YILDIZ
SOCIAL SCIENCE REVIEW

YILDIZ SOCIAL
SCIENCE REVIEW
(YSSR)

Editor's Introduction

It gives me great pleasure to welcome you to the second volume and first issue of YILDIZ Social Science Review for which I have acted as Editor-in-Chief.

In this first issue of second volume YSSR, there are five papers. The first author is Ercan Eren who is the founder of the department of economics at Yıldız Technical University. He is a professor during 1993 at Yıldız Technical University. The paper by Eren is about the insufficiency of the equilibrium concept in economics and further development instead of this concept during financial crisis.

Second paper's authors are from Zirve University Kemal Kurtuluş and Sema Kurtuluş and from Istanbul University Diren Bulut. The paper is about the comparison the internet user groups by the main purpose of the internet and social media usages. It is also aimed to define the behavioral differences based on the leading addictive signs of internet users.

Third paper is written by Ahmed Seid Hassen from Gazi University Ankara Turkey. The paper aims at valuing consumers' willingness to pay for environmental attributes of a cut flower using choice experiment and hence identifying the presence of a hypothetical market for environmental friendly flowers in Ethiopia.

Fourth paper is written by Yunus Sözen from Ozyegin University, Istanbul Turkey. The paper analyzes the paradoxes of deliberative democracy.

The last paper is written by Kutay Çilingiroğlu who is a Ph. D. student in Yildiz Technical University and Senior Software Developer in private company. This paper developes an agent based computational model of duopolistic competition to analyze how the network effects and switching costs shape competitive outcomes by simulation methods.

I appreciate the five papers for the first issue of the second volume of Yıldız Social Science Review.

All comments are welcome.

Prof. Dr. Murat Donduran
Editor-in-Chief
YILDIZ SOCIAL SCIENCE REVIEW (YSSR)

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2008 Krizi ve Makroiktisatta Bazı Sorgulamalar: Evrimci Makro İktisada Doğru mu?

Ercan Eren[*]

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Özet

İktisadi kriz dönemlerinde anaakım iktisatta sorgulamalar ve yeni paradigma arayışları hızlanmaktadır. Bu çalışmada iktisatta denge kavramının krizleri açıklamadaki sorunları öne çıkartılmaktadır

İktisatta önemli tartışmalardan bir tanesi, 2008 Krizinin öngörülememesi üzerinedir. Bu çalışmada öngörü sorununun temelinde denge anlayışının yattığı iddia edilmektedir. Denge yerine evrimci yaklaşımla, denge dışılığın daha yardımcı olacağı savunulmaktadır.

Bu çerçevede iktisatta denge yaklaşımının temelleri iktisadi düşünce tarihinde arandıktan sonra, paranın içselliği ve finansal krizler literatürü kısaca gözden geçirilmektedir. İlginç bir noktada negatif faiz oranı literatürüne değinilmesidir. Son olarak kompüter bilimindeki gelişmeler çerçevesinde iktisatta yeni yaklaşımlar incelenmektedir.

Anahtar Kelime: Denge, Evrim, İktisadi Düşünce, Simülasyon

JEL Kodları: B2,B4,B5,E1,E5.

1 Giriş

İktisadi kriz dönemlerinde anaakım iktisatta sorgulamalar ve yeni paradigma arayışları hızlanmaktadır. Bu çalışmada iktisatta denge kavramının krizleri açıklamadaki sorunları öne çıkartılmaktadır.

İktisatta denge ve evrim kavramlarının, özellikle fizik ve biyoloji temelli bir geçmişi vardır. Fizikte son yüzyıldaki gelişmeler, biyolojide öne çıkan evrim kavramını da içermektedir. Evrimi kalkış noktası olarak alan makroiktisat, krizleri daha iyi açıklayabilir ve çözüm önerilerinde bulunabilir mi? Bu konuda kompüter bilimindeki olağanüstü gelişmeler, kısmen iyimser olmamıza yardımcı olmaktadır.

Makalede ilk önce denge-evrim ikilemine değinilmektedir. Daha sonra para-finans temelli istikrarsızlık konusu ele alınmaktadır. Son bölümde evrim temelinde makroiktisatta gelişmeler, kompüter biliminin katkısı çerçevesinde kısaca özetlenmektedir.

2 İktisatta Denge ve Evrim

İktisatta çok sık kullanılan kavramlardan biri, belki de ilki, 'denge'dir. Bugünlerde kavram, dengenin istikrarı-istikrarsızlığı, dengesizlik ve özellikle oyun teorisindeki gelişmelerin de etkisiyle çoklu denge üzerine yönelmiştir.

İktisatta denge kavramının kullanılmasında şüphesiz klasik fizik temeldir. Klasik ve neoklasik iktisadın ortaya çıkış ve gelişiminde klasik fizik, ona öykünme çok önemlidir; [1] fiziğin yasaları gibi iktisadın

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[1]Bu aslında 18 ve 19.yy.ın genel bir bakış açısıdır. Örneğin, Kapital'i Darwin'e atfedecek kadar ondan etkilenen Marx'da da "bilimsellik" ve "determinizm" temeldir.

da evrensel yasaları vardır. Kurumsal, kültürel, tarihsel özelliklerden bağımsız olarak tam rekabetçi piyasa dengeyi sağlayacaktır

Bu bakış açısına göre iktisadi krizlerin ortaya çıkmaması, çıksa da geçici bir durum olarak görülmesi gerekir.

Süreç içinde kısa, orta ve uzun dönem ayrımı yapılarak, orta ve uzun dönemde gelir (Y) ve işsizliğin (U) doğal-yapısal değerleri olduğu, kısa dönemde bundan aşağı veya yukarı yönde sapılabileceği düşüncesi yaygınlaştı. (Trend değer ve bundan sapma; ekonomik genişleme ve daralma)

Fakat bu analizlerin hiçbiri, 1929 veya 2008 gibi krizlerinde yoğun müdahale ve düzenlemeler olmasaydı da trend değerine dönüleceği görüşünü desteklememektedir.

Tablo 1: Banka Kurtarmanın Maliyeti (Mishkin, Matthews, ve Giuliodori, 2013, s.248)

Ülke	Tarih 1980-2009	GSYH'nın Yüzdesi Olarak Maliyet
Endonezya	1997-2001	57
Arjantin	1980-2	55
Tayland	1997-2000	44
Şili	1981-5	43
Türkiye	2000-1	32
Güney Kore	1997-8	31
İsrail	1977	30
Ekvador	1998-2002	22
Meksika	1994-6	19
Çin	1998	18
Malezya	1997-9	16
Filipinler	1997-2001	13
Brezilya	1994-8	13
Finlandiya	1991-5	13
Arjantin	2001-3	10
Ürdün	1989-91	10
Macaristan	1991-5	10
Çek Cumhuriyeti	1996-2000	7
İsveç	1991-5	4
ABD	1988	4
Norveç	1991-3	3
İzlanda	2007-9	13
İrlanda	2007-9	8
Lüksemburg	2007-9	8
Hollanda	2007-9	7
Belçika	2007-9	5
İngiltere	2007-9	5
ABD	2007-9	4
Almanya	2007-9	1

Reinhart ve Rogoff (2011) 'ta gösterildiği üzere, piyasa ekonomilerinde sürekli, çoğu finansal ağırlıklı olan krizler yaşanmaktadır. ABD'de 19. ve 20.yy.da 1819, 1837, 1857, 1873, 1884, 1893, 1937, 1930-33 yıllarında -başka bir deyişle ortalama 20 yılda bir- bankacılık sisteminden kaynaklanan krizler

yaşanmıştır. Ancak yoğun düzenlemeler ve mevduat güvencesi sonrasında bu krizlerin sıklığı azalmıştır (Mishkin, Matthews, ve Giuliodori, 2013, s.233) . Bir anlamda, iktisadi düşünce tarihçilerinin sürekli *deja vu* yaşadığı söylenebilir

Gerçek olan; piyasa ekonomisinin içsel olarak kriz ürettiği ve doğası icabı istikrarsız olduğu, krizlerden çıkmak için de yoğun müdahale, kurtarma ve düzenlemelerin yapıldığıdır. Bir anlamda Minsky (2008)'nin kitabının başlığında da ifade ettiği gibi, 'İstikrarsız ekonominin istikrarı'söz konusudur. İstikrarsızlık, genellikle yüksek maliyetlerle azaltılmakta, sonra mevcut veya yeni kurumsal gelişmelerle tekrar ortaya çıkmaktadır; ekonominin doğası istikrarsızlıktır.

Piyasa ekonomisinin gerçeği evrim, değişme, süreksizlik, ani donmalar (ani durum değişiklikleri, ani kesikler), doğrusal olmama, kendiliğinden düzen, kendi kendine organize olma, birbirini etkileme ve adaptasyondur. Bu bağlamda denge, dengesizlik ve çoklu denge kavramları yerine (Flanders, 2015) 'denge dışı'(*out of equilibrium*) kavramını kullanmak daha doğru olabilir. Çünkü dengesizlikten söz edebilmek için dengenin ne olduğunu bilmek gereklidir. Aynı şekilde, 'dengenin olmaması'(*non-equilibrium*) kavramı da önerilmektedir (Henry, 2010; Davanzati ve Pacella, 2014).

Bu gerçeği ilk fark edenlerin başında T. Veblen gelmektedir. Veblen, Darwin'den esinlenerek evrimci iktisat kavramını ilk kullanan kişidir. Evrimci yaklaşım yanında, 1904 ve 1905 yılında yayımlanan kitap ve makalesinde de, kredi genişlemesini ve bu süreç içinde varlık fiyatlarındaki gelişmeleri, ekonomik genişleme, daralma ve ekonominin yeniden yapılanması sürecini anlatmıştır.

1929 krizini öngören az sayıda kişiden biri olan Veblen'in analizi evrimcidir ve piyasa ekonomisinin doğasının da bu şekilde olduğu ifade etmektedir.

Bugün başta H.Minsky olmak üzere, H.Simons ve (1930 sonrası) I. Fisher'in kriz analizlerinin de Veblen'in analizine benzediğine ve kurumsalcı yönlerinin önemine dikkat çekilmektedir. Marx, Veblen, Keynes, Minsky, Simons ve Fisher'in (buna Avusturya Okulu da eklenebilir) kriz teorilerinin ortak noktası, krizlerin piyasa ekonomisinin doğal durumu olduğudur. Farklar ayrıntılarda ve çözüm önerilerindedir.

