relationship between economic freedom and income inequality. In the model it applies to income segments, economic freedom increases the market revenues of the two lowest income segments, while the market revenue of the highest income tranche decreases. Thus, it has been concluded that economic freedoms decrease income inequality. (Scully, 2002: 90).

Bergh and Nilson (2010)'s study, which consisted mainly of 78 middle and high income countries, examined the relationship between income inequality and economic freedom over the 1970-2005 period. In the study, there is a positive relationship between income inequality and economic freedom., When an analysis is made considering the level of development of the countries, it is seen that the effect of economic freedom on income inequality in developed countries is stronger. However, the impact of each component of economic freedom differs from one another. In this context, it is seen that free foreign trade and deregulation increase inequality, but there is no relationship between public economy and inequality in the developing countries and there is a positive relationship in developed countries. On the other hand, it is concluded that the improvements in the monetary system do not affect income inequality and that there is a negative relationship between the legal system and income inequality (Bergh and Nilson, 2010: 500-501).

Bennet and Vedder (2013) 's study on the US shows that the increase in economic freedom decreases income inequality. However, the relationship between these two variables varies with the level of initial economic freedom. In this context, an inverse U-shaped relationship between economic freedoms and income inequality was observed. In other words, after a certain level of economic freedom, an additional increase in economic freedom leads to a decrease in income inequality. According to Bennett and Vedder, if the Kuznets hypothesis is valid, which suggests that there is an inverse U-shaped relationship between economic growth and income inequality, the same relationship is likely to occur between economic freedoms and income inequality. Given that economic freedom has had a positive impact on economic growth in many studies, it is expected that economic growth, which will increase due to expanding economic freedom in the first period of development, will increase income inequality and that decrease income inequality after a certain period of development (Bennett and Vedder, 2013: 49-53).

Ashby and Sobel (2008) also examine the relationship between income inequality and economic freedom in the United States. The results of the study reveal a negative relationship between economic inequality and income inequality. In the study, as the economic freedom increases, the average income

of all income groups increases and at the same time, the share of low-income groups in the national income also increases (Ashby and Sobel, 2008: 341-344).

In a study of 58 countries, Apergis (2015) examines the long-run relationship between income inequality and economic freedom in the form of linear and nonlinear models. Linear model results show that there is a negative relationship between economic freedom and income inequality, whereas in non-linear model this relationship varies depending on the level of economic freedom. In the study, there is a threshold value that determines the direction of the relationship. Accordingly, there is a positive relationship between economic freedom and income inequality in economic freedom values below the level of 6.67, whereas a negative relationship is observed in points above this value. As in Ashby and Sobel (2008), in the study of Apergis, high-income groups benefit more from an increase in the freedom index at lower levels of economic freedom, whereas at higher liberation levels, as the index value increases the share of low-income groups in the national income also increases (Apergis, 2015: 365-366). Apergis and Cooray (2017), who have increased the number of countries to138, use the same methodology in their studies. In the study, the threshold value is reduced to 5,428 but the direction of the relationship is the same as in Apergis (2015) (Apergis and Cooray, 2017: 99-102).

In their study on European Union members, Perez-Moreno and Angulo-Guerreno (2016) concluded that economic freedom increased income inequality. In terms of economic freedom components, it is stated in the study that low public expenditures and low marginal tax rates, which mean broader economic freedom, increase income inequality. In addition, according to the results of the study, there is a positive relationship between income inequality and deregulation in credit, labor and goods markets. (Perez-Moreno and Angulo-Guerrro, 2016: 342-343).

In a study covering 115 countries, Ahmad (2017) found that there is a positive relationship between the general economic freedom index and income inequality and that this relationship was stronger in terms of free foreign trade and market regulations (Ahmed, 2017: 23).

One of the recent studies examining the relationship between economic freedom and income inequality is the work of Graafland and Lous (2017) that covering 21 OECD countries. According to the results of the study, while the freedoms in the fields of financial, free foreign trade and regulation increase income inequality, sound money decreases income inequality in OECD countries (Graafland and Lous, 2017: 2087).

