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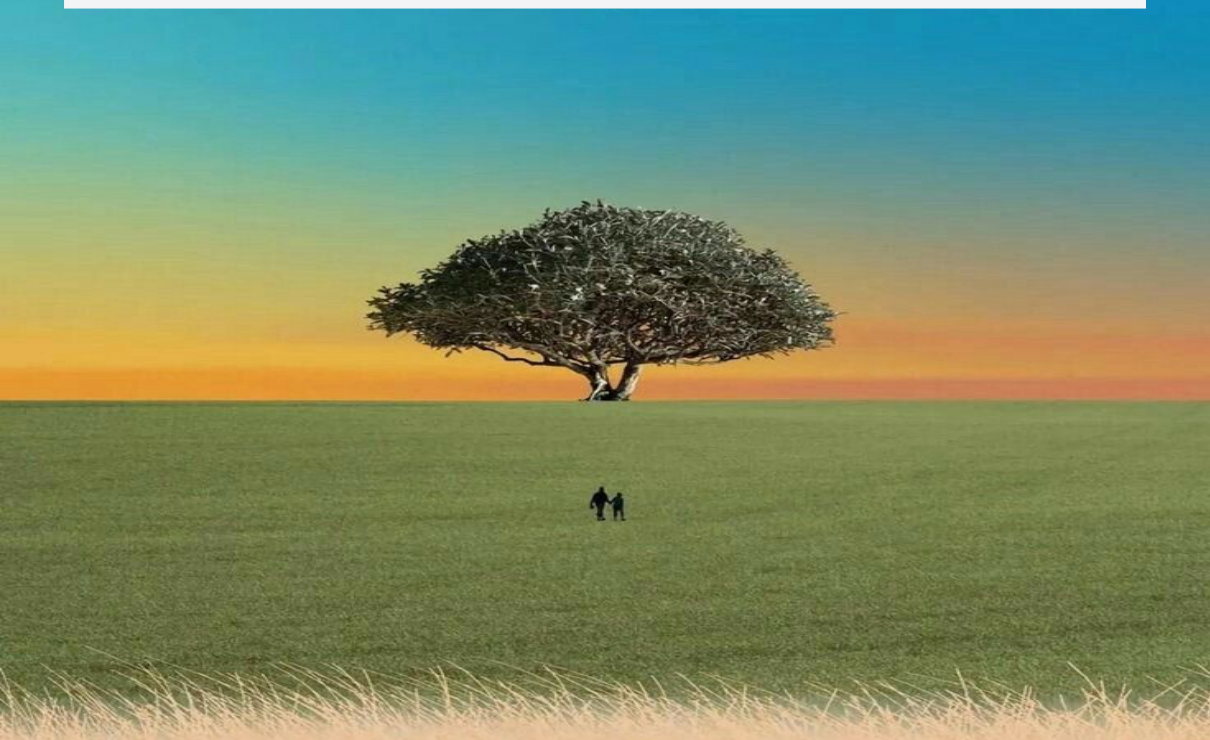

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"Bu kitapta yer alan bölümlerde kullanılan kaynakların, görüşlerin, bulguların, sonuçların, tablo, şekil, resim ve her türlü içeriğin sorumluluğu yazar veya yazarlarına ait olup ulusal ve uluslararası telif haklarına konu olabilecek mali ve hukuki sorumluluk da yazarlara aittir."

SINIRLI RASYONELLİK

Kutlu ERGÜN[1]

1. GİRİŞ

İnsanın bilişsel kapasitesinin sınırlarını hesaba katan rasyonel seçim modelleri genellikle sınırlı rasyonellik modelleri olarak bilinir. Sınırlı rasyonellik kavramını formüle eden Herbert Simon'un bu bilişsel sınırlamalara ilişkin tipik varsayımları, dünyaya ilişkin sınırlı anlayış, bu bilgiyi geri alma konusunda sınırlı kapasite, eylemlerin sonuçlarını tahmin etme konusunda sınırlı yetenek, potansiyel eylem yolları üretme konusunda sınırlı yetenek, belirsizliği yönetme konusunda sınırlı kapasite ve rekabet eden arzuları değerlendirme konusunda sınırlı yetenek gibi unsurlardan oluşur (Grüne-Yanoff, 2007).

Sınırlı rasyonelliğe dair bütüncül bir teori yoktur (Aumann, 1997). Sınırlı rasyonalite terimi, rasyonel karar alma sürecinde bireylerin karar verirken ve hesaplama yaparken karşı karşıya kaldığı bilişsel sınırlamaları belirtir. Bu kavram, iktisadi davranışsal yaklaşım alnında temel bir unsur olup gerçek karar alma sürecinin alınan nihai kararları nasıl etkilediğine odaklanır. Davranış odaklı ekonomistler tarafından ortaya atılan standart ekonomik varsayımından sapmalar, insan düşüncesi ve karar alma süreçlerine ilişkin anlayış üzerine temellenmiştir. Bu sapmalar, özellikle alternatifleri keşfetme, bu alternatiflerin sonuçlarını kesinlik veya belirsizlik altında değerlendirme ve bu alternatifleri etkili bir şekilde karşılaştırma söz konusu olduğunda, insan bilişsel kapasitesinin sınırlamalarını hesaba

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katmaktadır. Hem bilgi eksikliğini hem de gelecekteki sonuçları öngörme konusunda kısıtlı yeteneği kapsayan bilişsel sınırlar, alternatiflerin değerlendirilmesinde önemli rol oynar. Bilişsel sınırlar yalnızca belirli bilgilerle ilgili basit kısıtlamaların ötesine uzanmaz; ayrıca ilgili fenomenleri tahmin etmek için mevcut bilimsel teorilerdeki eksiklikleri de vurgular (Simon, 1990).

Bireysel rasyonalitenin standart teorisi, sınırlı rasyonellik üzerine olan tartışmaların temelini oluşturur. Bireyleri belirgin bir tercih kümesine sahip olarak tasvir eder ve bir eylemi, bu tercihleri en etkili şekilde karşılıyorsa rasyonel olarak tanımlar. Daha spesifik olarak, bu teori bireyleri, eylemlerin sonuçlarının garantili sonuçlar olmasa da tanımlanmış olasılıklara sahip olduğu risk koşulları altında kararlar alan kişiler olarak görür. Bu teorinin temel ilkeleri beklenen fayda teorisinde kendini göstermiştir. Beklenen fayda teorisi, bireylerin çeşitli olasılıkları nasıl değerlendirdiğini ve değerlendirdiğini analiz eder. Von Neumann ve Morgenstern tarafından geliştirilen bu teori, bir kişinin belirli bir olasılığa olan tercih gücünün, o olasılığın peşinde koşarken risk alma isteğinden etkilendiğini öne sürer (Grüne-Yanoff, 2007). Deneysel ve ampirik kanıtlar, bireylerin davranışlarının klasik iktisada ilişkin teorilerden sistematik olarak saptığını göstermektedir. Bu durum bu normatif teorilerin yalnızca yaklaşık betimleyici modeller oluşturduğunu göstermektedir (Grant & Van Zandt, 2007). Bu kapsamda Beklenen Fayda Teorisi, karar vericinin risk ve belirsizlik durumunda olasılıklar arasında seçim yapmasını ve sonuçların fayda değerlerinin ilgili olasılıklarla çarpılmasıyla elde edilen ağırlıklı toplamları karşılaştırmasını ifade eder. Bu temel ve görünüş, çağdaş karar teorisindeki en önemli iki sorunu ortaya çıkarmaktadır. Birincisi fayda formülde yer alan sayıların atıfta bulunduğu şey nedir ve özellikle kesinlik altındaki seçimleri temsil eden fayda sayılarıyla aynı değer ölçeğine mi sahiptir?

İkincisi, olasılık ve fayda değerlerini birleştiren ağırlıklı toplam süreci, göz önünde tutulması gereken tek süreç midir? Eğer alternatif modellemeler varsa, seçim işlemi nasıl olacaktır? Faydaya ilişkinin girdinin çoğunluğu, belirsizlik yerine riskle ve seçim bağlamlarıyla ilgilidir (Mongin, 1998). Sınırlı rasyonellik kavramının doğru bir şekilde anlaşılabilmesi için öncelikle beklenen fayda teorisinin irdelenmesi gerekir. İnsanların birtakım bilişsel önyargılara sahip olması nedeniyle karar ve seçimlerinde hataya yapacağı düşüncesi he ne kadar kabul görse de beklenen fayda teorisinin rasyonel insana atıf yapması bu teoriye ilişkin en azından genel bir bakış açısının incelenmesi gerekir. Aşağıda öncelikle beklenen fayda teorisine ilişkin genel bir bakış açısı çizilmekte ve sonrasında sınırlı rasyonellik kavramı araştırılmaktadır.