Anaakım çerçevesinde bakıldığında aslında evrimci yaklaşımın kalkış noktası olarak iki kişiden özellikle söz etmek gerekir; C. Menger ve A. Marshall. Menger'in çalışmaları Jevons ve Walras'dan farklı olarak klasik fizik temelli değildir ve evrim fikri önemlidir. Menger çizgisinde özellikle J.Schumpeter ve F.A. Hayek, evrimci iktisat literatüründe sayılan ikinci kuşak iktisatçılardandır. Daha sonra değinileceği üzere Avusturya okulunda piyasa ekonomisinde dalgalanmalar (kriz!) doğal bir durumdur.

Bu noktada A. Marshall için bir parantez açmak gereklidir. Marshall'ın ders kitaplarına yansıyan tarafı ile kendi somut görüşleri oldukça farklıdır. Marshall, Alman Tarihçi okuluna ve H. Spencer'e yakındır; evrim fikri temeldir. Fakat takipçilerinin yaptığı iktisat denge iktisadıdır.

Marshall, *İktisadın Prensipleri* kitabının önsözünde şunları söylemektedir (Marshall, 1890), (Hodgson, 1993, s.406): "*İktisatçıların Mekkesi iktisadi dinamikten çok iktisadi biyolojidir. Ancak biyolojik kavramlar mekanik kavramlarından daha komplekstir; Esaslar (Foundations) üzerine yazılacak olan bir kitap, mekanik analojilere görece daha fazla yer vermek durumundadır. Ayrıca akıllara statik bir analoji getiren "denge" kavramı da sık sık kullanılır. Bu vakıa, bu ciltte modern çağa ait normal yaşam koşullarına verilen önemin baskın bir ağırlığa sahip olması gerçeğiyle birleştiğinde, kitabın temelindeki düşüncenin "dinamik"ten ziyade "statik" olduğu fikrini uyandırabilir. Fakat kitap baştan sona hareketi yaratan güçler üzerinedir: Ve dayanak noktası statikten ziyade dinamiktir.*"

Yine bir başka sayfada Marshall (1890, s.772); Hodgson (1993, s.407) şunları yazmaktadır: "*İktisat da biyoloji gibi, içsel doğası ve oluşumu yanında dışsal biçimi de sürekli değişen madde ile ilgilenmektedir; bu nedenle iktisat, geniş anlamda biyolojinin bir dalıdır.*"

Marshall'ın başka çalışmalarında da benzer ifadeler bulmak mümkündür.

Bu çalışmanın konusu olmamakla birlikte, 20. ve 21.yy fiziği de biyoloji gibi evrim temellidir veya evrim çok önemlidir (Eren, 2016c). Aslında entropi kavramı başlangıç olmak üzere, düzensizlik fizikte çok önemli bir kavramdır. Bir anlamda Marshall'ın iktisat konusundaki düşüncelerine karşılık gelen gelişmeler olmuştur.

Biraz farklı olmakla birlikte benzer bir durum neoklasik iktisat ve neo-Keynesci iktisadın gelişiminde çok önemli bir yeri olan J.Hicks için de geçerlidir. Hicks, 1930'lu yıllardan itibaren reel dünyada dengesizlik olduğunu belirtmiştir. Yaşamının son dönem yapıtlarından biri olan *Causality in Economics'* te de (1979) şu noktalar dikkati çekmektedir: (Eren, 1992, s.195-197). a) Ekonometriye az güven duymaktadır. Antiampiristtir. b) İktisat kuramları zamana bağlıdır. Kuramlar ve iktisat tarih içindedir. Zaman boyutunu aşamaz. c) İktisat bilim değil disiplindir. d) İktisatta güçlü öndeyi olanaksızdır. Zaman boyutu nedeniyle *ceteris* asla *paribus* değildir[2]. e) İktisatta nedensellik vardır. f) Tarihsel zaman önemlidir. g) Yanlışlamacı değildir; iktisat kuramında yanlışlama hatalı oluştan değil gerçeklerin değişmesindendir. h) Varsayımların gerçekliliği önemlidir. Bütün bu özellikleriyle iktisat bilimden çok sanat ve felsefeye benzemektedir.

Ayrıca Hicks, statik nedenselliğin (zamanın olmadığı durumun) ancak fiziksel kuramlar için geçerli olabileceğini, iktisatta geçerli olmadığına işaret etmektedir. Statik nedensellik ve denge arasında yakın ilişki vardır. Statik nedensellikte geçmiş ve gelecek aynıdır. İktisatta ise tarihsel zaman içinde nedenin etkiden önce geldiği, zincirsel nedensellik geçerlidir. Hicks, ayrıca olasılık hesapları konusunda da kuşkuludur.

Özetle, Marshall ve Hicks gibi anaakım iktisadın çok önemli iki temsilcisinden hareketle şunu söyleyebiliriz: İktisatta denge analizinin temel olması, iktisadi krizleri anlamamızı güçleştirmektedir. Hâlbuki somut ekonomide sürekli değişim vardır. Değişim ve istikrarsızlığa (aynı zamanda dengesizlik ve çoklu denge) denge yerine, evrim temelinde yaklaşmak gerekir. Sorun istikrarsız ekonomide istikrar sağlamaktır.

Bu çalışmanın son bölümünde; evrim temelinde değişim, tarihsel zaman, süreksizlik, kesiklik, ani donma, kendi kendine organize olma, adaptasyon, heterojen ajanlar, sınırlı rasyonellik, dengesizlik, çoklu denge gibi özellikler içeren makro iktisadi modellerin olanaklı olup olmadığı konusu fazla ayrıntıya girmeden tartışılacaktır.

Bu noktada, ilerlemeden bir konuya işaret etmek gerekmektedir. İktisatçıların çok hoşuna gitmese de iktisadın ortaya çıkışı ve gelişiminde fizik ve biyoloji çok önemlidir. Fizik, matematik ve mühendislik eğitimi almış iktisatçılar iktisatta çok önemli figürlerdir. Örneğin Nobel İktisat Ödülü alanların özgeçmişleri incelendiğinde bu hemen görülebilir. Aynı şekilde Jevons, Walras, Pareto, Marshall, Fisher, Leontief, Samulelson ve Phillips gibi çok sayıda örnek verebiliriz. Biraz değişik ve ilginç bir örnek H. Simon'dır. Yapay sinir ağları, kompleksite, algoritma iktisadı, sınırlı rasyonellik, maksimizasyon yerine yetinmecilik gibi konularda iktisada çok önemli katkılarda bulunan ve Nobel iktisat ödülü alan H. Simon, iktisat ve matematik kökenli olmasına rağmen iktisat bölümlerinde çalışmamıştır. Belki de katkılarının temeli de farklı bir deneyim yaşamasıdır!

Bugünkü kurulan modellerde algoritma iktisadı ve kompüter biliminde gelişmeler çok önemlidir. Bu gelişmelere bütünüyle hâkim olan iktisatçıların hemen hepsi mühendislik (özellikle kompüter bilimi) kökenlidir. Neredeyse, C++, Java, Python program dilleri, bunlardan geliştirilen simülasyon kütüphaneleri Mason, RePast, JAS-mine ve Mathematica, Matlab, Mathcad ve ACE temelli Netlogo gibi özel programları bilmeden ve hâkim olmadan iktisatla uğraşmak mümkün değildir! Kısacası, kompüter bilimi ve simülasyon (benzetim) tekniklerine hâkim olmadan evrimci makro veya denge-temelli makro iktisat (Bunun en gelişmişi DSGD modelleridir) yapmak mümkün gözükmemektedir.

Çalışmada evrimci bakış açısından sadece[3] paranın içselliği ele alınacak, daha sonra evrimci (makro)

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[2]Bu duruma bir örnek toplam talep (AD) eğrisi ile ilgilidir. 2008 krizi sonrasında birçok ülkede AD pozitif eğimlidir. P ve Y arasında aynı yönde ilişki vardır. Gelecek beklentilerinin olumsuz olması durumunda (resesyon) P düşerken toplam talep de (AD) düşmektedir. Aslında ekonomik genişleme döneminde de benzer bir sonuç ortaya çıkabilmektedir. Özellikle varlık piyasalarında pozitif eğimli talep eğrisi genel bir durumdur.

[3]Otomatik piyasalar, işletme yönetimi, doğal ve insani sistemler, iktisat politikası, elektrik piyasası, kurumların evrimi ve sosyal normlar, finansal iktisat, endüstriyel organizasyon, emek piyasaları, öğrenme ve fikrin (aklın) oluşumu, makro iktisat, piyasa tasarımı, ağ(şebeke) oluşumu ve evrimi, organizasyonlar, patika bağımlılığı, politik iktisat, teknolojik değişme ve iktisadi gelişme vb. birçok alanda evrim ve kompütasyon temelli çalışmalar yapılmaktadır.

iktisatta dikkat çeken belli başlı noktalara değinilecektir.

3   Ekonominin Doğası ve Para

Bu bölümde çok fazla ayrıntıya girmeden ekonomik dalgalanmaların parasal-finansal yönü üzerinde durulacaktır Para ve ekonomik faaliyet ilişkisi kabaca iki ayrımda incelemek mümkündür;

a) Miktar kuramı geleneği, b) Paranın içselliği geleneğidir.

Miktar kuramı geleneğini; paranın dışsal olarak belirlemesi, yansız olması (nispi fiyatların değişmemesi) $M \rightarrow P$ nedenselliği çerçevesinde ele alabiliriz.

Geleneği daha eskilere götürmek (Nicolaus Copernicus, 1517) mümkün olmakla birlikte David Hume ile başlatabiliriz. A. Smith ve D. Ricardo'da miktar kuramı yanlıdırlar. 1840'larda ortaya çıkan nakit okulunu da bu gelenek içinde değerlendirebiliriz. I. Fisher ve A. Marshall, miktar kuramının iki versiyonunu geliştirmişlerdir. Keynes de ilke olarak miktar kuramı içinde değerlendirilebilir.

Keynes'de kısa dönemde para yanlıdır. Uzun dönem için net bir şey söylememiştir. Neoklasik sentezde de ($IS - LM$ analizi) para dışsaldır ve kısa dönemde yanlıdır.