3. Data and Method

This study examines the relationship between economic freedom and income inequality in G-7 countries. For this purpose, the data of the G-7 countries covering the period of 2000-2015 are used. In the model created to reveal the relationship between income inequality and economic freedom; while

the income inequality is dependent variable, the economic freedom index, sub-components of this index, female labor force participation rate and unemployment rate are used as independent variables. The net gini coefficients from the Standardized World IncomeInequality Database (SWIID, v7.1) represent income inequality. The SWIID database is the most comprehensive database and allows comparison across countries as it standardizes revenue. SWIID offers both pre-tax market gini (market gini) and post-tax net gini coefficients. Since the taxes and transfers provide a more even distribution of income, the market gini coefficient is greater than the net gini coefficient. Especially in order to measure the increasing proportion of taxes and thus see the effect of taxes on income inequality, the market gini coefficient and the net gini coefficient can be compared. Since it is based on disposable income, net gini coefficient can reflect income inequality better. Therefore, as in many studies (Bergh & Nisson, 2010; Dorn et al., 2917), data on the net gini coefficient obtained after tax and transfer expenditures were used.

The World Economic Freedom (EFW) index, created by the Fraser Institute, is used for economic freedom data. Women's labor force participation rates and unemployment rates are taken from the World Development Indicators that published by the World Bank.

In this study, the following regression equation formed by Baltagi is used (Baltagi, 2005: 11).

$$y_{it} = \beta_0 + \beta_1 X'_{it} + \mu_{it} \qquad\qquad i=1,\dots N, \ t=1,\dots.T \qquad (1)$$

With *y* denoting dependent variable, X denoting independent variable, i denoting household, individuals, firms and countries etc. and t denoting time. β_0, β_1 and µ show the constant, coefficient and error term respectively.

In addition to the relationship between the economic freedom index and income inequality, the relationship between income inequality and five different areas of economic freedom, which constitute the index, will also be examined. Therefore, the results will be evaluated within the framework of six different models. When variables with natural logarithm are replaced in equation each regression model is expressed as follows.

1. Model: $lngini_{it} = \beta_0 + \beta_1 lnEFW_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (2)
2. Model: $lngini_{it} = \beta_0 + \beta_1 lnSIZE_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (3)
3. Model: $lngini_{it} = \beta_0 + \beta_1 lnLEGAL_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (4)
4. Model: $lngini_{it} = \beta_0 + \beta_1 lnMONEY_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (5)
5. Model: $lngini_{it} = \beta_0 + \beta_1 lnTRADE_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (6)
6. Model: $lngini_{it} = \beta_0 + \beta_1 lnREG_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + \mu_{it}$ (7)

In the above equations; gini, EFW, SIZE, LEGAL, MONEY and TRADE show net gini coefficient, World Economic Freedom index, government size;, legal system and property rights, sound money;, free foreign trade and market regulations respectively.

3.1. Panel Unit Root Test

In the panel data analysis, it is necessary to carry out stability tests in order to determine whether the variables contain unit roots. Because the regression results obtained by series with unit roots can be misleading. Tests obtained from the studies of Levin, Lin and Chu (2000) and Im, Pasaran and Shin (2003) are widely used in panel data unit root analysis.

The basic equations based on the LLC hypothesis and the IPS hypothesis (Im et al., 2000: 55) are as follows:

$$\Delta y = \delta y_{t-1} + \sum_{L=1}^{P_i} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it} \, m = 1,2,3, \tag{8}$$

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \varepsilon_{it} \tag{9}$$

In this study, Pedroni (1999) co-integration test, which is widely used in panel co-integration tests, is used to demonstrate the existence of a long-term relationship between variables. In order for Pedroni cointegration test to be applied, all series must be stationary at I (1) level. Therefore, the series will first be tested at the I (0) level. If all series are not stationary at the I (0) level, it will be checked whether the series are stationary at the I (1) level. If it is determined that all series included in the model are stationary at I (1) level, it will be possible to investigate the existence of long term relationship between variables.

When Table 1 is examined, it is seen that all the variables contain unit roots at I (0) level and they become stagnant at I (1) level. It is therefore possible to perform the Pedroni cointegration test among the variables.