2. BEKLENEN FAYDA TEORİSİ

Beklenen fayda teorisi ya da kısaca fayda teorisi belirsizlik altında karar alma analizine hakim olmuş olan bir yaklaşımdır. 18. yüzyılda Daniel Bernoulli tarafından formüle edilmiş, von Neumann ve Morgenstern (1944) tarafından teorileştirilmiş ve Savage (1954) tarafından öznel olasılık kavramı eklenerek daha da geliştirilmiştir. Beklenen fayda teorisi, sigorta satın alınması ve harcama yapılması ile tasarruf arasındaki ilişki gibi farklı olguları açıklamak için kullanılmıştır. Ayrıca bu teori, karar analizlerinde optimal kararları ve politikaları belirlemek için normatif bir teori olarak da kullanılmıştır (Tversky, 1975). Daniel Bernoulli ve Gabriel Cramer beklenen kâr veya servetin maksimizasyonunun, bireylerin riskli parasal seçimler opsiyonlar arasındaki seçimlerini yeterince tanımlayamayacağını savunarak riskli parasal opsiyonların beklenen getirilerine göre değil, getirilerinin faydalarına ilişkin beklentilere göre

değerlendirilmesini önerdiler. onlara göre, paranın faydasının miktar olarak artması beklenebilse de, bu artışın doğrusal olması için zorunlu bir neden yoktur. Özellikle, servetin faydası azalan bir oranda artıyorsa, bu durumda birey daha yüksek beklenen getiriye sahip olan ancak daha fazla risk içeren diğer seçenekleri tercih edecektir (Fishburn, 2013). Bu kapsamda beklenen fayda teorisi riskli olasılıklar arasındaki seçimleri açıklar. Riskli olasılıklar tek veya çok boyutlu olabilir. Bu çeşitli (diyelim ki n) sonuç vektörlerini x_i ile ve n ilişkili olasılığı p_i ile gösterirsek, $\sum_{k=0}^{n} pi = 1$ olur. Bu durumda genel olarak Beklenen Fayda Modeli, insanların $\sum_{k=0}^{n} F(pi)U(xi)$ maksimize etmesini öngören bir model olarak tanımlanır. Bu model, alternatiflerin bütünsel bir değerlendirmesi, olasılıklar ve sonuçlar üzerinde ayrılabilir dönüşümler ve olasılıkları ve sonuçları çarpımsal olarak birleştiren beklenti gibi temel özelliklere sahiptir (Schoemaker, 1982). Model ayrıca U: X → R bir fayda fonksiyonunu belirtmek üzere ekonometrik olarak aşağıdaki şekilde de tanımlanabilir (Quiggin, 2012):

$$V\ ([x;p]) = = \sum_{i=1}^{n} p_i\ \mathrm{U}\ (x_i) = \ \mathrm{E}\ [\mathrm{U}\ (x)] \qquad 1.1$$

Bununla birlikte temel olarak iki bileşenden oluşan beklenen fayda teorisinin ilk bileşeni, insanların karar verirken bir rehber olarak seçimlerinin farklı olası sonuçlarının beklenen fayda değerini kullanmaları, diğeri ise azalan marjinal fayda yaklaşımı kapsamında aynı şeyin daha fazlasının yalnızca azalan bir oranda ek fayda yarattığı fikri veya anlayışıdır (Lengwiler, 2009). Azalan marjinal fayda yasasının rasyonel ve irrasyonel davranışları ve fayda ve faydasızlık kavramlarını anlamlandırmada önemli bir kavramsal çerçeve sunar (Todorova, 2021). Marjinal fayda tüketilen ek malın toplam

fayda üzerinde yaptığı değişikliğin malın miktarında olan değişikliğe olan oranını ifade eder [(Marjinal Fayda (MU) = Toplam faydada ortaya çıkan değişim (TU)/Mal miktarındaki değişim (Q)] ve tüketim miktarı arttıkça azalma eğilimi gösterir.

Diğer yandan beklenen fayda teorisine ilişkin yaklaşım iktisat literatüründeki yaklaşımların değişmesi ve dönüşmesi ile birlikte eleştiri konusu olmuş ve faydasını maksimize eden rasyonel insan yerine bilişsel önyargılara sahip ve hata yapan insan anlayışı ön plana çıkmıştır. Peters ve Adamou (2021) beklenen fayda teorisinin 17. yüzyılda kurulan ve insan davranışına dair açıkça yanlış tahminlerde bulunan kusurlu bir kavramsal çerçeveye uygulanan 18. yüzyıl eklentisi olduğunu ve rastlantısallığa ait matematiğin 18. yüzyılda henüz başlangıç aşamasında olduğundan, kavramsal sorunların göz ardı edildiğini ve fayda teorisinin ekonomiyi yanlış yöne sürüklediğini öne sürmüşlerdir. Ayrıca fayda fonksiyonlarının doğasında bulunan keyfilikten hiçbirine sahip olmadan, günümüzde insanların parasal miktarlara uyguladığı doğrusal olmayan eşlemelere fiziksel bir anlam vermenin de mümkün olduğunu belirtmişlerdir. Bu eleştirinin yanı sıra özellikle davranışsal ekonomi alanındaki yaklaşımlar bireylerin bilişsel önyargılara sahip olduğunu söylemiş ve bu ön yargıları da kavramsal yaklaşımlar çerçevesinde gruplandırmıştır. Örneğin bireylerin zihinsel muhasebe veya kayıptan kaçınma gibi davranışsal sergilemelerinin bilişsel ön yargılar nedeniyle irrasyonel davranışlara neden olduğu alan çalışmaları ile ortaya konmuştur. Deneysel çalışmaların çoğu, beklenen fayda teorisinin gerçek seçim davranışının çok iyi bir öngörücüsü olmadığını ortaya koymuş ve bu süreçte yeni tanımlayıcı teorilerin ortaya çıkmasına neden olmuştur. Özellikle 1970'ler boyunca, beklenen fayda teorisinin geçerliliğinin aksini kanıtlayacak bilgiler ortaya çıktıkça, klasik iktisada ait tartışılmaz normatif standartlar olarak görülen yaklaşımlar

yeniden incelenmeye ve tartışılmaya başlandı. Bu türden yeni yaklaşımlar, beklenen faydaya yönelik çok sayıda normatif alternatife yol açtı (Fishburn, 1988).

3. FAYDA TEORİSİ'NDEN SINIRLI RASYONELLİĞE

Modern ekonomi teorisi, insanların bazı sonuçları varsayımsal olarak değerlendirse de bazı sonuçları diğerlerine göre daha fazla tercih ettiğini öne sürmektedir. Risk altında eşzamanlı karar alma konusundaki paradigmaya göre, tamamen rasyonel olan bir kişi, bir dizi sonucun karşılaştırmalı değerlendirmeleri yapabilen ve bu kapsamda faydasını maksimize etme ilkesine uyan kişidir. Bu, o kişinin kararlarının tutarlı bir şekilde olası sonuçlarını rasyonel olarak değerlendirdiğini ve akıl yürütmeye dayalı olarak mümkün olan en yüksek beklenen faydayı elde etmeyi amaçladığı anlamına gelir (Wheeler, 2018). Bununla birlikte bu türden çok yaygın olan katı rasyonalitenin karmaşık modellerine karşı çeşitli itirazlar dile getirilmiştir. Birincisi, basit iç gözlem ile basit karar almalarda bile çoğu birey faydasını maksimize etme çabasında değildir. Yani bireyler farklı alternatifler arasında bilinçli olarak maximal bir seçim yapmazlar. İkincisi, bu tür maksimizasyonlar oldukça zordur ve bireyler isteseler bunları pratikte gerçekleştiremez. Üçüncüsü, özellikle alan çalışmaları ve laboratuar deneyleri, bireylerin genellikle rasyonel karar teorisinin bazı temel varsayımlarına uymakta başarısız olduğunu gösteriyor. Dördüncüsü, laboratuar deneyleri, varsayımlardan farklı olarak rasyonel analiz sonuçlarının bazen gerçek yaşama uymadığını gösteriyor. Son olarak, rasyonel analiz sonuçları zaman zaman basit iç gözlem temelinde bile makul görünmüyor (Aumann, 1997).

Sınırlı rasyonellik ifadesi genellikle insanların faaliyette bulundukları ortam sınırlı zihinsel yeteneklerine göre çok karmaşık olduğunda başvurdukları rasyonellik türünü belirtmek için kullanılmaktadır. Simon'a göre, bireylerin zihinsel kapasitelilerindeki sınırlılıklar, karar ortamının karmaşıklığıyla birlikte onların tüm alternatifleri değerlendirmesini engeller. Bu sınırlar, karar verici konumundaki bireylerin ve kuruluşların alternatiflerin sonuçlarını değerlendirmesi gerektiğinde de mevcuttur, böylece karar verici bu amaç için bazı sezgisel prosedürler kullanır. Karar verici, yeterince iyi veya tatmin edici çözümler arayarak tatmin edici bir strateji benimser. Bütün bunlar, Simon'un yaptığı gibi, insan davranışının kasıtlı olarak rasyonel olduğu, ancak yalnızca sınırlı bir şekilde rasyonel olduğu iddiasını savunmanın başka bir yoludur (Dequech, 2001). Temel olarak davranışsal ekonomistlerin yaptığı da aslında budur. Bireylerin rasyonel olduğu inancı ve düşüncesi başlangıcından itibaren temel iktisadi düşünceler tarafından benimsenmiştir. Ancak üzerinde durulan asıl konu insan davranışlarının rasyonel olmadığı ve bu kapsamda bireylerin neden rasyonel davranamadığı sorusuna cevap aramaktır. Temel olarak fayda teorisine karşı geliştirilmiş bir sınırlı rasyonellik teorisinden bahsedilemez. Aumann'ın (1997) öne sürdüğü gibi sınırlı rasyonelliğe dair bütüncül bir teori yoktur. Diğer yandan Simon'a (2000) göre rasyonellikteki çeşitli sınırlar, neoklasik ekonominin faydayı maksimize eden rasyonelliği, Adam Smith ve çağdaşlarının bireylerde gözlemlediği pratik akıl yürütmeyle yer değiştirmeye başladıkça, iktisat teorisinde bir devrimden çok eski rejimi geri getirmeyi amaçlayan bir karşı devrim ortaya çıkıyor. Adam Smith'in ortaya koyduğu iktisadi anlayış, insan sınırlamalarına çok fazla yer bırakmış ve sonuçları optimizasyon varsayımlarına dayanmamış olsa da, rasyonelliğe ait sınırlamalar veya ekonomik karar alma ve ekonominin işleyişi üzerindeki etkileri hakkında sistematik bir teori sunmayı bile amaçlamamıştır.