Yakın döneme gelirsek, M. Frieman'da para dışsaldır; kısa dönemde (adaptif beklentiler nedeniyle) yanlı olabilir, ama orta dönemde yansızdır.

Yeni klasik iktisatta para dışsal ve sürpriz (şok) durumları dışında para kısa dönemde de yansızdır (Lucas arz fonksiyonu).

Yeni Keynesci iktisatta para dışsal; fiyat ve ücret yapışkanlıkları nedeniyle kısa dönemde yanlı, ancak orta dönemde yansızdır.

Miktar kuramı geleneğinin temeli daha çok Anglosakson düşüncesidir. Bu gelenekte klasik dikotomi (parasal-reel kesim ayrımı) değişik versiyonlarda devam etmektedir. Ayrıca para arzının dışsal olması, günümüzde para miktarının merkez bankası tarafından belirlendiği anlamına gelmektedir. Parasal-reel kesim ayrımından dolayı, parasal ve reel kesimin iç içe olduğu bazı kavramları açıklamak zor olmaktadır. Buna örnek olarak negatif faiz oranı verilebilir [4].

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[4]İktisatta sorunlu alanlardan bir tanesi faiz oranı konusudur. Klasik ve Neo Klasik iktisatta başlangıçta klasik dikotemi üzerine kurulmuştur. Parasal ve reel kesim birlikte ve birbirinden ayrıdırlar. Neo klasik iktisatta faiz oranı açıklaması mikro iktisat kaynaklıdır ve fiziksel terimlerle ifade edilir.

Gerçek dünyada ise tıpkı reel faiz oranının zaman zaman negatif değerler alıyor olması gibi, nominal faiz oranı da negatif değer alabilir.

$r = i - \pi$ olduğuna göre, $i = \%0$ olsa bile, deflasyonist bir ortamda, yani enflasyon (π) negatif ise (Japonya ve 1929'larda olduğu gibi) *reel faiz (r) pozitiftir.* Örneğin 1929'da ABD'de nominal faizler sıfıra yakın olduğu halde, reel faiz %6 civarında, çok yüksek bir düzeydedir. $i = \%0$ ve π pozitifse bu kez r negatif olur. 2008 sonrası ABD'nin durumudur ve bu durum ABD'nin resesyona ve deflasyona girmemesine önemli katkıda bulunmuştur.

Peki nominal faiz (i) negatif olabilir mi? Bu, ekonominin resesyona ve deflasyona girmemesine katkıda bulunabilir mi? Aslında bu bir efektif talep sorunudur. Nominal faizin (i) negatif olmasına rağmen talep artmayabilir ve deflasyon hızlanabilir.

Gerçekte iktisatta negatif faiz oranı eskiden beri gündem de olmuştur. Şu alıntıdan da görüleceği üzere, bu konuda Türkçe yazında (Neumark, 1948, s.466) eserinde çok önemli bilgiler yer almaktadır: " *Filhakika, Marshall, Taussig ve Schafer gibi bazı iktisatçılar tarafından haklı bir şekilde ileri sürüldüğü veçhile, bazen, bir 'menfi faiz'bile mevzubahistir.* "

Neumark, metnin dipnotunda daha ayrıntılı bilgiler vermektedir: "*Bazı hallerde, tasarruf sahipleri, paralarını kendi ellerinde bulundurmaktansa, bunları başkalarına (mesela bankalara) vererek onlar vasıtasıyle hıfzetmeyi daha kolay ve emin görürler ve hatta bunun için bir de 'muhafaza resmi'ödemeğe hazır bulunurlar, ki buna 'menfi faiz'adı verilmiştir. Bu münasebetle, sözü geçen 'menfi faiz'e, realitede şu halde de, yani bir memleket parasının kıymetinin düşürüleceği korkusu baş gösterince, kapitalistlerin o memleketteki sermayelerini, parasına karşı emniyet hissettikleri diğer bir memlekete nakletmeleri halinde, rastlandığını söyleyelim. Esasen tasarrufun zımni fakat esaslı şartlarından biri de, para vahidinin 'dahili kıymet'inin (reel ehemmiyetinin) - realitede daha ziyade aksi varit olmakla beraber - değişmeyeceğinin farz edilmesidir.*" (Neumark, 1948, s.466)

Neumark'ında belirttiği gibi Marshall (1890, s.192-193)'da negatif faiz oranının olabileceği belirtilmekte ve kaynak olarak da [Herbert] Foxwell (1886) verilmektedir. Dolayısıyla negatif faiz oranı kavramının 1886'da iktisat literatürüne girdiğini söyleyebiliriz.

Kısaca miktar kuramı geleneğinde para miktarında artış veya azalış toplam talebi (AD) etkilemektedir.

Anaakım iktisat geleneğinde reel konjonktür dalgaları ve Yeni neoklasik sentez ayrı bir çizgiyi temsil etmektedir. Bu önemli değişikliğe biraz sonra değinilecektir.

Daha çok heterodoks iktisatçılar tarafından öne çıkartılan ikinci yaklaşım, paranın içselliği üzerinedir. Paranın içselliğinde öne çıkan unsur, banka parası veya aynı anlama gelmek üzere kredi parasıdır.

2008 krizi sonrasında finansal kriz analizinde daha fazla öne çıkmaya başlamıştır. Bu yaklaşımda ayrıntıda iki farklı bakış vardır:

a. $M \to P$ (ve Y),

b. Y (ve P) $\to M$.

Her iki yaklaşımda da para yanlıdır.

Yaklaşımı 1840'larda ortaya çıkan Bankacılık Okulu ile başlatabiliriz. T. Tooke'de para içseldir ve $P \to M$'dir.

Marx'da da para içseldir. Özellikle, $M \to C(mal) \to M^i$ analizde M $\neq M^i$ olmaktadır. Bunu paranın para yaratması, yani paranın içselliği olarak kabul edebiliriz (Brunhoff ve Foley, 2006; Moseley, 2004).

Veblen (1904, 1905) kredi genişlemesi ve varlık fiyatlarındaki değişmeleri ayrıntılı olarak analiz etmektedir. Minsky'nin analizi Veblen'e çok benzemektedir. Veblen'de krizinin ortaya çıkışı, kriz ortamı ve kriz sonrası ekonominin yapılanması ayrıntılı olarak ele alınmaktadır. Bu süreç birbirini tekrarlayan doğal bir durum olarak evrimci olarak analiz edilmektedir. Süreç kredi genişlemesi ile başlar ve dolayısıyla para içseldir.

Wicksell'de analiz iki çerçevede yapılmaktadır:

a) Doğal faiz oranı (r_p) veri iken, piyasa (banka) faiz oranının (r) onun altında, üstünde ve eşit olduğu durum.

- $r < r_p$ ekonomik genişleme ve enflasyon,

- $r > r_p$ durgunluk ve deflasyon ile sonuçlanmaktadır.

- $r = r_p$ durumu ise istikrarı ifade etmektedir

"*Bu nedenle, depolanmış servetten çok az faydalanılabildiği; birçok insanın kendi gelecekleri için hazırlık yapmak istedikleri; ancak bu malları şimdi ödünç almak isteyenlerin, gelecekte geri verme konusunda çok azının güvence sunabildiği bazı durumlar düşünebiliriz. Bu tür durumlarda erteleme veya yararlanmak için bekleme, bir ödül getireceği yerde, cezayla karşılaşan bir eylem olur: birisi bir başkasına gözkulak olması için bazı imkânlarını verdiğinde, ödünç verdiğinden daha fazlasını değil, ancak daha azını kesin olarak alabilmeyi bekleyebilir: faiz oranı negatif olur.*"

Marshall'dan sonra Fisher (1930, s.29) ' de negatif faiz oranın mümkün olduğunu belirtmektedir: "*Çilek mevsiminde, aynı adam, o zaman için fazla olan iki kutu ürününü, gelecek kış yalnızca bir kutu ürün alma hakkı ile, kendi isteğiyle değiştirebilir. Yani zaman tercihi her zaman gelecekteki mallar yerine şimdikini tercih etmek biçiminde olmaz; bazı koşullar altında tersi de olabilir. Sabırsızlık da negatif olabilir ve bazen öyledir de!*"

Negatif faiz oranında önemli bir tartışma konusu, Silvio Gesell'in orijinali 1916 yılında Almanca; İngilizcesi ise 1958 yılında yayımlanan *The Naturel Economic Order* kitabında ileri sürülen bir vergi gibi düşünülen negatif faiz oranı önerisidir.

Gesell'in önerisi ve eksi faiz önerisi, 1930'lu yılların depresyon koşullarında oldukça tartışıldığı görülmektedir.

I. Fisher,1933 yılında yayımlanan *Stamp Scrip* adlı çalışmasında, farklı açıdan bakmakla birlikte Gesell'in önerisine olumlu yaklaşmıştır.

Keynes, *Genel Teori'* de Gesell'in önerisini Bölüm 23'te uzun uzun tartışmış, ancak olumlu yaklaşmamıştır (Keynes, 1936, s.216-217)

H. Simons'da, Gesell'e doğrudan atıf olmamakla birlikte önerdiği bankacılık reformunda mevduat ve yatırım bankacılığı ayrımı yaparak, mevduat bankalarının ödünç verme özelliğinin kaldırılmasını savunmaktadır. Buna karşılık mevduat tutma karşılığında işlem ücretinin alınması teklif edilmektedir. Bu da negatif faiz oranı demektir.

$r \neq r_p$ durumu bankacılık faaliyetinin doğal işleyişidir. Para içseldir ve bunun için aktif para politikası önerilmektedir.

b) Doğal faiz oranının (r_p) değişmesi. Bu durum, ekonominin arz yönüyle ilgilidir. Doğal faiz oranı, sermayenin marjinal ürünüdür. Diğer değişkenler veri iken sermaye miktarındaki artış, sermayenin marjinal ürününü (MP_k) azaltır, teknolojik gelişmeler MP_kyı, dolayısıyla doğal faiz oranını arttırır.

Bu çalışma açısından önemli olan ilk analizdir. Para içsel olmak üzere $M \to P$ ilişkisi geçerlidir.