Table 1: *Panel Unit Root Test Results*

Method	t stat. ı(0)	Prob. ı(0)	t stat. ı(1)	Prob. ı(1)
	lnGINI			
Levin, Lin,&Chu	-0.9918	0.1660	-3.3454	0.0004*
Im, Pesaran&Wu	-1.2384	0.1078	-5.0837	0.0000*
ADF-FisherChi-square	24.2540	0.0415**	50.7257	0.0000*
	lnEFW			
Levin, Lin,&Chu	-0.9899	0.1611	-1.4447	0.0043*
Im, Pesaran&Wu	-1.2384	0.1078	-2.7067	0.0034*
ADF-FisherChi-square	24.2540	0.0415**	29.5065	0.0089*
	lnFLFP			
Levin, Lin,&Chu	-2.4411	0.0073*	-3.5391	0.0002*
Im, Pesaran&Wu	-0.7429	0.2287	-3.2826	0.0005*
ADF-FisherChi-square	22.0380	0.0778	35.5213	0.0012*
	lnUNEMP			
Levin, Lin,&Chu	-0.3497	0.3633	-3.9184	0.0000*
Im, Pesaran&Wu	-0.3681	0.3564	-2.1608	0.0154**
ADF-FisherChi-square	14.4002	0.4203	25.9054	0.0266**

Continuation of Table 1: *Panel Unit Root Test Results*

	lnSIZE			
Levin, Lin,&Chu	-0.7274	0.2335	-2.5230	0.0058*
Im, Pesaran&Wu	-0.3133	0.3770	-2.9622	0.0015*
ADF-FisherChi-square	12.5692	0.5607	3..1598	0.0038*
	lnLEGAL			
Levin, Lin,&Chu	-1.9952	0.0230**	-2.5853	0.0049*
Im, Pesaran&Wu	-0.6897	0.2452	-3.0886	0.0010*
ADF-FisherChi-square	18.3662	0.1906	34.1094	0.0020*
	lnMONEY			
Levin, Lin,&Chu	2.0150	0.9780	-4.0967	0.0000*
Im, Pesaran&Wu	1.7886	0.9632	-3.2128	0.0007*
ADF-FisherChi-square	6.8819	0.9392	34.3003	0.0019
	lnREG			
Levin, Lin,&Chu	-1.5042	0.0663	-1.3168	0.0039*
Im, Pesaran&Wu	-15296	0.0630	-2.8921	0.0019*
ADF-FisherChi-square	23.4457	0.0534	31.4133	0.0048*
	lnTRADE			
Levin, Lin,&Chu	-3.0608	0.0011*	-4.4192	0.0014*
Im, Pesaran&Wu	-6.6266	-6.2654	-2.9932	0.0032*
ADF-FisherChi-square	14.4690	0.4154	32.6447	0.0000*

Note: *, and ** show significance at 1% and 5% level respectively.

3.2. Pederoni Co-integration Test

The cointegration tests are conducted to investigate the existence of a long-term relationship between the series. In this study, the long-term relationship between series is investigated using Pedroni cointegration test (1999, 2004).

Table 2: *Pedroni Co-integration Test Results*

Within-dimension			Between-dimension		
	statistic	Prob.		statistic	Prob.
$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnEFW_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Stat.	1.8005	0.035**	Grouprho-Stat.	0.878	0.810
Panel rho-Stat.	-0.9864	0.162	Group PP-Stat.	-6.492	0.000*
Panel PP-Stat.	-3.9807	0.000*	Group ADF-Stat	-2.199	0.000*
Panel ADF-Stat.	-2.7604	0.022**			
$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnSIZE_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Stat.	1.2518	0.105	Grouprho-Stat.	0.985	0.837
Panel rho-stat.	-0.6393	0.261	Group PP-Stat.	-7.286	0.000*
Panel PP-Stat.	-3.1883	0.000*	Group ADF-Stat	-3.558	0.000*
Panel ADF-Stat.	-2.3164	0.010**			
$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnLEGAL_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Stat.	1.8689	0.030**	Grouprho-Stat.	0.302	0.618
Panel rho-stat.	-1.1620	0.122	Group PP-Stat.	-9.216	0.000*
Panel PP-Statistic	-4.2965	0.000*	Group ADF-Stat	-4.446	0.000*
Panel ADF-Stat.	-2.8461	0.002*			