Modern psikoloji insanların karmaşık veya iyi tanımlanmamış durumlarda tümdengelim mantığında yalnızca orta düzeyde iyi olduğumuzu ve bunu yalnızca orta düzeyde kullandığımızı ifade etmektedir. Bununla birlikte insanlar bariz evrimsel faydalar sağlayan örüntüleri ve davranışları görmede, tanımada veya eşleştirmede daha başarılılar. İnsanlar karmaşıklık sorunlarında örüntüler arar; bunları kullanarak geçici iç modeller veya hipotezler veya şemalar oluşturur, sorunu basitleştiririz, mevcut hipotezlerimize dayalı çıkarımlar yapar ve bu çerçevede hareket eder. Çevreden gelen geri bildirimlerle birlikte bireylerin sahip olduğu hipotezlerine olan inançları güçlenebilir veya zayıflayabilir. Bireyler tam olarak akıl yürütemediğinde veya sorunu tam olarak tanımlayamadığında, aradaki boşlukları doldurmak için basit tümevarımsal modeller kullanır (Arthur, 1994). Ancak akıl yürütmede ve mantık ilkelerini kullanmada temel olan tümdengelimsel model kullanmaktır. Aksi halde mantık yürütme tümevarımsal modele kaydıkça bireyler rasyonellikten uzaklaşmaktadır. Klasik ve Neoklasik iktisadın ortaya koyduğu temel problem insanların çoğunun akıl yürütmede tümdengelimsel modeli kullanamamasına rağmen tam rasyonel karar verebilecekleri yönündeki öngörüsünde yatmaktadır.

Rasyonellik, tüm olası alternatif davranışlar arasında bir seçim yapmayı gerektirir ancak gerçekte seçim yapma durumunda bireylerin aklına bu alternatiflerden sadece birkaçı gelir. Tam rasyonalite, bireylerin seçimlerinde karşı karşıya oldukları bilgi eksikliğiyle sınırlanmaktadır. Bu sınırlama hem karar almada gerekli olan temel bilgi hem de belirli bir durumda uygun kararlar almak için gerekli olan daha kapsamlı ve spesifik bilgi için geçerlidir. Diğer yandan karar alma süreçleri aynı zamanda zihinsel süreçlerin hızıyla sınırlanabilir. Bireyler ayrıca, kararlarını verirken, bu kararlar üzerinde etkili olan değerleri ve anlayışlarıyla da sınırlanır ve bunlar genellikle

içinde bulundukları toplum ve çevrelerince şekillendirilir (Hernandez & Ortega, 2019). Beklenen faydanın maksimizasyonu ve Bayes modelleri gibi sınırsız rasyonaliteyi savunucuları dışında yer alan rasyonalite savunucuları genellikle ortaya koydukları modellerinin gerçekçi olmayan zihinsel yetenekler varsaydığını kabul etseler de, yine de bireylerin sınırsız rasyonelmiş gibi davrandıklarını ileri sürerek onları savunurlar. Bu durum, olasılık yasaları sürecini değil, yalnızca akıl yürütmenin sonucunu açıklamaktadır. Buna karşın hızlı ve tutumlu sezgisel yöntemler, daha az hesaplama yeteneği ve daha az bilgi gerektirmesinin yanı sıra, aynı zamanda bilişsel süreçleri, bilgi aramasının ne zaman sonlandırılacağı ve edinilen bilgiye dayanarak bir kararın nasıl verileceğini de belirtmektedir. Hızlı ve tutumlu sezgisel yöntemler, basit arama kuralları ve basit durdurma kuralları olan yöntemlerdir. Buna karşın, kısıtlar altında optimize eden modeller, aramanın sonlandırılmasının zaman, hesaplama, para ve diğer harcanan kaynaklar açısından optimize edilmesini varsayar. Temel olarak bu rasyonellik anlayışı, zihnin her yeni bilgi parçası için aramanın fayda ve maliyetlerini hesaplaması gerektiğini ve maliyetler faydaları aştığında da aramayı durdurması gerektiğini savunur (Hoffrage & Reimer, 2004). Bununla birlikte hem bireysel hem de kolektif davranışın tüm özel sonuçlarını ana hatlarıyla belirleyebilen kapsamlı bir rasyonalite teorisi geliştirmek idealist bir hedef gibi görünüyor. Bunun başlıca nedeni, bireylerin akıl yürütmesini etkileyen tüm değişkenlerin veya bunların işlediği mekanizmaların henüz tam olarak keşfedilmemiş ve anlaşılmamış olmasıdır (Cristofaro, 2017).

4. SONUÇ

İnsanın bütünüyle rasyonel olması teoride mümkün gibi gözükse de bireylerin tek tek sahip oldukları bilişsel kusurları ve

ön yargıları bu rasyonelliği mümkün kılmıyor. Ancak bu durum standart iktisat teorisinin ortaya koyduğu bu teorinin geçersiz veya değersiz olduğunu göstermiyor. Sınırlı rasyonellik kavramı ile karşılaştırıldığında beklenen fayda teorisi iktisadi bir teori olarak sınırlı rasyonellik yaklaşımının ortaya atılmasına ve geliştirilmesine imkan vermiştir. Özellikle davranışsal iktisatçılar yeni bir teori üretmekten çok klasik iktisadın rasyonel insanının neden bütünüyle rasyonel davranışlar sergileyememesi konusunda alan çalışmaları ve laboratuar deneyleri yaparak daha çok rasyonalitedeki sapmaların nedenleri üzerinde durmuşlardır. Bu durum ise onların standart iktisadi anlayışı reddetmek yerine rasyonellik kavramına yeni bir bakış açısı getirdiklerini ortaya koyuyor. Neticede sınırlı rasyonellik kavramı insanların tamamıyla rasyonel olduğunu reddetmekten daha çok bu rasyonalitenin temel olarak önyargılar tarafından sınırlandığını ortaya belirtiyor.

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DOES RELIGION AFFECT THE EMPLOYMENT DECISION OF WOMEN?

Elif ERBAY[1]

1. INTRODUCTION

During the past few decades, the topic of religion has stimulated the interest of many researchers. Both theoretical and empirical analysis to capture the effect of religious patterns on various outcomes make significant contributions to the discipline of economics (Iannaccone, 1998; Barro & McCleary, 2003; Noland, 2005). This study falls in the empirical line of work and investigates the effect of religion on female labor force participation (FLFP). Although female employment is one of the significant determinants of socioeconomic well-being and economic growth, women's involvement in paid work is amongst the core issues in real life, which generally causes disagreement between religious and non-religious parts (Guiso, Sapienza, & Zingales, 2003). Therefore, it is crucial to investigate whether there is a notable effect of religion on female's work decisions and through which channels it operates. Several authors have found evidence that affiliating with a religious group is associated with lower labor force participation of women (Heineck, 2004; Lehrer, 1995). It is also deduced from these studies that the degree to which certain denominations adhere to traditional gender norms determines their impact on the labor supply. On the other hand, a piece of literature has proven that the importance given to religion has diminished over time; hence, its effect on female

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employment decisions becomes smaller and even disappears (Bayanpourtehrani & Sylwester, 2013). Since the existing results in the literature are mixed, this research aims to find the current effect of different denominations on the employment decisions of females.

The main contributions of this study to the literature are two-fold. Firstly, not only determinants of labor supply but also demand-side factors are included in the analysis. The employment opportunity of women varies across countries due to economic conditions. Moreover, many countries impose tight restrictions on female employment; hence, jobs done by females in these countries are very limited. Therefore, including demand-side determinants is crucial to capture the cross-country differences since labor demand may change significantly across countries. Secondly, previous literature generally uses country-fixed effects to capture economic characteristics and institutional structure; however, it would lead to a multicollinearity problem if the number of countries in the sample is relatively high. In this study, rather than country-fixed effects, I use region-fixed effects to overcome this problem.

2. LITERATURE REVIEW

The differences in female employment across countries have been still persistent. Many studies investigate the effect of demographic characteristics such as age, marital status, fertility, and education level on female employment decisions (Mincer, 1985; Besamusca, Tijdens, Keune, & Steinmetz, 2015; Fleisher, 1971). Psacharopoulos and Tzannatos (1993) analyze the female labor force participation in 15 Latin American countries. They find an increase in female employment despite adverse economic conditions. Moreover, their findings show that there is a negative relationship between female labor force participation and

marriage as well as fertility. Jaumotte (2004) analyzes the factors determining female employment in 17 OECD countries by controlling various policy instruments. She asserts that tax incentives, child subsidies, paid maternity influence female labor force participation positively. Dayioglu and Kirdar (2009) analyze the trends and determinants of female labor force participation in Türkiye by conducting cohort analysis. According to their findings, education has a positive impact on female employment, yet an increase in the number of children affects the labor force participation of women negatively. They also state that female employment is higher in rural than urban areas.

Moreover, recent studies considering institutional factors in addition to demographic characteristics as determinants of female labor force participation have enriched the literature. Extensive research has been carried out to find the effect of culture, religion, social norms, and other institutional structures on female employment (Hertel, 1988; Goksel, 2013; Xiao & Asadullah, 2020). Read (2004) analyzes the relationship between the labor force participation of women and religion. She also examines whether religion affects female employment directly or indirectly while the indirect mechanism operates through family behaviors. The findings demonstrate that religion harms female labor force participation only in case of child presence. H'madoun (2010) conducts an empirical analysis to examine the effect of religiosity on female employment activity using the 2005 wave of the World Values Survey. She measures not only the difference between denominations but also the level of religiosity. Her findings suggest that there exists a significant difference between religious and non-religious women in the labor force participation. The intensity of beliefs decreases the employment likelihood. Additionally, the institutional structure of countries determines the employment decisions of women. Pastore and

Tenaglia (2013) perform an analysis similar to the study of H'madaoun, yet their research encompasses 47 European countries. The results show that belonging to the Orthodox and Muslim denominations decreases the employment likelihood of females while Protestant women are more likely to be employed. Bayanpourtehrani and Sylwester (2013) carried out a cross-country analysis from 1985 to 2005 to examine the effect of religion on female labor force participation. They use various control variables: the ratio of female to male labor force participation rate, the percentage of females in total employment, GDP per capita in 1985, a proxy for democracy level in the country, the ratio of fuel exports to GDP. Unlike the findings of other studies, they assert that religion, especially Islam, does not affect the employment probability of women. They also find suggestive evidence about the weakening relationship between religiosity and labor force participation over time. Fischer and Aydiner Avsar (2015) compare the labor force participation of women in the MENA region with Europe. They examine globalization and conservatism as determinants of female employment. For globalization, international trade, information flow through a person and media, and the Internet are utilized. Religious values and socio-political characteristics related to family and leadership are proxies used for conservatism. Davis and Gao (2020) investigate why religious women work less than non-religious women. To tackle this question, they employ the employment happiness premium measuring the happiness obtained from being employed according to the religious denominations. The results show that the employment happiness premium is higher for men than women for every religion and the premium gap between women and men changes significantly across religions. They also suggest that patriarchal social norms have an important role in labor force participation and generally limit female employment.