Avusturya Okulu iktisatçıları Mises ve Hayek'te de Wicksell'e benzer bir analiz vardır; ekonomik dalgalanmanın nedeni piyasa faizinin doğal faiz oranından farklı olmasıdır ($r \neq r_p$). Bu durumun kaynağı ise kredi (parası) miktarındaki artıştır. Bu bankacılık faaliyetlerinin doğal sonucudur. Sonraki çalışmalarda merkez bankasının kısa dönem faiz oranının, piyasa faiz oranının altına düşürmesi ve bunun yarattığı kredi genişlemesi sürecinin ve ekonomik genişlemenin altı çizilmektedir. Avusturya okulunun ifadesiyle bu dolambaçlı üretiminin artmasıdır. Kredi miktarındaki artış süreci, ilk önce nispi fiyatları (paranın yanlılığı) ve nihai olarak da farklı oranlarda P'yi arttırmaktadır. Avusturya okulunda heterojen iktisadi ajanlar sistematik hata yapmaktadırlar[5], Avusturya Okulunun önerisi %100 karşılık sistemiyle, mevduat bankacılığının para yaratmasının önlenmesi ve altın standardı sistemine geri dönüştür (Eren, 2015, 2014, 2016a)

Avusturya Okulunda da ekonomik dalgalanma doğal sürecin sonucudur. Bu arada Bu arada Hayek'in kendiliğinden düzen kavramıyla genellikle evrimci iktisat içinde değerlendirildiğini de belirtmek gerekir.

Almanya'nın ikinci dünya savaşı sonrası ekonomik yapılanmasının temeli olan sosyal piyasa ekonomisi düşüncesinde de paranın içsel olduğu; ekonomik dalgalanmaların kapitalizmin doğal bir parçası olduğu için de, gerektiğinde ekonomiye (piyasayla uyumlu, liberal müdahalelerle) müdahale edilmesi gerektiği düşüncesi vardır. Örneğin bu yaklaşımın önemli ismi W. Röpke'nin iktisadi düşüncesi Avusturya Okulu temellidir ve paranın içsel olduğunu ilgili bütün çalışmalarında belirtilmektedir. Bu çerçevede Röpke, Avusturya okulundan farklı olarak kuralları koyan bir merkez bankasını ve gerektiğinde ekonomiye nispi fiyatları bozmayacak biçimde müdahaleyi savunmaktadır. Ayrıca Röpke'de altın standardına dönüş önerilmektedir (Eren, 2016b).

Bu noktada dikkat çekilmesi gereken bir iktisatçı Henry Simons'dır. H. Simons, eski kuşak Chicago Okulu iktisatçısıdır ve H. Minsky'nin, Schumpeter ve O. Lange ile birlikte kendisini en fazla etkileyen iktisatçı olarak adını saydığı kişilerden biri ve hocasıdır. Simons'da da para içseldir ve kredi parası çerçevesinde analiz yapılmaktadır. Simons, Avusturya okuluna benzer biçimde, %100 karşılık sistemini önermektedir. Simons'da ayrıca piyasa ekonomisine getirilmesi gereken düzenlemeler, gelir dağılımında adaletin önemine dair yaklaşım da söz konusudur. Analizi birçok açıdan sosyal piyasa ekonomisi görüşü içinde değerlendirilebilir.

1930 sonrası I. Fisher ise farklı bir çizgidedir. 1930'dan sonra kredi genişlemesi (borç deflasyonu) analizi yapmış ve Minsky'nin analizinin temellerini oluşturmuştur. Ayrıca denge kavramı konusunda kuşkularını belirtmiştir. Ekonomiyi okyanusa benzetmiş ve okyanusta sürekli dalgalanma olduğuna, bazen de kasırgalar çıktığına dikkat çekmiştir. Denge ise durgun bir sudur ve böyle bir durum okyanusta yoktur! 1935 yılında %100 karşılık sistemini önermiştir. Ayrıca 1930 konjonktürü gereği negatif faiz oranı uygulanmasına sempati ile bakmıştır.

Fisher-Simons çizgisi Paul H. Douglas, Irving Fisher, Frank D. Graham, Earl J. Hamilton, Wilford I. King, and Charles R. Whittlesey tarafından 1939 yılında hazırlanan ve 'Chicago Planı'olarak da bilinen, *'A Program for Monetary Reform'* planının temelini oluşturmuştur. Planda %100 karşılık sistemi önerilmektedir [6].

Şimdiye kadarki analizler görüldüğü üzere ekonomik dalgalanmaların parasal kaynağı, paranın içselliği, kredi genişlemesi, bankacılık sektörünün para yaratması üzerinedir. Ve bunun için çoğu liberal olan

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[5]Minsky'ye oldukça yakın analiz yapılmaktadır.

[6]1987 yılındaki bir çalışmasında J. Tobin'in de benzer kaygıları taşıdığı görülmektedir. (Tobin, 1987)

bu görüşlerde, para-finans konuları analize girdiğinde sıkı düzenlemeler önerilmektedir! Para-reel kesim ayrımı daha muğlâktır. Biraz sonra ele alacağımız Keynesci yaklaşımda parasal üretim fonksiyonu ve efektif talebin altı özellikle çizilmektedir. Keynesci analizde parasal ve finansal sektör içice olmadan reel model kurmak "Prens olmadan Hamlet" oynamaya benzemektedir. (Gibson ve Setterfield, 2015b)

Keynes çizgisinde olaya yaklaşıldığında durum biraz farklıdır. Keynes çizgisinde çok önemli bir kavram efektif taleptir. Keynes'de efektif talep kavramı dengesizlik analizine işaret etmekle birlikte, bugün daha çok evrim çerçevesinde ele almayı kolaylaştırmaktadır.

Keynes'de *Genel Teori*'de paranın dışsal olması çerçevesinde analiz yapılmakla birlikte, *'Para Üzerine Deneme'* (1930) kitabında para içseldir.

H. Minsky, doğası gereği Keynes'de paranın içsel olması gerektiğini belirtmektedir.Minsky (2008, s.61) "*Oysaki Keynes kriz açıklaması veya teorisi teklif etmedi. Resmi tamamlamak için bu boşluğu biz doldurmalıyız: Keynes'in teorisi konjonktürel genişleme[7] , krizinin içsel oluşumu ve borç deflasyonu olmaksızın eksiktir.*" ifadesinde belirttiği gibi, Keynes'in analizine paranın içselliğini, böylece yatırımların nasıl finanse edildiğinin analizini eklemiştir. Buna göre, $M = M1 + M2$ olarak ifade edilen likidite tercihindeki boşluğu $M = M1 + M2 + M3 - M4 = L1(Y) + L2(r, P_k) + L3(F) - L4(NM)$ şeklinde doldurmuştur. $L1 =$ İşlem güdüsü, $L2 =$ Spekülasyon güdüsü (r, faiz oranı, P_k, varlık fiyatı), $L3 =$ İhtiyat güdüsü, F, finansal yükümlülükledir. *Ex ante* yatırımlar arttığında, *ex ante* F artar.), $L4 =$ Para benzerlerini ifade etmektedir. Para benzerleri olarak tasarruf mevduatı, tasarruf bonosu alınmaktadır. Finansal yenilikler $L4'$ de karşılık bulmaktadır. $L4$, paranın içselleşmesinin kalkış noktasıdır (Minsky, 2008, s.73).

$L4$ süreci P_k ve r' yi etkiler. r, bono, tahvil, ipotekli konut kredileri (morgage) vb. piyasalarla iç içedir. Buradan yatırımlar ile ilişki kurulmaktadır. Böylece Keynes'de ayrıntılı belirtilmeyen yatırımların nasıl finanse edildiği sorusuna yanıt verilmektedir. Minsky finansal piyasaları, borçlanmayı ve dolayısıyla paranın içselliğini analize sokmaktadır. M' deki artış (içsel olarak, $\triangle M$) veya paranın dolaşım hızındaki artış ile yatırımların bir kısmı finanse edilmektedir. Böylece Minsky, Keynesci analize finansal piyasaları dâhil ederek, piyasanın işleyişini içselleştirmiştir.

Bu çizgide öne çıkan Post Keynesçi İktisattır (PKİ). Burada Keynes yanında M. Kalecki de önemlidir. Kalecki'de yatırım karı, gelir ve tasarrufu belirler, tersi geçerli değildir ve para içseldir.

Kaldor (1970) monetarist iktisadı eleştirmek için yazılmış ve paranın içselliği incelenmiştir.

Robinson (1971), miktar kuramının tersinden doğru olduğunu belirtmektedir. $PY = MV$ denklemine göre, Y ve M deki değişmeler ya M para arzını ya da V dolaşım hızını değiştirmektedir; para içsel ve yanlıdır.

3.1 H. Minsky'de Paranın İçselliği

Minsky'nin finansal kriz açıklamasının teorik kaynaklarından ilki Keynes ve Kalecki başta olmak üzere, post-Keynesci iktisattır. Bunun yanında I. Fisher, J. Schumpeter de çok önemlidir. Keynes (efektif talep), Fisher (borç deflasyonu) ve Schumpeter ('finansal'yenilik) sentezi yapılmıştır. Bugün bakıldığında öğrencilik yıllarında kendisini çok etkileyenlerin başında (Schumpeter ve O. Lange dışında) saydığı H. Simons da ayrıca dikkat çekicidir. Simons ve Schumpeter'de parasal görüşleri yanında kapitalizmin kurumlarının analizi yapılmaktadır. Minsky'nin kurumcu bakışında Schumpeter[8] ve Simons'ın etkisi hissedilmektedir.

Minsky'de kurumcu, evrimci bakış açısı temeldir. Kurumsal temelde iktisat değiştikçe, buna uygun olarak da iktisat politikası da değişir (Papadimitri ve Wray, 1998)

Minsky'de evrim fikri, istikrarsızlık kavramıyla çoğu zaman iç içedir. Kapitalizm istikrarsızdır, çünkü dün, bugün ve yarın finansal ve birikim sistemidir (Minsky ve Kaufman, 2008, s.327);(Henry,

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[7]Boom: balon oluşumu

[8]Minsky'nin asistanı olduğu A.H. Hansen yerine Schumpeter'le doktora çalışması yapması, kurumcu iktisada olan ilgisinden kaynaklanıyor olabilir.