Continuation of Table 2: *Pedroni Co-integration Test Results*

$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnMONEY_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Stat.	1.1077	0.134	Grouprho-Stat.	0.175	0.569
Panel rho-stat.	-1.5565	0.059	Group PP-Stat.	-9.660	0.000*
Panel PP-Stat.	-5.0865	0.000*	Group ADF-Stat	-3.129	0.000*
Panel ADF-Stat.	-1.7286	0.041**			
$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnTRADE_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Stat.	1.4700	0.070	Grouprho-Stat.	0.648	0.741
Panel rho-stat.	-1.0212	0.153	Group PP-Stat.	-8.182	0.000*
Panel PP-Stat.	-3.4958	0.000*	Group ADF-Stat	-2.363	0.009*
Panel ADF-Stat.	-1.5719	0.048**			
$lngini_{it} = \alpha_i + \delta_i t + \beta_1 lnREG_{it} + \beta_2 lnFLFP_{it} + \beta_3 lnUNEMP_{it} + e_{it}$					
Panel v-Statistic	-2.1256	0.016*	Grouprho-Stat.	0.820	0.794
Panel rho-statistic	-1.1495	0.125	Group PP-Stat.	-8.671	0.000*
Panel PP-Statistic	-6.6062	0.000*	Group ADF-Stat	-3.905	0.000*
Panel ADF-Stat.	-3.0759	0.001*			

Note: * and ** show significance at 1% and 5% level respectively.

Pedroni co-integration analysis consists of seven tests, four of which are within-dimension and three of which are betwen-dimension. The Pedroni cointegration test results, which examine the long-term relationship between economic freedoms and income inequality, are shown in Table 2. In all models, the majority of the seven tests are considered to be co-integration between series. Thus, the Pedroni cointegration test shows that there is a long-term relationship between EFW and income inequality, as well as between EFW components and income inequality.

3.3. PMG Method and Evaluation of Results

Although the Pedroni cointegration test provides information on whether there is a long-term relationship between the variables included in the model, it does not estimate for the direction and strength of this relationship. Panel FMOLS, Panel DOLS or Panel ARDL / PMG methods can be used to make this estimate. PMG method is used in this study. In the PMG method that developed by Pesaran, Shin and Smith (1999), while the long-term coefficients of the countries remain the same, the short-term coefficients are allowed to change. In order to make this clearer, Pesaran, Shin and Smith (1999) uses the following ARDL (p, q, q,…, q) equations system (Pesaran et al., 1999: 625).

$$y_{it} = \sum_{j=1}^{i} \lambda_{ij}\, y_{i,t-j} + \sum_{j=0}^{q} \delta'_{ij}\, X_{i,t-j} + \mu_i + \varepsilon_{it} \tag{10}$$

In the equation, $i = 1,2,… N$; $t = 1,2,… T$; X_{ij} shows the vector of the explanatory variable for the group i, and the δ_{ij}, μ_i, ε_{it} show the coefficient vectors, the constant effects and the error term respevtively. An essential feature of cointegrated variables is that they are sensitive to deviations from long-term equilibrium. This means an error correction model in which the variables in the system are affected by the deviations in the short-run equilibrium (Blackburne

and Frank, 2007: 188). Therefore, equation (10) will be converted to the following equation when reparameterize as VECM (Vector Error Correction Model) system (Pesaran et al., 1999: 626).

$$\Delta y_{it} = \emptyset_i(y_{i,t-1} - \theta'_i X_{it}) \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta y_{i,t-1} + \sum_{j=0}^{q-1} \delta'^*_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \ (11)$$

The parameter $\emptyset_i$ is the error-correcting speed of adjustment term. If $\emptyset_i = 0$, then there would be no evidence for a long-run relationship. If $\emptyset_i < 0$, then variables are assumed to return to long-term equilibrium. So $\emptyset_i$ is the parameter that expected to be negative and θ'_i is the coefficient that includes long-term relationships between variables. ECT = $(y_{i,t-1} - \theta'_i X_{it})$ is the error correction term, λ^*_{ij} and δ'^*_{ij} are long-run coefficients.