3. DATA

This study utilizes the 7th wave of the World Values Survey (WVS). This survey offers rich data on a wide range of topics including demographic characteristics, economic attitudes, religious background, and beliefs of individuals. In the 7th wave, surveys were conducted by more than 70,000 individuals in 49 countries from 2017 to 2020. The empirical analysis is limited to a female sample aged 15-64. Two countries – Andorra and Macau SAR – are excluded because the Women, Business and the Law (WBL) index, which is used as a determinant of labor demand, is not available for Macau SAR. Additionally, there is no World Bank data on the female labor participation rate for Andorra. Because of this, making a comparison between official numbers and findings from the survey is not possible. Therefore, Andorra is dropped as well. After the exclusion of missing data on crucial variables, the sample includes 29,884 female individuals.

The dependent variable in the model is female labor force participation. It is a dichotomous taking one if an individual has paid employment, and zero otherwise. Paid employment includes full-time employment (30 hours a week or more), part-time employment (less than 30 hours a week), and self-employment categories. Retired/pensioned people, housewives, students, and unemployed individuals are grouped as not participating labor force.

The demographic characteristics used as independent variables include age, educational attainment, marital status, and the number of children. Age is categorized into 10 groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64. In this way, the effect of different age groups on female labor force participation can be examined. Education level is grouped into 5 categories: no degree, primary school graduates, secondary school graduates, high school graduates, and university

graduates. It is expected that female education will lead to a higher participation rate. Individuals are divided into 3 groups according to their marital status: single, married, and other. Single respondents form the control group while married people and individuals living together are grouped as married. Divorced, separated, and widowed people form the other category. The number of children is another important indicator since the larger the number of children born, the more interruptions in labor market activity. Therefore, we expect a lower participation rate for women with children.

Besides labor supply determinants, demand-side factors are also included in the model. Different regressions for urban and rural areas are conducted to capture changing dynamics in these regions. Additionally, Women, Business and the Law (WBL) index, which is created by the World Bank, measures the law and regulations that affect women's employment opportunities in each country. By using this index, it is possible to observe various employment conditions of women across countries. For instance, if there is a limitation on the work opportunities of females, the index captures this effect. Moreover, region-fixed effects are included as a proxy for the institutional structure like culture and social norms. 10 regions are created according to the location and economic characteristics of countries, which are Africa, OECD countries in Asia (Japan and South Korea), Australia, East Asia and Pacific, Europe and Central Asia, Latin America, Middle East and North Africa, OECD countries, South Asia, and the United States. Finally, time-fixed effects measure trends over time.

According to rational choice theory, religiosity should seen as "preferences" and presumed exogenous when attempting to explain economic behavior. Differences in individual behavior can thus be attributed to variations in economic opportunities and constraints, and the remaining part can be ascribed to differences in preferences. One could argue that considering how women's

labor force participation is impacted by their religious beliefs is an attempt to endogenize choices. Utilizing the WVS dataset, which includes multiple questions on respondents' religious backgrounds, makes this feasible. In line with the data, religious denominations are represented by dummy variables in 7 categories, which are No denomination, Catholic, Protestant, Orthodox, Muslim, Buddhist, and Other.

4. METHODOLOGY

In order to provide basic insight, Table 1 shows the mean values of variables according to religious denominations. Compared to their contemporaries, Buddhist women have a greater employment rate (69.8%). Members of Muslim denominations, on the other hand, have much lower employment rates (38%). Lower education statistics are similar while higher education figures show different trends across religions. Buddhist females are less likely to complete higher education and in the sample, only 14% of whom is graduated from high school or university. More than 70% of Muslim and Buddhist women are married while this ratio is close to 60% for other denominations. Muslim women tend to have more children with an average of 2.17. If a person belongs to a religious denomination, she is more likely entitled herself as religious. Most people are living in urban areas; however, the ratio of living in urban areas among Muslim and Buddhist women is lower, around 50%. To sum up, statistics are similar across religions, yet Muslim and Buddhist females are separated slightly from other denominations.

Table 1. Descriptive Statistics

	No Denomination	Catholic	Protestant	Orthodox	Muslim	Buddhist	Other
Employed	0.628	0.521	0.592	0.593	0.382	0.698	0.519
Lower Education	0.622	0.619	0.582	0.616	0.534	0.536	0.591
Higher Education	0.283	0.206	0.255	0.295	0.201	0.14	0.236
Age	39.49	39.01	38.28	41.09	37.15	42.41	39.57
Married	0.654	0.624	0.629	0.619	0.727	0.752	0.644
# of Children	1.4	1.97	1.81	1.44	2.17	1.65	1.9
Religious Person	0.22	0.816	0.768	0.827	0.806	0.594	0.752
Chief Earner	0.274	0.251	0.269	0.342	0.162	0.298	0.241
Urban	0.771	0.715	0.718	0.652	0.504	0.467	0.762
# of Observations	5,986	5,438	1,719	2,929	10,079	1,826	1,907

Note: The data come from the 2017-2020 World Values Surveys. The sample is restricted to female individuals aged 15-64. Lower education includes primary and secondary school graduates while higher education stands for high school and university graduates.

The following equation is computed to identify the variables that influence religious women's engagement in the workforce:

$$LFP_{icjt} = \alpha + X'_{ijt}\beta + \gamma Z_{ct} + \delta R_{icjt} + \eta_t + \eta_j + u_{icjt}$$

where LFP_{ijt} denotes the labor force participation for individual i in country c and region j at time t. It is a binary variable taking 1 if an individual has paid employment, and 0 otherwise. X'_{ijt} represents individual-level control variables including 5 education levels, 10 age categories, 3 groups of marital status, the number of children, a dummy variable for the chief wage earner in the family. The education groups are (i) no degree, (ii) primary school graduates, (iii) secondary school graduates, (iv) high school graduates, and (v) university graduates. The age categories are 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64. Marital status is divided into 3 levels: (i) single, (ii) married and living together as a married, (iii) divorced, separated, and widowed. As a difference from previous studies, Z_{jt} represents the supply-side factor of labor force participation of women. It represents the WBL index as a proxy for the economic opportunity of women across countries over time and urban-rural

area differences. R_{ijt} stands for the religious-related characteristics of each individual. It includes 7 groups of religious denominations. η_t and η_j is for time-fixed effects and region-fixed effects, respectively.

Given that LFP is a binary outcome, this study opts for the logit method. The logit model assumes the following cumulative probability density function:

$$probability(Y = 1) = \frac{1}{1 + e^{-z}} = \frac{e^{z}}{1 + e^{z}} = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n}}$$

Y=1 shows that the event will occur, which is in this case that a person participates in the labor market and e is the exponential value. In the logit model, the probability of occurrences increases with 'X', changing between 0-1, but never steps outside the 0-1 interval. The relationship between the variables is non-linear. Odds can be bigger than 1. Since it is hard to interpret the model because of exponential calculations, the odds are usually used.

$$Odds = \frac{prob(Y = 1)}{prob(Y = 0)}$$

5. EMPIRICAL RESULTS

Table 2 shows the estimates of three different models. The marginal effects of the independent variables – that is, the odds ratio – are presented for interpretation purposes. The first model in Table 2 includes only demand-side determinants, which are education level, age, marital status, the number of children, being a chief wage earner as well as religious denominations. In addition to these variables, the second model encompasses the supply-side factors. And the last model includes region and time-fixed effects.

Table 2. Average Marginal Effects of Logit Regressions

	Baseline	+ Supply-side factors	+ Fixed Effects
Education			
Primary School	0.059***	0.053***	0.030***
Secondary School	0.147***	0.144***	0.121***
High School	0.216***	0.210***	0.183***
University	0.272***	0.224***	0.218***
Age			
20-24	0.150***	0.149***	0.146***
25-29	0.249***	0.249***	0.244***
30-34	0.289***	0.288***	0.275***
35-39	0.299***	0.300***	0.286***
40-44	0.339***	0.338***	0.321***
45-49	0.329***	0.324***	0.304***
50-54	0.285***	0.279***	0.256***
55-59	0.222***	0.210***	0.185***
60-64	0.097***	0.088***	0.069***
Marital Status			
Married	0.039***	0.034***	0.024***
Other	-0.038***	-0.039***	-0.042***
# of Children	-0.024***	-0.023***	-0.018***
Chief Earner	0.338***	0.335***	0.323***
Religion			
Catholic	-0.057***	-0.062***	0.017*
Protestant	0.003	0.005	0.028*
Orthodox	-0.064***	-0.067***	0.007
Muslim	-0.167***	-0.100***	-0.036***
Buddhist	0.100***	0.129***	0.039
Other	-0.071***	-0.056***	0.004
WBL Index		0.003***	-0.001***
Urban		-0.019***	-0.002
# of Observations	29,884	29,884	29,884
Pseudo R^2	0.161	0.166	0.201
Controls for			
Region Fixed Effects	No	No	Yes
Year Fixed Effects	No	No	Yes

Note: The sample includes 15-64 year-old females in the 2017-2020 World Values Surveys. *, **, *** indicates significance at the 10%, 5%, and 1% levels, respectively.

The results of the first model indicate that a woman's employment prospects are enhanced by investments in human capital, as measured by the respondent's educational attainment. Having at least a primary school degree increases a woman's

employment opportunities, and further education improves her chances even further. With age, female labor force participation rises, and the effect has the usual inverted U-shaped non-linear pattern. It peaks between the ages of 40 and 44 and then starts to drop. It is more likely for married women and people living together as married to participate in the labor market, which is an unexpected result. Yet, it shows the changing trends in females' labor force participation over time. Women's participation declines with the number of children living in the home. The likelihood of having a job is increased if you are the primary wage earner in the household.