2010)

Minsky'de uzun dönem istikrarlı denge yoktur. Ekonomik sistem kesin olarak dalgalıdır (Flanders, 2015, s.88). Kriz dönemlerinde bazı reformlar ile istikrarsızlık dinlenmeye konulur, ancak bir zaman sonra tekrar devam eder (Minsky ve Kaufman, 2008, s.370);(Henry, 2010)

Bu çalışmada Minsky (1982, 2008); Minsky ve Kaufman (2008); Keen (2001, 2010, 2013) ayrıntılı olarak ele alınmayacaktır. Kısaca, Minsky'de güvenli finans; C (nakit akım) $> P_i + I_i$ (borç servisi, borcun ana parası+faizinin dönemsel (periyodik) ödemeleri), spekülatif finans, $P_i + I_i > C > I_i$ ve Ponzi finans, $I_i > C$, (Cari borcu ödemek için varlık satışı) süreçleri söz konusudur (Mulligan, 2013). Ponzi finans sürecinde bir olumsuz durum Minsky anına dönüşerek, finansal krizi ortaya çıkarmaktadır.

Krediyi alan genellikle girişimcidir. Yatırım için temel kaynak para arzının içsel olarak genişlemesiyle sağlanır. Bu tasarruf edenlerin var olan satın alma gücünü azaltmaksızın, girişimcilere satın alma gücü sağlar. Böylece artan makroekonomik etkilere sahiptir (Keen, 2011).

Kredi temelli ekonomide toplam talebin (AD) üç kaynağı vardır:

1. Mal ve hizmet satışından elde edilen gelir, asıl olarak tüketimi finanse etmektedir.

2. Girişimcilerin borcunun artmasından kaynaklanan talep, genellikle yatırımları finanse etmektedir.

3. Ponzi borcunun artmasından doğan talep, temel olarak mevcut varlıkların satın alınmasını finanse etmektedir.

Kredi ekonomisinde $AD = Gelir+borçta\ değişmedir$. Talep mal ve hizmetlerin ve mevcut aktiflerin satın alınmasındaki artışın birlikte genişlemesinde kendini gösterir. Borç bundan dolayı pozitif ve negatif etkilere sahiptir. Yenilik ve yatırıma karşılık gelen kısmı ekonomik genişlemeyi sağlarken, aynı zamanda varlık balonlarına neden olmaktadır. Borcun büyük kısmının *Ponzi* finansa gittiği durumda ise, sonuçta ekonomik krizler ortaya çıkmaktadır (Keen, 2011).

Bu süreçte önemli olan kredi (borç) talebidir. Kredi talebi, kredi parasını, yani para miktarını belirlemektedir. $PY = MV$ süreci söz konudur. Dolayısıyla ekonomik dalgalanma ve kriz doğal bir durumdur.

Bugün, Minskyi analizini Keen (2010)'in yaptığı gibi sistem dinamiği yöntemini kullanarak, Vensim veya benzeri bilgisayar programları yoluyla veya Guilmi ve de Carvalho (2015) 'da görüldüğü üzere ajan bazlı hesaplamalı iktisat(ACE) modelleri ile similasyonunun yapmak kolaydır.
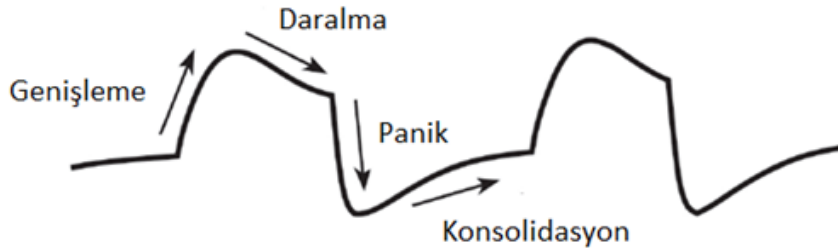
Şekil 1: Veblen-Minsky Konjonktür Dalgaları (Kapeller ve Schütz, 2014, s.802)

Minsky'nin analizlerinin önemli bir yönü de, varlık piyasalarının (özellikle konut ve finansal piyasalarının) işleyişinin mal piyasalarından farkını göstermesidir.

3.2 Efektif Talep, parasal üretim fonksiyonu ve Paranın İçselliği: P. Davidson

Bu bölümde Davidson (2002); Davidson. (2006)'un görüşleri kısaca özetlenecektir.
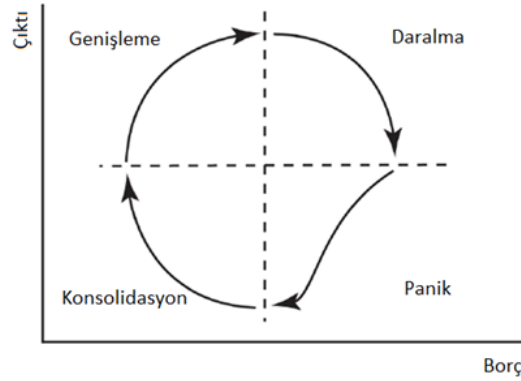
Şekil 2: Veblen-Minsky Konjonktür Dalgaları (Kapeller ve Schütz, 2014, s.803)

P. Davidson'da paraya yaklaşım H. Minsky'den biraz farklıdır. Davidson'un analizinde finansal piyasalara fazla ağırlık verilmemekte, efektif talep ve parasal üretim fonksiyonuna dikkat çekilmektedir.

Yerleşik iktisatta, Ekonomik genişleme (*boom*) ve krizler (*slumps*) yalnızca tesadüfî şoklardır. Uzun dönemde durağan denge büyüme patikası vardır.

Hâlbuki gerçek hayatta üretim, para, gelecek ve belirsizlik birbirinden ayrılamaz. Para bugün ve gelecek arasındaki ilişkinin akımıdır.

Gelecek belirsizdir, kontratlar ve para belirsizliğe karşı güvencedir. Para ve üretim teorisini birbirinden ayrı düşünmek mümkün değildir.

Bu ilişkide önemli konu efektif taleptir.

Say'de

$Dw = AD, Zw = AS$ (Her ikisi de ücret birimlerinde. Nominal değerler para-ücret oranı tarafından deflate ediliyor.) den hareketle,

$$Dw = f_d(N)$$

$$Zw = f_z(N)$$

$$f_d(N) = f_z(N)$$

.

Keynes'de $Dw = Dw_1 + Dw_2 = f_d(N)$ dir.

Dw_1 cari gelire bağlı harcamalardır ve bundan dolayı N tarafından belirlenir.

$$Dw_1 = f_1(N)$$

.

Dw_2, cari gelire ve istihdama bağlı değildir. Bundan dolayı AS'nin belirleyicilerinden farklıdır.

$$Dw_2 \neq f(N)$$

.

Bu eksik istihdama yol açmaktadır.

Dw_2, planlanmış tasarrufa eşit olan cari gelir ve istihdamla ilgili değildir.

$$Dw_2 = f_z(N) - f_1(N)$$

.

Dw_2, belirsizlik, hayvani güdüler (*animal sprits*) tarafından belirlenmektedir.
I harcaması, AS (gelir) ile ve istihdamla ilgili değildir. Yani

$$Dw_2 \neq f(N)$$

Klasik teoride $Dw_2 = 0$ dir. Bu yüzden $Dw_1 = f_1(N) = f_z(N) = Z$ dir.
Keynes'e göre,
$Dw_2 = 0$ olsa bile temel psikolojik yasa çerçevesinde MPC azaldığından,
$Dw_1 = f_1(N) \neq f_z(N)$ dir. Dolayısıyla esnek fiyatlar, tam istihdamı garanti etmemektedir.
Kısaca, parasal üretim teorisi, kısa ve uzun dönemde paranın yansızlığını reddetmektedir.
Say yasasının postülaları;

1. Paranın yansızlığı,

2. Genel (*gross*) ikame aksiyomu,

3. Ergodiklik aksiyomudur.

Her şey başka şey ile ikame edilebilir; gelir veri iken nispi fiyatlar değiştiğinde, daha ucuz olan mal alınmaktadır. Bu varsayım, bütün piyasa fiyatlarının tam esnek olduğu, emek piyasası dâhil bütün piyasaların açık olduğu anlamına gelmektedir. Yani işsizlik yoktur.

Ergodiklik aksiyomu, geleceğin geçmiş ve bugünün verisinden hesaplanabileceğini varsaymaktadır.

Davidson, Keynes'in Say'ın postülalarını kabul etmediğine işaret etmektedir. Keynes'de bütün likit varlıkların üretim esnekliği sıfırdır. Bu para ve likit aktiflerin, özel sektörde emeğin kullanımıyla üretilemeyeceği anlamına gelmektedir. Ayrıca (üretilemeyen) likit aktifler ve üretilebilir mal ve hizmetler arasındaki ikame esnekliğinin sıfır olduğunu ifade etmektedir. Likit aktif talebi arttığında nispi fiyatlar değişmektedir. Para kullanılan girişim ekonomisinde kazanılan gelir ürünlerden ziyade üretilemeyen finansal aktifler biçiminde tutulmaktadır. Likide tercihi, yarına karşı güvence arayışıdır.

Keynes'de işlem motifi, ihtiyat ve spekülasyon güdüsüyle para talep edilmektedir. İşlem güdüsü, firma açısından finans motifini de içermektedir. Finans güdüsü, paranın yansızlığını gerektirmektedir.

Paranın kullanımının değer saklama güdüsüne ve yatırım teorisine *'hayvani güdüler'* (*animal sprits*) olarak bakmak gerekmektedir.

Özet olarak, paranın içselliği ve ekonomik dalgalanmaların doğal bir süreç olduğu yaklaşımlarının ortak yönleri:

- Daha az soyuttur. Kurumsal faktörlere, hukuksal durumlara, piyasa yapılarına, ekonominin hangi durumda olduğuna (genişleme, daralma) dikkat çekilmektedir.

- Genellikle (hepsi değil) AD' deki değişmeler para miktarını belirlemektedir.

- Paranın içsel olduğunun kabulü, parasal kaynaklı şok kavramının sorgulanmasına neden olmaktadır. Onun yerine *Minsky an'ı* gibi bir durumdan söz etmek daha doğrudur, yani kesiklik, süreksizlik, ani donmuşluk kavramı daha doğrudur. Bu evrim, değişme kavramı içinde değerlendirilebilir.

- Para-finans kesiminin düzenlenmesi gereklidir. Bu konuda en radikal görüşler daha çok, %100 karşılık sistemi ve altın standardı sistemine dönüşü öneren, Avusturya Okulu kaynaklıdır.