Table 3: *PMG Results   (Dependent Variable: lnGINI)*

	Variable	Coefficient	Std. error	t-statistic	Probability
Model 1	**Long -Run**				
	lnEFW	0.2289	0.0037	60.3756	0.0000
	lnFLFP	-0.1144	0.0034	-32.8921	0.0000
	lnUNEMP	0.0148	0.0006	21.9386	0.0000
	Short-Run				
	ECT	-2.2926	0.8724	-2.6277	0.0122
Model 2	**Long-Run**				
	lnSIZE	0.0311	0.0140	2.2245	0.0299
	lnFLFP	-3.0318	0.0388	-0.8201	0.4154
	lnUNEMP	0.0093	0.0031	2.9764	0.0042
	Short-Run				
	ECT	-1.9395	0.6001	-3.2318	0.0020
Model 3	**Long -Run**				
	lnLEGAL	0.0248	0.0103	2.4063	0.0210
	lnFLFP	-0.1457	0.0198	-7.3515	0.0000
	lnUNEMP	0.0087	0.0020	4.3138	0.0001
	Short-Run				
	ECT	-1.9735	0.0103	-2.1140	0.0210
Model 4	**Long -Run**				
	lnMONEY	-0.4411	0.0458	-9.6322	0.0000
	lnFLFP	-4.1418	0.0357	-3.9704	0.0002
	lnUNEMP	0.0065	0.0020	3.1866	0.0024
	Short-Run				
	ECT	-1.0776	0.2923	-3.6858	0.0005

Continuation of Table 3: *PMG Results*

		Long -Run			
Model 5	**lnTRADE**	-0.0330	0.0129	-2.3283	0.0252
	lnFLFP	-0.1266	0.0213	-5.9390	0.0000
	lnUNEMP	0.0081	0.0017	4.6744	0.0000
		Short-Run			
	ECT	-1.8193	0.0129	-2.3283	0.0252
Model 6		Long -Run			
	lnREG	-0.0582	0.0279	-2.0837	0.0438
	lnFLFP	-0,1132	0.0404	-2.7988	0.0079
	lnUNEMP	0.0143	0.0044	3.1957	0.0028
		Short-Run			
	ECT	-2.0027	0.7059	-2.8367	0.0072

Table 3 shows the long-run relationship between income inequality and each component of the EFW index. In all models, long and short term probability values are significant at 1% and 5% level. Also error correction term (ECT) is negative as expected.

According to model 1, where the relationship between freedom index (EFW) and income inequality is examined, there is a positive relationship between economic freedoms and income inequality in the G-7 countries in the long run. An increase of 1% in the economic freedom index increases the income inequality by 0.22%. This is in line with the results of the work of Carter (2006) and Bergh and Nilson (2010), and indicating that increasing economic freedoms worsen the redistribution of income against the low-income groups.

As presented in the literature, the impact of each component that constitutes the EFW on income inequality may differ from each other and may not be the same with the impact of EFW. This is clearly seen in Table 3. In the second model of the study, the relationship between income inequality and government size (SIZE) index, together with other control variables, was examined. According to the results of the model, there is a positive relationship between this freedom index, which measure the size of the public economy, and the income inequality. An increase of 1% in freedom in the area of public economy increases the income inequality by 0.03%. However, it is necessary to pay attention to a subject to avoid a misinterpretation here. As stated earlier, the high value of this index means that the volume of public economy is small. In other words, the high index value indicates that more liberal economic policies are applied, the share of subsidies, transfer expenditures and other public expenditures in GDP is low and there is no progressive taxation, in short, welfare state practices are insufficient. Under these circumstances, redistribution of income does not have a corrective effect on the situation of

low-income people. In this context, according to the 2018 World Inequality Report, Continental countries, and especially France, are more successful in limiting income inequality compared to the United States. According to the report, the success stems from the policies that implemented for low- and middle-income groups in these countries. (Alvaredo et al., 2018: 67). Therefore, as posed in theory and practice, the positive relationship between the government size index and income inequality is an expected result.