As mentioned above, religious denominations in seven categories are added to capture the effect of religion on female employment activity. The reference category consists of individuals who do not belong to any denomination. The findings show that different denominations have distinct effects on women's labor force participation. Protestant women are not much affected, but only Buddhist women are more likely to participate in labor force. Although the negative impact is far greater for Muslims, women from all other religious groups are less likely to be employed.

The second model includes supply-side factors which are the WBL index and a dummy variable for living in an urban area. By including these factors, the other control variables' effects remain largely unchanged. The effect of the WBL index is positive and significant, which means improvement in employment opportunities for women increases their labor force participation. Moreover, the findings indicate that rural women are more likely than their urban counterparts to engage.

The final model also covers the region and time effects. Including regional variables does not change the sign of other control variables except for religious denominations. The effect

of religion, to the extent that it has been accounted for by culture, will probably be underestimated because region-fixed effects account for factors like institutional structure, economic development level, and other unobserved regional features. Hence, a change in the signs and magnitudes of the impact of religious denominations is expected. After controlling for regional effects, Orthodox, Buddhist, and other denominations do not have any significant influence on female labor force participation. The detrimental effect is still present for Muslim women, even though Catholic and Protestant women are more likely to work.

6. CONCLUSION

Nowadays, increasing the number of women in the workforce is seen as a component of the answer to economic issues including poverty and aging. Furthermore, the primary driver of economic growth in the majority of the industrialized world during the past few decades has been the rise in women's labor force participation. Nonetheless, the greater disparity in female employment within and between countries indicates that women are significantly more likely than men to be unemployed. Thus, it is crucial to investigate the wide range of factors that influence women's employment choices.

Numerous topics, including the impact of domestic and private life, social policies, labor market structure, and the degree of economic development on women's labor force participation, have already been explored in the substantial body of literature. Finding out empirically if religiosity has an additional impact on female labor force participation is the aim of this research. For the analysis, data and variables were drawn from the 7th wave of World Values Surveys; limited to women aged 15 to 65 in 47 countries. After controlling for age, education, marital status, the

number of children, and being a chief wage earner, women belonging to a religious denomination except Protestants and Buddhists are found to participate less than women who do not belong to any denomination. Including the labor demand determinants in the model does not change the results significantly. However, containing region-fixed effects makes a substantial difference in the results since they also stand for the institutional structure of countries. After controlling for regional fixed effects, only women with Muslim faith have lower labor force participation while Protestant and Catholic females are more likely to participate in the workforce.

This study contributes to the literature by including labor demand determinants as well as labor supply factors, and regional effects for institutional characteristics. By adding to the empirical research in this field, the results highlight how crucial it is to include religion when examining economic behavior. Religion does matter, even though there are still some unclear and unsolved questions about how religion affects the availability of female labor.

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BEYOND WINNER-TAKES-ALL: OPTIMAL PRIZE ALLOCATION IN CONTESTS

Mustafa YILDIRIM[1]

1. INTRODUCTION

Many competitive interactions among individuals or groups are fundamentally contests, environments in which participants expend costly, irreversible resources to outperform rivals and, ultimately, secure a valuable prize. We see this play out in sports and politics, where athletes and candidates invest significant energy and capital to win. In legal battles, for instance, litigants invest heavily in expert witnesses to secure a favorable verdict. The stakes become even higher in the field of international relations, where military conflicts drive nations to sacrifice invaluable lives for dominance. Perhaps the most widespread application of this principle is in business. There, contests unfold on multiple levels: employees vie for promotions, firms lobby for regulatory favors, and brands allocate substantial budgets to capture market share.

The formal study of contests is worthwhile, not just for understanding behavior in these common situations, but also for designing them effectively. Contest theory gives us a unifying framework: Any contest involves a set of participants, who can be individuals, teams, or entire organizations, all vying for a prize that might be cash, a trophy, professional advancement, or simply prestige. These contestants expend physical, intellectual, or

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financial effort and incur costs according to an underlying effort-cost function that may differ between competitors. Finally, a contest success function translates their efforts into probabilities of winning through rules that can range from deterministic, where the highest effort always wins, to probabilistic, where even low-effort players have a chance of success.

While a contest designer cannot control participants' innate costs or strategic effort, they can influence outcomes through the other components. They can adjust the number of participants (often with entry fees), modify the contest success function (e.g., by adopting video-assisted refereeing), and, most critically, set the prize allocation, the most powerful and practical of these tools. Therefore, the central challenge in contest design boils down to two questions: how many prizes to offer, and how to distribute the total value among them. This review synthesizes theoretical and experimental research to address these questions by examining several prominent contest models and their implications for optimal prize allocation.

2. PROMINENT CONTEST TYPES

This section establishes the analytical foundation for our review by detailing three canonical contest formats (all-pay auctions, Tullock contests, and rank-order tournaments), each defined by its characteristic contest success function. For each format, we first present its formal structure and core theoretical results under both symmetric and asymmetric conditions. We then summarize key experimental and field studies that validate (or challenge) these predictions, highlighting how design features influence participant behavior and outcome efficiency. These insights will set the stage for our subsequent, in-depth examination of prize-allocation strategies within each framework.

2.1. All-Pay Auctions

In an all-pay auction, the player with the highest effort x_i (analogous to a bid in standard auctions) wins, with ties broken by a random draw among the top bidders. Let $\mathbf{x} \equiv (x_1, \dots, x_i, \dots, x_n)$ denote the effort profile and $M_{-i} = \max_{j \neq i}\{x_j\}$. Then, player i wins with probability

$$p_i(\mathbf{x}) = \begin{cases} 1 & \text{if } x_i > M_{-i} \\ 1/k & \text{if } x_i = M_{-i} \text{ and } k \text{ players tie} \\ 0 & \text{if } x_i < M_{-i}. \end{cases}$$

Unlike standard auctions where only the winner pays, all participants must pay their bid, rendering each outlay a sunk cost. Since early formalizations by Hirshleifer and Riley (1979), Nalebuff and Stiglitz (1983), and Hillman and Riley (1989), all-pay auction models have applied to a variety of settings, including lobbying (Baye, Kovenock, & de Vries, 1993; Che & Gale, 1998; Kvasov, 2007), R&D races (Dasgupta, 1986), litigation (Baye, Kovenock, & de Vries, 2005), and military conflicts (Konrad, 2009).

In a canonical all-pay auction with complete information, there is no pure-strategy equilibrium because any bid can be profitably undercut by the winner or outbid by the loser. This dynamic yields a unique mixed-strategy equilibrium with two players, but often a continuum of equilibria with three or more (Baye, Kovenock, & de Vries, 1996). With symmetric bidders, total expected bid equals the prize value V (full rent dissipation). Asymmetries in valuation or cost deter weaker bidders and reduce aggregate bids (Clark & Riis, 1998a; Hillman & Riley, 1989; Konrad, 2009), while bid caps can paradoxically increase revenue by leveling the field (Che & Gale, 1998).

An all-pay auction's ability to award the prize to the highest-valuation player (i.e., its selection efficiency) hinges

upon information and timing. Under complete information, the stronger bidder may still lose (Baye et al., 1996), but with incomplete information, monotonic strategies almost ensure selection of the highest-valuation bidder (Amann & Leininger, 1996). Sequential moves or handicaps can further improve efficiency, sometimes reducing total effort (Konrad & Leininger, 2007; Pérez-Castrillo & Wettstein, 2016).

Experiments confirm that asymmetry discourages weaker players but consistently find overbidding relative to Nash predictions (Dechenaux, Kovenock, & Sheremeta, 2015; Gneezy & Smorodinsky, 2006). While experience mitigates overbidding (Lugovskyy, Puzzello, & Tucker, 2010), deviations are often attributed to non-monetary factors like the joy of winning, loss aversion, or cognitive biases (Gneezy & Smorodinsky, 2006; Müller & Schotter, 2010). Despite this persistent overbidding, the qualitative effects of heterogeneity and information largely align with theory.

2.2. Tullock Contests

Originating from models of rent-seeking (Tullock, 1980), Tullock contests allocate the prize probabilistically: each player's probability of winning rises with his relative effort but never reaches certainty (unless all others exert zero effort). Formally, if $\mathbf{x} \equiv (x_1, \dots, x_i, \dots, x_n)$ is the effort profile and r measures effort's discriminatory power, then

$$p_i(\mathbf{x}) = \begin{cases} \dfrac{x_i^r}{\sum_{j=1}^{n} x_j^r} & if\ \mathbf{x} \neq (0, \dots, 0) \\ 1/n & otherwise. \end{cases}$$

As $r \to 0$, the outcome becomes purely random; conversely, as $r \to \infty$, the contest converges to an all-pay auction. The specific case $r \to 1$ is often referred to as the lottery contest. Beyond rent-seeking, the Tullock framework has been used to

model various competitions, including R&D races (Baye & Hoppe, 2003), advertising battles (Dockner & Jørgensen, 2018), political campaigns (Fey, 2008), sports tournaments (Szymanski, 2003), litigation (Farmer & Pecorino, 1999), and military conflict (Garfinkel & Skaperdas, 2000).

In symmetric contests with prize value V, a unique pure-strategy equilibrium exists if the decisiveness parameter satisfies $r \leq n/(n-1)$.[2] There, each player exerts x^*, resulting in a total effort $TE^* = nx^*$:

$$x^* = \frac{r(n-1)}{n^2} V \; and \; TE^* = \frac{r(n-1)}{n} V,$$

implying that individual effort falls with the number of contestants (n) while aggregate effort rises. Conversely, greater discriminatory power (r) boosts both individual and total efforts, since each additional unit of effort has a larger impact on winning. Because $TE^*/V = r(n-1)/n < 1$, some prize value always remains undissipated, which contrasts sharply with symmetric all-pay auctions, where equilibrium bids fully exhaust the prize. If $r > n/(n-1)$, no pure-strategy equilibrium exists and players resort to mixed strategies.