- Keynesci yaklaşımlarda düzenleme yanında müdahale fikri de öne çıkmaktadır.

- Piyasa ekonomisi istikrarsızdır. Sorun istikrarsız ekonominin istikrarını sağlamaktır.

- Paranın içselliği ve piyasa ekonomisinde ekonomik dalgalanmaların, onun ötesinde krizlerin doğal olduğu İsveç-Alman geleneğidir. Alman Tarihçi okul ve Kurumsalcı iktisat geleneğin başlıca temsilcileridir. Bunun yanında Marx, Stockholm Okulu (Wicksell, Mrydall), Kalecki ve Avusturya Okulunu da bu gelenek içinde değerlendirmek gerekir (Toporowski, 2012)

4 Anaakım İktisatta Gelişmeler

Bugünün "anaakım" iktisadında da, parasal-finansal analizde İsveç-Alman ekolü öne çıkmaya başlamıştır. Bu gelişmeden kısaca söz etmekte fayda vardır.

1980'den sonra para talebinin istikrarı ile ilgili çalışmalarda küreselleşme, finansal yenlikler, parayı tanımlanan güçlüğü gibi nedenlerle para talebi fonksiyonunun istikrarsız olduğuna yönelik çalışmalarda büyük artış vardır.

Miktar kuramı geleneğinden çok önemli bir kopuş reel konjonktür dalgaları (RKD) yaklaşımıdır. RKD yaklaşımında arz yönlü (özellikle teknoloji) şokları trend değerleri etkiler ve yeni bir trend değeri oluşur. Yani *cari değer= trend değeridir*. Dolayısıyla Y ve U her zaman trend değerindedir.

Bu çalışma açısından önemli bir görüş RKT'de paranın içsel, ama yansız oluşudur. Dolayısıyla parasal kaynaklı bir şok söz konusu değildir. Y' deki değişmelere uygun olarak M değişmektedir. Bu, miktar kuramı geleneğinden çok farklı bir yaklaşımdır ve bir kopuşu ifade etmektedir.

RKT analizlerinin bir diğer önemi stokastiklik, kalibrasyon, kompütasyon kavram ve analizleridir. Kompüter bilimi vasıtasıyla simülasyonlar yapılmaktadır.

1990'lardan sonra Yeni Keynesci iktisat ve son yıllarda daha yaygın ifadeyle yeni neoklasik sentezin öne çıkması söz konusudur. Yeni neoklasik sentezde RKT'den geliştirilen DSGD modelleri ortak çerçevedir. Veri Y'_p de, π hedefi $IS - PC - MR$ üç denklemi (IS, toplam talebi; PC, Phillips eğrisi toplam arzı karşılamakta; MR ise parasal kuraldır) çerçevesinde gerçekleştirilmeye çalışılmaktadır. Daha çok büyük istikrara (*Great moderation*) karşılık gelen çerçevede, özellikle talep şoklarına bağlı olarak, politika faiz oranı (Taylor kuralı) kullanılmaktadır. Fiyat (ve çıktı) istikrarı temellidir. Finansal istikrar dikkate alınmamıştır.(Carlin ve Soskice, 2014)

Modelde para içsel olmaktan ziyade *içselleştirilmiştir*. Yani faiz oranı belirlenerek, para miktarının ona uyum sağlayacağı varsayılmıştır. Bu nedenle finansal piyasalar ve finansal istikrara fazla önem verilmemiştir. Minsky'ye benzer, finansal yenilikleri içeren içsel para arzının kullanılması (kredi parası, borçlanma, efektif talep) daha gerçeğe yakın sonuçlar verebilirdi.

Model, birçok tartışmalı yönlerine karşın, simülasyon yaklaşımı, kompütasyon teknikleri gibi yönlerden, evrimci modeller açısından da çok önemli gelişmelere öncülük etmiştir. Bu nedenlerle önceki yaklaşımlardan farklıdır. Miktar kuramı geleneğinden tam olmasa da bir kopuşu temsil etmektedir. Ama denge, temsili ajan, rasyonel beklentiler varsayımları yine de temeli oluşturmaktadır.

Denge yerine denge-dışılık, sürekli değişimden hareketle model kurmak olanaklı mıdır? Son bölümde kısaca bu yöndeki gelişmelere değinilecektir.

5 Gelişmeler

Bilgisayar ve davranış bilimlerindeki gelişmeler, A. Smith, Menger, Marshall, Veblen, Keynes, Schumpeter ve Hayek başta olmak üzere birçok iktisatçının başından biri farkında olduğu yerleşik iktisat geleneğinde evrim ve sürekli değişmeyi içeren yeni bir çizginin modellenmesine olanak sağlamaktadır. Bunlardan başlıcaları şunlardır;

- Temsili ajan yerine heterojen ajan ile çalışmak. İnsanlar birbirinden farklıdır, birinin iyimser olduğu durumda diğeri kötümser olabilir. Birinin korku ve endişe içinde olduğu durumda, diğeri sakin olabilir. Modeller farklı ajan tiplerini içerebilmelidir.

- Sermaye de heterojendir.

- İktisadi rasyonellik. Davranışsal iktisat ve nöro-iktisattaki gelişmeler iktisatta varsayılan rasyonellik anlayışının büyük ölçüde sorgulanmasına neden olmuştur. Sınırlı rasyonellik başlığında toplayabileceğimiz 'yeni'rasyonellik anlayışı, özellikle davranışsal oyun teorisi, evrimci oyun teorisi ve algoritma iktisadı çerçevesinde bilgisayar programlarında kolayca modellenebilmektedir. Ayrıca, kişisel çıkar yanında güven, itimat, kötülük gibi kavramları da rasyonellik içinde modellemek mümkündür.

- İktisadi ajanlar birbirini etkilemektedirler. Atomistik hareket fazla gerçekçi değildir. Matematikteki çizge (graf) teorisindeki gelişmeler çerçevesinde, ağ (network) iktisadı yardımıyla ilişkileri görmek ve etkileşimi (kompleks) adaptif sistemler yoluyla modellemek mümkündür.

  $\sum$ mikro $\neq$ makro. Bütün toplamdan farklıdır.

- İktisadi değişkenleri mikro ve makro düzey yanında, *meso* (orta) düzeyde de ele almak gereklidir. Kurum, sınıf, kültür, sendika, dernek gibi orta düzey değişkenler vasıtasıyla mikro değişkenlerin kendi ve *meso* değişkenler arasında, *meso* değişkenler vasıtasıyla mikro ve makro değişkenler arasındaki ilişkileri modellemek gereklidir. Ağ iktisadından da faydalanarak bunu yapmak mümkündür.

- İktisatta denge analizi yanında kendiliğinden düzen, süreksizlik, kesiklik, atlama, evrim, kompleksite aynı derecede önemlidir. Özellikle ajan bazlı hesaplamalı iktisattaki gelişmelerle bilgisayar ortamında bunları modellemek olanaklıdır.

- Uzun dönem değerler, trend değerler, denge değerler kavramları tartışmalıdır. Dengeden uzaklaşıldığında tekrar dengeye (uzun dönem) dönüleceği yaklaşımını tekrar ele almak gereklidir. Örneğin 2008 krizinde ekonomiye yoğun biçimde müdahale edilmiş olmasaydı, U veya Y' de uzun dönem değerlerine dönülmesi söz konusu olmayabilirdi. Uzun dönemde hepimiz ölümlüyüz!

- Piyasa ekonomisi istikrarsız bir ekonomidir. Bunu her zaman negatif anlamda almamak gerekir. Zaman zaman düzenleme, müdahale ve oyunun kurallarının değiştirilmesi gerekebilir.

Bu gelişmelerin iktisatta karşılığı kompleksite iktisadı ve ajan temelli hesaplamalı iktisattır (*Agent-based Computational Economics*-ACE). ACE alanındaki yayınlarda belirgin bir artış dikkati çekmektedir (Richiardi, 2015). Belirtmek gerekir ki, bu alanda özgün olabilmek için ön koşullardan biri programlama dillerine hâkim olmaktır. Birçok üniversitede ACE laboratuarları ve programları açılmaktadır. Beş milyon ajana kadar ulaşan modellerden söz edilmektedir.

ACE modelleri başta post-Keynesci iktisatta paranın içselliği ve finansal krizleri açıklamak için yaygın olarak kullanılmaya başlanmıştır (Gibson ve Setterfield, 2015a; Richiardi, 2015; Gibson ve Setterfield, 2015b; Setterfield ve Gibson, 2013; Bucciarelli ve Silvestri, 2013; Setterfield ve Budd, 2010; Guilmi ve de Carvalho, 2015; Silva ve Lima, 2015).Başka alanlarda da benzer gelişmeler vardır. Avrupa Komisyonu'nun desteklediği EURACE, ULHIA ve CRISIS adlarında üç büyük proje vardır. Sonuncusu sistematik istikrarsızlıkla ilgilidir (Richiardi, 2015).

Bu arada ACE temelli çalışmalar dışında sistem dinamiği modelleri de (Tymoigne, 2006; Harvey, 2013; Valentinov, 2013; Keen, 2010) paranın içsellik, finansal istikrarsızlıklar, vb. hususları açıklamada oldukça başarılıdır. Örneğin, Bezemer ve Hudson (2009)'de 2008 krizini öngören onbir iktisatçı arasında sayılan S. Keen'in modeli sistem dinamiği metodolojisine dayanmaktadır. Bu alanda *Vensim, Stella, Powersim Studio* , *AnyLogic* gibi programlar kullanılmaktadır.