In the third model, which examines the relationship between the legal system-property rights index (LEGAL) and income inequality, a positive relationship is observed between the variables. A 1% increase in these freedom areas increases the income inequality by 0.02%. There are different arguments in the literature on the relationship between property rights and income inequality. The result of this study, as stated by Bergh and Nilson (2010), is that the protection of property rights will increase the value of the wealth of the rich and thus the income inequality will increase. On the other hand, the theoretical approach of Engerman and Sokoloff (2002) does not coincide with the results of this study.

The fourth model examines the relationship between the sound money index (MONEY) and income inequality. Model results show that there is a strong and negative relationship between the freedoms in the monetary area and income inequality. A 1% increase in strong currency index decreases income inequality by 0.44%. This means that income inequality will be lower in economies with price stability. This confirms the common view in economic theory that high inflation increases income inequality. Moreover, it is in parallel with the results of Albanesi (2007) which is one of the prominent studies on this subject.

A negative relationship was found between freedoms in international trade (TRADE) and income inequality. This result does not support the Hecksher-Ohlin theory, which argues that increasing international trade will increase income inequality in developed countries. However, some empirical studies have found that reducing barriers to international trade has led to a reduction in income inequality in developed countries. (Milanovic, 2005; IMF, 2007).

There is a negative relationship between the freedoms (REG) in the regulation areas and income inequality, but is not very strong. This result means that the regulations on the credit market, labor market and business will reduce income inequality. Theoretically, different arguments have been put forward on the effect of regulation on income distribution. For example, one of them argues that increasing the possibilities of using credit would reduce inequality of income because a larger part of people could realize their potential, while another suggests that such reforms would increase income inequality in cases where political elites can influence deregulation policy. In this context, theoretically, the effect of regulations on income inequality is unclear (Berg and

Nilson, 2010: 490). Empirically, many studies have concluded that regulations reduce income inequality. (Litwin, 2015; Lin and Yun, 2016; Autor et al., 2016; Haan and Sturm, 2017). Thus, even though the results of the study are not theoretically rejected, they do not overlap with empirical studies.

The PMG models created above measure the relationship between income inequality and economic freedom, as well as the direction and strength of the long-term relationship between income inequality and female labor force participation (FLFP) and unemployment (UNEMP) rates. In all models, income inequality decreases as female labor force participation increases and income inequality increases as unemployment increases

Conclusion

There has been a rising trend in both economic freedoms and income inequality since the 1980s. There has been a rising trend in both economic freedoms and income inequality since the 1980s. Such overlap between the two phenomena raises the question: are economic freedoms the cause of income inequality? The results of theoretical and empirical studies are insufficient to establish a common view of the relationship between economic freedoms and income inequality.

This study examines the relationship between economic freedoms and income inequality in G-7 countries over the 2000-2015 periot. One of the most important results in the study is that there is a positive relationship between income inequality and economic freedoms. As the economic freedom index increases, the gini coefficient increases. When the relationship between the different freedom areas constituting the economic freedom index and the income inequality is examined, it is seen that the results are different. There is a positive relationship between the government size index, which shows the validity of the rules of the market economy, and the income inequality. In this context, lower public spending and lower marginal tax rates, which mean higher economic freedom, lead to an increase in income inequality. This situation emphasizes the role of social state approach in reducing income inequality. Compared to the European countries of the G-7 countries, the USA's high index of freedom in this area is considered to be one of the reasons for higher income inequality in the United States. Another area of freedom that increases income inequality is the legal system and property rights index. Although this result has been supported by some theoretical arguments, it does not coincide with empirical studies.

Sound money, free trade and regulation indices, which are other areas of economic freedom, have a decreasing effect on inequality. The theoretical approaches and empirical results put forward in the literature suggesting that income inequality will increase in economies without price stability. This argument support this relationship between sound money index and income inequality. On the other hand, although Hecksher-Ohlin does not support the

results of this study some recent studies show that free trade reduces income inequality in developed countries. Although the negative relationship between income inequality and deregulation has been supported by some theoretical arguments, most empirical studies reveal opposite results.

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