In asymmetric settings, weak players exert less effort than their strong counterparts, dampening total effort relative to the symmetric case. But since outcomes are probabilistic, this discouragement is milder than in all-pay auctions; consequently, exclusion-type strategies (e.g. removing the strongest entrant) fail to raise effort (Fang, 2002). Moreover, Tullock contests are

[2] Szidarovszky and Okuguchi (1997) establish that even with heterogeneous contestant abilities and any number of players, the Tullock contest admits a unique Nash pure strategy equilibrium whenever the decisiveness parameter satisfies $r < 1$.

typically less efficient at awarding the prize to the highest-valuation player than all-pay auctions.

Experiments on Tullock contests reveal patterns similar to all-pay auctions, notably significant effort heterogeneity and overbidding relative to Nash predictions (Sheremeta, 2013). While empirical results support the theory that individual effort falls as player numbers increase, absolute effort levels consistently exceed benchmarks (Sheremeta, 2011). This overbidding is often explained by non-monetary factors like the joy of winning, probability weighting, or bounded rationality (Sheremeta, 2015). Despite these quantitative deviations, the model successfully captures the key qualitative trade-offs.

2.3. Rank-Order Tournaments

First formalized by Lazear and Rosen (1981), rank-order tournaments award prizes strictly by the ordering of noisy outputs rather than their absolute values. A player's output is typically modeled as $y_i = x_i + \epsilon_i$, where x_i is effort and ϵ_i represents additive noise, such as measurement error or chance events. Prizes are assigned strictly according to the ranking of these noisy outputs (y_i), rather than their absolute values. This feature makes tournaments well suited to settings where precise measurement is costly but relative performance is observable—examples include promotions and executive pay (Gregory-Smith & Wright, 2019), sales incentives (Poujol & Tanner, 2010), professional sports (Ehrenberg & Bognanno, 1990; Humphreys & Frick, 2019), R&D races (Zhou, 2006), and political campaigns (Kräkel, Nieken, & Przemeck, 2014).

Theoretical analysis of tournaments delivers several robust predictions concerning equilibrium behavior and outcomes. A key determinant of behavior is the level of noise, which dictates the nature of the strategic equilibrium. Specifically, when noise variance is high or effort costs are

sufficiently convex, pure-strategy Nash equilibria can exist, creating a scenario analogous to a Tullock contest with low discriminatory power. Conversely, as noise diminishes, a tournament increasingly resembles an all-pay auction, which typically results in mixed-strategy equilibria.

Consistent with findings from other contest models, introducing heterogeneity in ability or costs results in a discouragement effect, whereby weaker contestants exert less effort, diminishing aggregate effort. This effect is typically exacerbated when participants are risk-averse. The impact of excluding the strongest competitor is also contingent on the noise level. Under low-noise conditions that approximate an all-pay auction, exclusion can intensify effort among the remaining players. In contrast, when noise is high and effort has little bearing on the outcome, removing the top performer may further depress overall effort. Regarding selectivity, a tournament's ability to reliably identify the highest-ability participant diminishes as noise increases, generally making it less selective than an all-pay auction. Its effectiveness relative to a Tullock contest depends on the specific relationship between the tournament’s noise variance and the contest's discrimination parameter. Finally, under conditions of incomplete information (where rivals' characteristics are unknown), tournaments serve a dual role: not only motivating effort but also sorting participants by ability, which adds a layer of strategic complexity.

Empirical evidence from laboratory experiments and field studies largely corroborates the main theoretical predictions (Dechenaux et al., 2015). Studies, including classic experiments by Bull, Schotter, and Weigelt (1987), show that participants tend to increase effort when the prize spread widens and decrease effort as noise increases. Field data from professional sports (e.g., golf scores, tennis serve aggression) and executive compensation also align with these incentive effects. While participants often

exert effort above Nash equilibrium levels (overbidding), this tendency might be less pronounced than in all-pay auctions or lottery contests. However, behavioral factors such as pride, misperceptions of probability, potential for collusion, or even sabotage can influence behavior and distort theoretical incentive structures.

3. OPTIMAL PRIZE ALLOCATION

3.1. All-Pay Auctions

Theoretical Findings: The systematic treatment of the prize as a design variable in all-pay auctions begins with Glazer and Hassin (1988), who establish the contestants' risk attitudes are a primary determinant of optimal design. For risk-averse players, they demonstrate that total revenue is maximized not by a winner-takes-all approach ($V_1 = V$ and $V_2 = \cdots = V_n = 0$), but by allocating the prize purse equally among all but the last-place finisher ($V_1 = V_2 = \cdots = V_{n-1} = V/(n-1)\ and\ V_n = 0$). The intuition is that risk-averse individuals are demotivated by the high uncertainty of a single-prize contest; spreading the prize pool reduces this risk. By contrast, Glazer and Hassin also show that for risk-neutral players with differing abilities, a winner-takes-all structure becomes optimal. Barut and Kovenock (1998) solidify the findings for the risk-neutral case by analyzing all possible equilibria in a complete-information setting. They prove that, in any equilibrium, total effort equals $\sum_{i=1}^{n} V_i - nV_n$. Since this expression is maximized when $\mathrm{V_n} = 0$, their analysis confirms that allocating the whole prize pool to a single winner is optimal and that, as long as prizes are weakly decreasing, the exact division of any residual purse among the remaining $n-1$ ranks is irrelevant. Together, these foundational analyses identify a key principle: optimal prize design is dictated by bidders' risk

preferences, with risk aversion favoring prize dispersion and risk neutrality favoring prize concentration.

Subsequent research introduces further layers of complexity, primarily focusing on player heterogeneity and the nature of effort costs. Clark and Riis (1998a) addresses heterogeneity, finding that while a single prize is sufficient for similar contestants, greater asymmetry in ability necessitates additional runner-up awards to maintain participation and effort from weaker players. Similarly, Moldovanu and Sela (2001) demonstrate the importance of effort-cost functions. A winner-takes-all design remains optimal for linear or concave costs, but multiple prizes become necessary under convex costs to prevent mid-tier contestants from dropping out.

More recent work explores the interaction between these factors. Olszewski and Siegel (2016) show that the optimal allocation depends on the interplay between risk preferences and cost curvature. For instance, risk-averse players with linear costs (or risk-neutral players with convex costs) are best motivated by many prizes of varying sizes. Conversely, risk-loving players with linear costs (or risk-neutral players with concave costs) warrant concentrating the purse into one or a few very large awards. Finally, Fang, Noe, and Strack (2020) uncover a paradox associated with strictly convex costs: increasing prize inequality can counterintuitively reduce total effort, whereas equalizing the top several prizes can raise both the average bid and aggregate effort.

Empirical Findings: Evidence from lab and field studies largely supports these theoretical predictions and highlights important behavioral nuances. Consistent with the risk-neutral model, experiments show that concentrating the prize pool in a single large award elicits greater aggregate effort than spreading it across several smaller prizes (Faravelli & Stanca, 2012;

Sheremeta, 2011). Field studies echo this pattern: winner-takes-all formats can deter weaker entrants, an effect softened when modest runner-up prizes are introduced, as predicted by Clark and Riis (1998a) and documented by Carpenter, Holmes, and Matthews (2010). Experimental work by Müller and Schotter (2010) likewise confirms that optimal prize structures shift with players' cost functions, in line with Moldovanu and Sela (2001).

Yet, the data also shows systematic departures from the canonical model. The clearest is overbidding, where subjects routinely bid more than the risk-neutral Nash equilibrium predicts, sometimes driving total bids above the prize value (over-dissipation). Some real-effort experiments further challenge a purely monetary view. Freeman and Gelber (2010), for example, find that multiple prizes generate more output than a winner-takes-all scheme even when the monetary stakes implied risk neutrality, suggesting that motives such as fairness or social comparison can matter.

Taken together, the evidence supports the main comparative-static insights: prize concentration works best for risk-neutral contestants with linear costs, whereas prize dispersion becomes preferable under risk aversion, convex costs, or large ability gaps. Still, the prevalence of overbidding and entry frictions reminds contest designers to temper theoretical prescriptions with behavioral realities.

3.2. Tullock Contests

Theoretical Findings: Because the Tullock contest-success function converts raw effort into win probabilities rather than fixed ranks, any investigation of optimal prize allocation must explicitly specify how rewards are distributed beyond first place. Berry (1993) tackles the problem by assigning each contestant a winning probability equal to her share of total effort supplied by all k-person coalitions that include her. With a fixed

prize budget, he shows that every additional prize weakens incentives and unambiguously lowers aggregate effort; under risk aversion, however, it can raise the largest individual bid as agents hedge against uncertainty.

Subsequent research explores alternative allocation rules and generalizes these insights. Clark and Riis (1996) argue that Berry's simultaneous model masks dynamic incentives and instead analyze a nested, sequential scheme in which players commit effort once and prizes are awarded in successive rounds among those who have not yet won. Their mechanism likewise predicts that adding prizes reduces total effort, but the initial bid's leverage across multiple rounds yields higher aggregate effort than Berry's benchmark. Building on this, Clark and Riis (1998b) show that for symmetric, risk-neutral players, a winner-takes-all design maximizes total effort whenever a pure-strategy equilibrium exists. Schweinzer and Segev (2012) confirm the general superiority of winner-takes-all yet demonstrate that in highly discriminatory contests (high Tullock parameter r) spreading the purse across a few prizes can "cool" rivalry, restore equilibrium, and sometimes generate more effort than any feasible winner-takes-all alternative.

Once asymmetries arise, a single prize risks discouraging weaker rivals. Secondary prizes can keep them engaged and boost aggregate effort (Clark & Riis, 1998a; Szymanski & Valletti, 2005). Cost curvature works similarly: with convex effort costs, concentrating the purse on first place either drives bids to extremes or pushes contestants out. Konrad and Morath (2024) show that distributing rewards—sometimes non-monotonically, e.g., a slightly larger second prize—balances incentives when high-cost players are present. Szymanski and Valletti (2005) offer a rule of thumb: in a three-player contest with one strong and two weak competitors, at least 25% of the purse should go to the runner-up when $r = 1$.