Eski İktisat	Yeni İktisat
Azalan getiriler	Artan getirilerin daha çok kullanımı
Marjinallik ve maksimizasyon prensibi temelli	Diğer prensipler olası
Tercihler veri, birey bencil	Tercihlerin oluşumu merkezi öneme sahip, bireyin bencil olması zorunlu değil
Atomistik ajan varsayımı yapılmakta ve tüm 'meso've 'makro'iktisadi olguların mikro olarak açıklanması istenilmekte	Ajanlar sosyal varlık olarak ele alınmakta
Perde arkasında toplum vardır.	Olanaklar, düzen ve yapının ana karar vericisi olarak kurumlar öne çıkmakta
Teknoloji veridir ya da iktisadi temelde seçilir.	Teknoloji başlangıçta değişken, daha sonra belirlenme eğiliminde
Asıl olarak deterministik, tahmin edilebilir.	Deterministik değil. Dalgalanmalar ve tuhaf etkenler (garip çekiciler, kelebek etkisi vb.) yüzünden tahmin edilemeyebilir.
19.yy fiziği temelinde (denge, durağanlık, deterministik dinamik)	Biyoloji temelli (yapı, model, kendi kendine organize, yaşam döngüsü)
Zaman yok (Debreu'da olduğu gibi) ya da yüzeysel olarak ele alınmakta (büyüme teorisindeki gibi)	Zaman merkezi, dönem ile yakın bağlantılı
Yaşlanma ile çok az ilgilenilmekte.	Bireyler yaşlanabilir.
Miktar, fiyat ve denge vurgusu	Yapı, model (*pattern*) ve fonksiyona (yer, teknoloji, kurum ve olanaklar) önem verilmekte.
Elemanlar miktar ve fiyatlardır.	Elemanlar model (*pattern*) ve olanaklardır; Her toplumda (antropoloji) uyumlu yapılar bazı fonksiyonları yerine getirmektedir.
Dil: 19.yy matematiği, oyun teorisi ve sabit nokta topolojisi	Dil daha nitel: Oyun teorisi niteliksel olarak kullanılır; Diğer niteliksel matematikten yararlanılır.
Nesiller gerçek anlamda görülmemekte	Nesillerin devir hızı (generational turnover) merkezi. Değişen ekonomide ve değişen nüfusun bulunduğu yaş yapısına ait olmak. Nesiller kendi deneyimlerini "taşırlar".

Endekslerin yoğun kullanımı, İnsanlar farksız	Bireysel yaşam üzerine odaklanmakta; İnsanlar ayrı ve farklı; Toplam (*aggregate*) ve birey arasında sürekli değişme; Refah indeksleri farklı ve kaba ölçüm olarak kullanılmakta; Bireysel yaşam süresi ölçü olarak görülmekte.
Her şeyin dengede olduğu anlamda gerçek dinamiklik yoktur. Dairesel harekette konik sarkaç (*Ball on string in circular motion*). Gerçek değişme olmaz: Yalnız dinamik suspansiyon.	Ekonomi her zaman zamanın kenarındadır. Geleceği, sürekli kaynaşan yapıları, ayrışmayı, değişmeyi içermektedir. Bütün bunlar dışsallıklar, artan getiriler, işlem maliyetleri, yapısal dışta bırakma ve kesikli harekete yol açmaya uygundur.
Dışsallıklar olmasaydı ve herkes aynı beceriye sahip olsaydı, Nirvana'ya ulaşırdık.	Dışsallıklar ve farklılıklar itici güç; Nirvana yok, sistem durmaksızın gelişmekte
Soruların çoğu cevapsız. Birleşik (*unified*) sistem uyumsuz.	Soru cevaplanmak üzere kalır; Fakat varsayımlar açık şekilde belirtilir.
'Test edilebilir hipotez'(Samuelson).Yasaların geçerli olduğu varsayılır.	Modeller veriye uygundur (EDA'da olduğu gibi). Uygunluk sadece uygunluktur; yasalar gerçek anlamda olası değildir. Yasalar değişir.
Görüşler (*sees*) basit yapı olarak alınır.	Görüşler doğası gereği komplekstir.
İktisat yumuşak fizik gibidir.	İktisat kompleksite bilimi kadar serttir (*high*).
Değişim ve kaynaklar ekonomiyi yönlendirir.	Dışsallıklar, farklılıklar, sıralama ilkeleri, uyumluluk, zihniyet (*mindset*), aile, olası yaşam süresi ve artan getiriler kurumları, toplumu ve ekonomiyi yönlendirir.
Gezegen (kaynaklar) ekonominin bir alt kümesi	Ekonomi gezegen ve onun biyosferinin bir alt kümesi

Tablo 2: Eski İktisat - Yeni İktisat Karşılaştırması ((Arthur, 2014, s:189.190.191)(Fullbrook, 2013, s.131-143)

6 Sonuç

Ekonomi doğası gereği sürekli değişmektedir. A. Smith'den başlayarak iktisatla ilgili birçok yazar bu gerçeği ifade etmişlerdir. Sorun, sürekli değişimin nasıl modelleneceğidir.

Kompüter bilimi ve bağlı olarak algoritma iktisadında gelişmeler, robototik anlamda olmakla birlikte bize yeni olanaklar vermektedir. Bu çerçevede, iktisat bölümü programlarında bu alana yönelik daha çok ders açılması gerektiği açıktır.
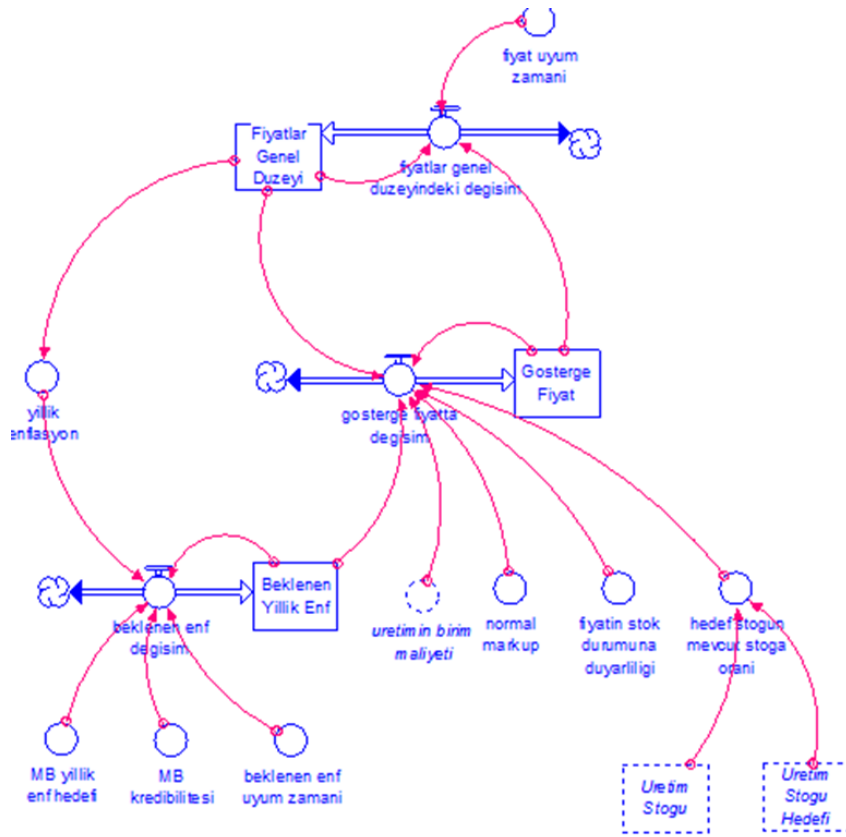
Şekil 3: Fiyatlar Genel Düzeyi Dinamiğine İlişkin Sistem Dinamiği Modeli
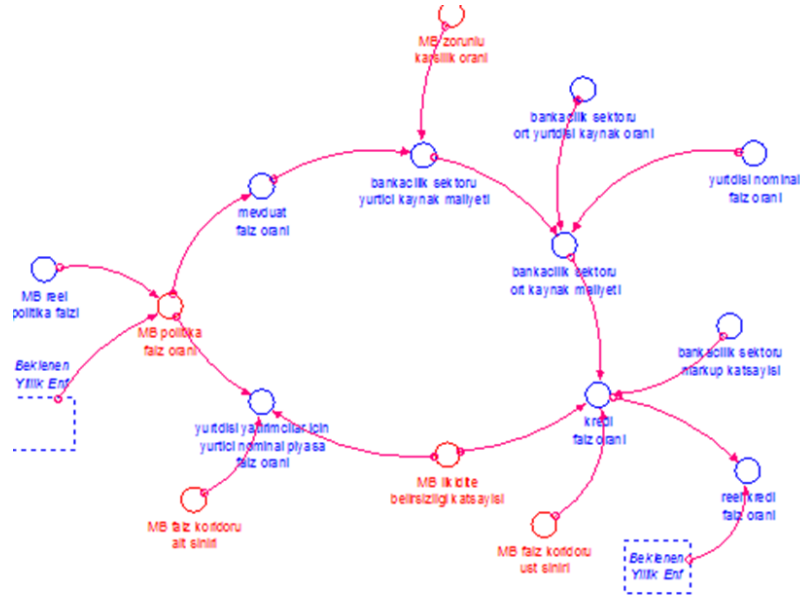
Şekil 4: Merkez Bankası Politikalarının Dinamiğine İlişkin Sistem Dinamiği Modeli

Kompüter bilimi yanında nörobilim, davranış bilimleri, oyun teorisindeki gelişmeler de iktisatçılara yeni olanaklar sunmaktadır.

Sistem dinamiği, ACE temelli makro iktisat yazınının arttığı ve özellikle krizleri açıklamada daha başarılı olduğu iddiası yaygındır.

Bir değerlendirme de finansal piyasalar ilgilidir. Klasik liberalizmi savunan iktisatçıların büyük çoğunluğu dâhil, birçok iktisatçı finansal piyasalarda serbestliği tehlikeli bulmuşlardır. Ortak görüş sıkı denetim ve düzenlemelerin gerekliliğidir.

Bir başka tespit, finansal piyasaların doğası gereği sürekli 'gölge bankacılık'yaratacağı ve bunu önlemenin güçlüğüdür. Örneğin 2008 krizinde, 1929 krizinden farklı olarak mevduat bankaları değil, gölge bankaların sorumluluğuna dikkat çekilmektedir. Kısaca denetim ve düzenlemelerden 'yeni'kurumlardaki, 'yeni'gölge bankalarındaki, yeni finansal yeniliklerle kaçılabilmektedir!

Son tespit sade, basit ve küçük finansal sektör durumunda finansal krizlerin daha az çıkacağı ve etkisinin küçük olacağı üzerinedir; sade dondurma iyidir!

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Abstract

RETHINKING MACROECONOMICS AFTER THE GLOBAL RECESSION OF 2008: TOWARDS AN EVOLUTIONARY MACROECONOMICS?