Beyond specific allocation rules, Tullock contests differ fundamentally from all-pay auctions: total effort can never fully dissipate the prize pool because even maximal effort only raises (never guarantees) the probability of winning (Sisak, 2009). Risk attitudes further shape design. When contestants are risk-averse, identical awards lower payoff variance and raise effort (Fu, Wang, & Wu, 2021a); risk-seekers, by contrast, favor steep prize gradients. Hence a winner-takes-all schedule is optimal only under symmetry, risk neutrality, and linear costs. With risk aversion, convex costs, or heterogeneity, dispersing the purse across multiple ranks is superior. Because effort converts to probabilities, Tullock contests can never reach the full rent dissipation of deterministic all-pay formats.

Empirical Findings: Empirical studies of Tullock contests largely confirm theoretical predictions of over-dissipation and incomplete rent extraction. Early laboratory experiments consistently show average bids substantially exceeding the 1/n risk-neutral benchmark. Millner and Pratt (1989), Potters, de Vries, and van Winden (1998), and Sheremeta (2011), for example, report mean efforts around 30–35% of the prize value in two-player lottery contests.

Experimental comparisons of prize structures with fixed budgets largely echo theoretical rankings under symmetry and risk neutrality. Sheremeta (2011) and Faravelli and Stanca (2012) find winner-takes-all formats generate higher aggregate effort. However, Shupp, Sheremeta, Schmidt, and Walker (2013) observe that two-winner formats can match or surpass winner-takes-all efforts, and Chen, Ong, and Sheremeta (2015) demonstrate that adding runner-up prizes effectively re-engages weaker participants, especially under intense competition conditions where pure winner-takes-all equilibria may fail (Schweinzer & Segev, 2012).

Field evidence from innovation tournaments and crowdsourcing platforms further highlights the advantages of tiered prize structures in attracting broader, more diverse entrant pools, resulting in higher overall contributions compared to strict winner-takes-all designs, particularly under heterogeneous abilities or cost structures (Chowdhury, Mukherjee, & Turocy, 2022; Shupp et al., 2013). Studies from professional golf tournaments and corporate sales contests reveal that broader prize distributions enhance performance without completely dissipating additional payouts, reflecting residual slack inherent in probabilistic contest success functions (Cason, Masters, & Sheremeta, 2020).

Behavioral experiments emphasize the importance of risk attitudes and fairness considerations: modest consolation prizes significantly boost participant effort (Cason et al., 2020; March & Sahm, 2018), aligning with risk-averse preferences for lower outcome variance (Fu et al., 2021a). Moreover, loss aversion frequently induces excessive bidding as participants strive to avoid walking away empty-handed (Kong, 2008).

To summarize, prize concentration dominates prize dispersion only under textbook assumptions, namely symmetry, risk neutrality, and linear costs, whereas multi-prize formats consistently outperform in realistic settings involving risk aversion, convex cost structures, or substantial participant heterogeneity. Persistent tendencies toward over-dissipation and practical participation barriers highlight the necessity of aligning theoretical prescriptions with behavioral realities in contest design.

3.3. Tournaments

Theoretical Findings: The optimal structure of rewards in tournaments, primarily the choice between a single top prize or multiple awards, is a central question in incentive theory.

Foundational work establishes the optimality of winner-takes-all formats, but only under idealized conditions of contestant homogeneity and risk neutrality (Lazear & Rosen, 1981; Green & Stokey, 1983).

This principle, however, is challenged by real-world complexities. Contestant heterogeneity is a primary factor; when participants differ significantly in ability or have career concerns, multiple prizes are more effective at encouraging broad participation and preventing discouragement among weaker competitors (Akerlof & Holden, 2007; Correa & Yildirim, 2024).

Risk preferences are an even more fundamental determinant. While as single prize remains optimal for risk-neutral players (Budde, 2009), multiple prizes become essential for risk-averse participants who are motivated by reducing outcome uncertainty (Drugov & Ryvkin, 2020; Stracke et al., 2014). This preference for prize-sharing is further amplified by behavioral biases like loss aversion, which makes equitable distributions psychologically less strenuous and potentially more motivating (Ryvkin & Wu, 2024; Fu et al., 2021b).

In summary, although winner-takes-all structures are theoretically optimal under restrictive assumptions, the broader academic consensus supports multi-prize formats. Once contestant heterogeneity, risk aversion, and behavioral biases are accounted for, optimal tournament design typically requires more equitable reward distributions to maximize participation and overall effort.

Empirical Findings: Empirical findings from laboratory experiments and field studies strongly support the core theoretical predictions about tournaments, while also highlighting critical behavioral and strategic nuances. Early empirical work confirmed the foundational incentive effects of prize structures, particularly in professional sports. For instance, Ehrenberg and Bognanno's

(1990) analysis of PGA golf tournaments clearly demonstrates that players exert greater effort—reflected in lower scores—in response to larger prize differentials. Similar evidence from professional tennis confirms that widening the gap between champion and runner-up rewards intensifies competitive behavior, aligning with the theory that larger prize spreads enhance motivation.

However, empirical evidence also validates theoretical insights about the complexities introduced by participant heterogeneity and risk aversion. Studies of motorcycle racing (Maloney & Terkun, 2001) and innovation contests (Tian, 2022) reveal that organizers frequently adopt multi-prize structures in practice. This real-world adaptation validates arguments that multiple rewards can mitigate excessive competitive pressure, encourage sustained engagement from a diverse pool of entrants, and accommodate risk-averse behavior.

Corporate and workplace settings offer further nuanced support, revealing a tension between incentivizing top performance and managing strategic behavior. On the one hand, executive compensation often follows a steep tournament structure designed to maximize managerial effort (Main, O'Reilly, & Wade, 1993). On the other hand, field experiments demonstrate the limits of this approach, showing that overly competitive incentives can inadvertently reduce average productivity by provoking unintended consequences like collusion to suppress effort or outright sabotage (Bandiera, Barankay, & Rasul, 2013; Harbring & Irlenbusch, 2005).

Laboratory studies, with their controlled conditions, allow for precise testing of these mechanisms. Classic experiments confirm that subjects' effort responds positively to larger prize spreads, aligning qualitatively with theory (Bull et al., 1987). However, these studies also consistently find that risk aversion

causes actual effort to fall short of model predictions. Furthermore, when interactions are repeated, implicit collusion often emerges, and excessively large prize gaps can incite the same counterproductive behaviors observed in field settings.

Behavioral considerations, notably fairness perceptions and loss aversion, add another layer of complexity. Research finds that participants exert greater effort when prize distributions are perceived as fair and attainable (Grund & Sliwka, 2005). Consequently, organizations often limit prize gaps or offer symbolic recognition to sustain morale and widespread effort (Kosfeld & Neckermann, 2011), a practice supported by theories of loss aversion (Fu et al., 2021b; Ryvkin & Wu, 2024). Innovation tournaments illustrate this trade-off clearly: Boudreau, Lacetera, and Lakhani (2011) show that while single large prizes attract elite talent, multiple smaller prizes significantly increase participant numbers and idea diversity. This underscores that the optimal prize structure depends critically on the contest's specific goals.

All in all, empirical research broadly confirms the theoretical effectiveness of tournament incentives. However, this evidence consistently reveals that simplistic winner-takes-all structures are rarely robust in realistic contexts. Participant heterogeneity, risk aversion, strategic frictions, and behavioral biases necessitate nuanced, context-sensitive prize designs. Effective tournaments typically strike a careful balance, maintaining significant rewards for top achievers while offering meaningful incentives to broader groups, thus ensuring sustained motivation and maximizing aggregate effort.

4. CONCLUSION: SUMMARY OF KEY INSIGHTS AND DIRECTIONS FOR FUTURE RESEARCH

In this chapter, we have explored how optimal prize allocation is shaped by a contest's strategic environment, drawing on theoretical models and empirical evidence from all-pay auctions, Tullock contests, and rank-order tournaments. The research reveals a core tension at the heart of contest design: the trade-off between the intensity fostered by concentrated, winner-takes-all prizes and the broad, inclusive motivation driven by dispersed, multi-prize schedules.

Theoretically, the answer is clear under idealized conditions. When contestants are symmetric, risk-neutral, and face linear costs, a winner-takes-all or extremely top-heavy prize structure is consistently optimal for maximizing total effort. However, this conclusion is fragile. The introduction of real-world complexities, such as risk aversion, heterogeneity in ability, or convex effort costs, flips the optimal strategy. In these more realistic scenarios, allocating prizes to runners-up becomes essential to provide insurance against uncertainty, mitigate the risks of intense competition, and keep a diverse set of participants engaged. Furthermore, the mechanics of the contest fundamentally matter. The deterministic nature of all-pay auctions makes aggregate effort less sensitive to prize distribution than in probabilistic Tullock contests, where additional prizes typically dilute incentives and full rent dissipation is impossible.

Empirical evidence enriches this framework, revealing systematic departures from risk-neutral benchmarks. Human behavior—shaped by fairness concerns, loss aversion, overbidding, and strategic collusion—often favors more equitable outcomes than pure theory would suggest. Consequently, effective contest design in practice frequently involves a nuanced

blend of incentives. A corporate innovation challenge, for example, might pair one large first prize to attract elite effort with several smaller awards and non-monetary accolades to foster broad creativity and sustain morale. The designer's task is to balance competition intensity against inclusive participation, carefully calibrating the prize structure to the specific traits of the contestants and the goals of the contest.

Looking ahead, the research frontier aims to bridge the gap between tidy models and this complex reality. Key directions include integrating behavioral regularities more deeply into theoretical models of dynamic, multi-stage contests; analyzing hybrid formats that blend elements of different contests to better reflect real-world procurement and crowdsourcing; expanding empirical testing to emerging realms like online platforms and e-sports; and extending contest design to team settings, where inter- and intra-group incentives interact.

Ultimately, prize allocation is the crux of contest design. There is no one-size-fits-all solution. Instead, effective contests are tailored to their context, blending theoretical rigor with empirical insight. Continued research at this intersection promises not only more efficient contest designs but also a deeper understanding of how to channel human competitiveness toward productive ends while mitigating its potential excesses.

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EVALUATION OF INCOME DISTRIBUTION IN TÜRKİYE: 2013 VERSUS 2023

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1. INTRODUCTION

Income distribution refers to how a nation's total income is divided among its people. It is an important measure of economic fairness and social justice in society. When income is distributed evenly, more people can meet basic needs like housing, education, healthcare, and food. On the other hand, highly unequal income distribution often leads to greater poverty, limited opportunities, social unrest, and slower economic growth (Stiglitz, 2012).

Governments and policymakers look at income distribution to see how the benefits of economic activity reach different social groups, shape taxation and welfare policies, and promote inclusive development. Income distribution is not just a factor related to economic efficiency; it also raises moral, ethical and political questions, since because extreme inequality can threaten democratic stability and social unity (Piketty, 2014). No need to state that democratic stability and social unity are essential for economic stability also. Studying income or wealth distribution heavily relies on the statistical measures, metrics and indices which summarize inequality into a single value or into a comparative framework suitable for evaluation.

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One of the most widely used and well-known measures is the Gini coefficient. The Gini coefficient ranges from 0 (presenting perfect equality) to 1 (presenting perfect inequality) (Deaton, 1997). For instance, if just one person holds the whole income in a society, then Gini coefficient will be equal to 1. Gini coefficient comes from and computed over the Lorenz curve, which shows the cumulative share of income received by different percentiles of the population. Gini index on the other hand, is the 0-100 scale version of the Gini coefficient; i.e. when the coefficient is 0.4 the index is 40.

The other significant indices include the Theil index and Atkinson index, which provide detailed tools for examining inequality across subgroups (such as male/female, old/young, skilled/unskilled or local/migrant) or income levels (Cowell, 2011). The Theil index, for example, is part of and related to the generalized entropy class of inequality measures and helps assess inequality within and between population groups. The Theil Index is especially valuable, accurate or functional in analyzing regional or sectoral inequalities and differences (Conceição & Ferreira, 2000). Meanwhile, percentile ratios (such as P90/P10 or P80/P20) and the Palma ratio (the income share of the top 10% divided by that of the poorest 40%) offer clear comparisons that highlight the extremes of income distribution and the relative welfare of rich or poor subgroups (Cobham & Sumner, 2013).

Understanding or analyzing income distribution and measuring inequality accurately are crucial for designing effective and to the point policies. For instance, progressive taxation, minimum wage laws, social assistance programs, policies towards protecting disadvantaged groups such as youth or women and investments in education and healthcare can all be tailored to decrease inequality. Last but not least, the choice of the proper metric can influence public perception and policy results. For instance, while the Gini coefficient provides a general

sense of inequality, it may hide structural issues affecting the poorest or the richest segments. Therefore, a thorough assessment typically involves using multiple indices and detailed data. In an era of globalization, technological change, and demographic shifts, the analysis of income distribution is essential for maintaining sustainable and inclusive economies (OECD, 2015).

This study uses microdata from the income and living conditions survey (SILC) to evaluate and compare income inequality metrics for Türkiye in 2013 and 2023. The examination includes percentile ratios, Generalized Entropy indices, Atkinson indices, and subgroup inequalities across gender, age, marital status, and regions. The data shed light on whether Türkiye has progressed towards a more equitable income structure or if disparities have increased.

2. OVERALL INEQUATLITY TRENDS

2.1. Percentile ratios

The percentile ratios are straightforward yet powerful tools for analyzing inequality. In 2013, the total income distribution had a p90/p10 ratio of 14.286, showing that the top 10% earned more than 14 times the income of the bottom 10%. By 2023, this number significantly decreased to 8.5, marking a considerable improvement. Likewise, the p75/p25 ratio dropped from 2.825 in 2013 to 2.514 in 2023, indicating a narrowing of income distribution among the middle percentiles. However, this improvement in percentile ratios should be viewed cautiously. While they indicate a reduction in disparities between extremes, they do not fully capture the sensitivity of inequality or the complete shape of the distribution, which is better illustrated by entropy and Atkinson indices.

2.2. Generalized entropy indices (GE)

The GE indices enable comparisons across different parts of the income distribution, with higher values indicating more inequality.

GE(0): Theil Index (sensitive to differences in the middle)

- 2013: GE(0) = 0.452
- 2023: GE(0) = 0.398

This decline suggests a small reduction in income disparities among the middle of the income distribution. It implies that redistribution mechanisms or economic growth may have slightly helped middle-income groups.

GE(1): Mean Log Deviation (sensitive to lower tail)

- 2013: GE(1) = 0.388
- 2023: GE(1) = 0.452

In contrast to GE(0), the GE(1) value increased, indicating a decline in income share among the poorest segments. This shows that while middle-class inequality improved, the lowest earners did not benefit equally from income growth.

GE(2): Sensitive to the top end

- 2013: GE(2) = 0.610
- 2023: GE(2) = 1.215

A sharp increase in GE(2) highlights a growing concentration of income at the top, raising concerns that the wealthiest are pulling further ahead despite overall improvements in ratios. This top-heavy inequality undermines inclusive growth.

2.3. Gini coefficient

The Gini index provides a single summary measure of inequality.

- 2013: Gini = 0.456
- 2023: Gini = 0.454

The Gini coefficient stayed nearly the same, indicating no significant change in overall inequality. This stable trend supports the nuanced findings from the GE indices: slight improvement for the middle class, worsening inequality for the poorest and richest, leading to a net balance.

2.4. Atkinson indices

The Atkinson index includes social preferences about inequality aversion. A higher Atkinson index indicates a greater loss of social welfare due to inequality.

- A(0.5): 0.183 (2013) → 0.184 (2023)
- A(1): 0.364 (2013) → 0.328 (2023)
- A(2): 0.769 (2013) → 0.665 (2023)

The decline in A(1) and A(2) suggests some reduction in inequality for those more sensitive to it, possibly connected to public policies or social transfers. However, the minimal change in A(0.5) aligns with the Gini results, again indicating stability in inequality.

2.5. Gender-based inequality

Mean Incomes

- 2013: Male = 17,295; Female = 10,437
- 2023: Male = 112,000; Female = 68,606

While both genders experienced nominal income growth, the relative income share remained uneven, with women earning

about 61% of men's income in both years, showing persistent gender gaps.

Gini and GE Indices

- Female GE(0): 0.571 (2013) → 0.389 (2023)
- Male GE(0): 0.359 (2013) → 0.363 (2023)

This indicates significant progress in reducing intra-female income inequality, likely due to rising labor force participation or social protection policies. However, between-gender inequality has stayed largely unchanged, with between-group GE_B(0) = 0.026 in both years.

2.6. Age-based inequality

Income inequality across age groups is an important factor, reflecting lifecycle income effects and policy impacts.

GE(0) within age groups

- 25-34: 0.375 (2013) → 0.334 (2023)
- 45-54: 0.404 (2013) → 0.418 (2023)
- 65+: 0.381 (2013) → 0.244 (2023)

While younger and older age groups experienced decreasing inequality, middle-aged groups saw a slight increase, possibly due to changing labor market conditions or pensions. The sharp decline among seniors may stem from more equal pension distribution.

Atkinson A(2)

- 65+: 0.606 (2013) → 0.398 (2023)

This backs the idea of improved equity among older income recipients, likely because of better retirement benefits or a narrowing of public/private pension gaps.

2.7. Marital status-based inequality

Subgroup indices show different trends depending on marital status.

Mean Income (2023)

- Married: 111,000
- Single: 75,429
- Widowed: 52,486
- Divorced: 95,124

Gini Index

- 2013 Widowed: 0.384 → 2023: 0.355
- 2013 Married: 0.430 → 2023: 0.449
- 2013 Single: 0.485 → 2023: 0.431

The Gini index fell significantly for singles and widowed individuals, while it grew slightly for married couples. This might suggest increasing income disparity within married groups, possibly linked to dual-income polarization.

2.8. Regional inequality

Income differences across Türkiye's regions (NUTS-1) show deep-rooted spatial inequality.

Regional Mean Incomes (2023)

- Highest: Istanbul = 118,000; West Anatolia = 113,000
- Lowest: Mid-East Anatolia = 65,277; South-East Anatolia = 71,617

Gini by Region (2023)

- Highest: Istanbul (0.472), Mid Anatolia (0.472)
- Lowest: East Marmara (0.394), Mid-East Anatolia (0.407)

While income levels vary widely, some poorer regions demonstrate lower internal inequality. However, within-region

inequality remains the primary source, with GE_W(0) = 0.385 and GE_B(0) = 0.014, indicating limited progress in regional convergence.

2.9. Labor vs. total income inequality

Finally, comparing labor income inequality to total income highlights the impact of transfers and social policy.

Gini Coefficients

- Labor (2013): 0.441 → 2023: 0.434
- Total (2013): 0.456 → 2023: 0.454

While total income is slightly more unequal, the gap has narrowed. This suggests that the redistributive impact of social policy in 2023 may have decreased or that income patterns driven by the labor market have strengthened.

3. CONCLUSION

Between 2013 and 2023, income inequality in Türkiye showed a complex and varied path. While overall inequality remained high, it exhibited signs of relative stability over the decade. There was a slight improvement in disparities among middle-income groups; however, the income gap between the poorest and the richest segments widened. This growing divide was particularly clear in measures like GE(2), which are sensitive to income differences at the top of the distribution. In terms of gender, intra-group inequality among women showed signs of improvement, suggesting a more uniform income distribution within this group.

Still, larger gender income gaps continue, indicating that equality between men and women remains distant. Demographically, older individuals and those living alone experienced the most significant gains in income distribution. In

contrast, married and middle-aged groups saw increasing disparities, suggesting a growing divide within these social categories.

Regional inequalities continued to persist as a feature of Türkiye's income distribution, with little progress towards spatial equity. Lastly, there is evidence that social redistribution mechanisms may not be as effective. This is reflected in the convergence of Gini coefficients for labor income and total income, suggesting that taxes and transfers may have played a smaller role in reducing inequality over the years. To create a more equitable society, Türkiye must address inequality at multiple levels by enhancing social transfers, supporting labor inclusion, tackling gender and regional disparities, and protecting vulnerable age groups. This evaluation serves as a foundation for shaping policies aimed at inclusive growth in the future.

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AKADEMİK PERSPEKTİFTEN

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