Ercan Eren

In the periods of economic crisis, search for new paradigms and methodological reconsiderations intensify in the mainstream economics. In this study, the insufficiency of the equilibrium concept in economics is examined. Recently, one of the most important debates in economics is the failure of prediction of the Global Recession of 2008. It is argued that the models that are based on the out-of-equilibrium concept with an evolutionary perspective could have exhibited a much better predictive performance than the current ones, those based on the concept of equilibrium.

In this study, after having searched for the origins of the equilibrium concept in the history of economic thought, the endogeneity of money and financial crises literatures are going to be presented. It will also be interesting to point out the negative nominal interest rate concept. Finally, recent developments in the economic methodology, in parallel to the developments in the computer science will be examined.

Keywords: Equilibrium, Evolution, Economic Thought, Simulation.
JEL Codes: B2,B4,B5,E1,E5.

Benefit Segmentation of Internet Users and Their Addictive Behavior

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Abstract

The dominance of technology is in consumers' daily life. Some of them prefer to use technology for business purposes; some integrate their basic needs of entertainment and fun over the internet and social media usage. This research aims to understand the different levels of integration and the deepness of the Internet users' needs and connection of online time, which might be an indication of online addictions and addictive behavior. With this purpose internet user groups are compared by the main purpose of the internet and social media usages. It is also aimed to define the behavioral differences based on the leading addictive signs of internet users.

Keywords: Internet Usage, Internet Addiction, Benefit Base Segmentation, Social Online Behavior

1   Introduction

An increasing number of people use internet and mobile technologies for different purposes of their daily lives. Most of the behavior patterns have changed since the benefits of the internet have reached to more and more people every day. Especially, the younger population tends to have a better rate of integration and show different behavior patterns compared to previous generations. With the available information flowing online, people no longer memorize phone numbers or have phonebooks, use paper maps or check transportation schedules on paper.

However the usage of internet and related technologies are not limited to information search anymore, people are depended on computer and communication technologies for business/work and writing; but they also use internet for gaming, and some are depended on social media for socializing and self-expressing. The purpose of using the same technologies brings the question of if the benefit based segmentation for internet users a viable option to reach different need profiles of internet users. Is this internet reliability a general profile which leads the users to a total addiction and dependency or is there still different attachment levels and behavior patterns?

The addiction is a very complex psychological research area with different types. Psychology literature defines addiction as a response to the need to outside stimuli and the feeling of discomfort without and attaching such stimuli or behavior and disconnect with others and other activities (Young, 1996). These stimuli can be material like alcohol or drug addictions or some behaviors in cases of gambling addiction. Despite the benefits of internet are well known and accepted, the relationship with internet is also transforming to a level of addiction, an impulse control matter at least (Young,

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1998). Different types of addictive profiles might be a sign of different internet user profiles and even segments.

The segmentation of the internet users could be based on many criteria, but with the possible technology integration perspective usually the demographic base segmentation is preferred (Kotler and Armstrong, 1980). However, segmenting with multiple criteria can be the new era for the consumer studies.

Benefit based or benefit segmentation was defined in the 1960s with a new perspective of achieving a better understanding of consumers' reasons to have same behavior patterns then their descriptive qualities (Haley, 1968). This basic perspective of understanding how the consumers think, rather than where they live or what their demographic profile is still an important aspect for psychographic, behavioral or value based segmentation approaches (Hendricks et al., 2004).

This study focuses on the different reasons for using internet and tries to understand the benefit based segmentation difference on the addictive profiles of these segments. In order to determine the different addictive profiles of the business/work related internet users and social and entertainment related users, a discriminant analysis was applied.

2   Literature Review

For this study, it is important to understand the nature of consumer segmentation and how addiction could be a differentiation point of constructing the benefit based consumer segments. Therefore, we would like to look through market segmentation and addiction literature.

Unlike taking the whole market as a homogeneous sum, segmentation basically divides the market based on different criteria to more homogenous pieces. It is aimed to have different segments, which have different characteristics when compared to each other by increasing the heterogeneity between different segments (Kotler and Armstrong, 1980; Kotler et al., 2014). The segmentation considers each unit/person as an individual data to place it in the right segment (Gunter and Furnham, 2014). Literature of segmentation depends on finding the best criteria to divide the market into segments and completing the process with targeting the right segment (Kotler and Armstrong, 1980; Aghdaie et al., 2013; Simkin L, 1998). While targeting the best market segment or segments first considers profitability, market growth and market size (Simkin L, 1998), effective segmentation should focus more on the homogeneity, measurability and accessibility of the segments (Kotler et al., 2014; McDonald and Dunbar, 2004; Eckrich, 1984; Weinstein, 2004) . While the most commonly used consumer market segmentation criteria are, demographic, geographic, psychographic and behavioral (Kotler and Armstrong, 1980) , new segmentation studies consider multi-criteria segmentation to be a better solution in some industry and markets.

Benefit based segmentation considers the benefit that the consumer hopes to get from the product and their reasons for using/choosing products are more important than defining the demographics (Haley, 1968). Lewis (1981) alters the benefit based segmentation definition and takes the level of importance of the product or the services for consumers into consideration. Some of the studies directly preferred the terminology of ?motivation? based segmentation and considers perceptions on benefits as the motivation of consumer choices (Ryan and Glendon, 1998). Attribute evaluation, true benefit evaluation and value-based evaluation of the consumers and their perceptions as segmentation criteria is also linked to each other but found different as segmentation evaluation (Botschen et al., 1999). Briefly, benefit perception is recognized as a motivation reflecting over the behaviors of the consumers and should be taken into consideration.

Since the motivation is a part of the consumers' choice, could addictive stimulus be considered as any other product? What if the impulse control problems or addictive stimuli's are not really leaving the consumer a choice of their behavior? Is it still the same if the addictive people and non-addictive

people still have the same motivations?

Addiction is a state of a person's high-level attachment to stimuli, where he has a high level of attention and time commitment which leads to losing interest to other things, and creates social and physical problems (Young, 1996). In most cases addiction is considered as a sickness, which requires more drastic precautions.

The periodic checks of social media and internet and increasing time spent online makes the internet an ?impulse control disorder? for psychology literature (Young, 1996, 1998). The behavior is defined as a mental disorder, yet some resources define behavior as ?overuse? of internet rather than an ?addiction? (Spada, 2014; Young, 1996).

The addiction of internet refers to the need of acceptance, anonymity, information search need, or the computer usage behavior as the source of addiction (Beard and Wolf, 2001). Almost most of the reasons creating any addiction seems to be replaced by internet addiction too. Classical symptoms like avoiding problems, feeling better with the behavior and even lying about the behavior, repeating the behavior and inability to stop the behavior and increase time/energy consumption for the behavior are also seen as Internet addiction (Young, 1999). Liu and Kuo (2007) links internet addiction to parent and peer problems, while Kardefelt-Winther (2014) refers to avoiding problems and focusing on feeling better.

Different dimensions of internet addiction are also defined by the literature. Addiction to the computer games is examined under the need of gaming as a class of addiction. While online pornography is accepted as a part of sex/cybersex addiction, web surfing is linked with information need and also named as information overload. The compulsive behaviors over the internet are also examined like online shopping addiction or online gambling and named as net compulsion. Addictive behavior of online relations could be named as cyber-relationship addiction (Young, 1999).

Social network or social media gets more excessive use of time online in Turkey as well (TUIK, 2013). Social media allows people to have the freedom to be anonymous, create their own profiles to communicate and even create new societies (Hughes et al., 2012; Kuss and Griffiths, 2011). People are eager to join and actively use social media for many reasons, including feeling better, avoiding problems, the need to be accepted in a group, etc. (Davenport et al., 2014; Andreassen et al., 2012) which are all considered as motivating factors. In this study, business/work related and social related motivations are divided into two different groups and the behavioral profile on addictive scale adapted from psychology Kurtuluş K. (2014) literature are compared.

3   Research Methodology

The aim of the research is to determine the differences between business/work related and social related internet users' (as benefit based segments) differences on internet and social media addictive behavior bases. It is also aimed to develop a forecasting model to estimate such addictive or compulsive behavior patterns of internet usage purposes. For this reason, we used the previously adapted 37 item Likert scale (1 totally disagree-5 totally agree) from Young's studies. We prefer to use the whole scale without eliminating it into dimensions and conducted a reliability test the scale and reached 0.982 Cronbach Alpha coefficients which indicate excellent fit. Addition to the demographic and internet using pattern questions, the primary purpose of using the internet was also examined. Information search, mailing, business/work/studying purposes, buying goods and services, news following categorized as business/work related behaviors while, social media content creation, content following, chats, games, and entertainment were considered as social purposes. Finally, discriminant analysis is used to determine these two groups' differentiation items from 37 item scale.

4   Findings

For this study, 255 participants are reached via an internet survey. Participants report using internet at the average of 6.47 hours per day (std. dev. 3.31). The average usage period of internet was 11.39 years (std. dev. 7.47). The participants state laptop computers are the most frequently used device for internet connection (%49.8) followed by desktop computers (%22.7).

?Following social media? is the most important reason for internet usage (%21.6), followed by ?data search? (%19.6) and ?content creation over social media? (%17.6). The fourth important reason seems to be ?business purposes? with %15.3.

The demographic profile of the sample is also examined. %52.2 of the participants are male. The average age is 19.18 (std. dev. 6.02). The majority of the participants have undergraduate degree (%52.2) and the average household is 4 people. The two highest income groups are; 2001 TL- 3000 TL (with %26.7) and 1001 TL-2000 TL (with %18.9). All of these data show that participants of this survey are very young, highly educated, mid-income class, average household size. Therefore, they are very homogeneous group of individuals.

Table 1: Eigen value and Wilk's Lambda of the discriminant analysis Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.547^a	100.0	100.0	.595

a. First 1 canonical discriminant functions were used in the analysis.

Table 2: Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.646	102.305	37	.000

In order to test the differences between the groups, a discriminant analysis was applied to the 37 item scale, which measures addictive attitudes of the internet use. Enter method discriminant analysis was chosen. Grouping variable was the work or social related user purposes.

Tests of Equality of Group Means	Wilks' Lambda	F	Sig.	Business group Mean	Social Group Mean
I think I should spend less time online	0.957	11.327	0.001	3.407	3.896
People around me complains that I spend so much time online	0.954	12.186	0.001	2.343	2.852
I usually spend more time online then I anticipated	0.985	3.821	0.052	3.336	3.635
I don't feel satisfied when I use internet less now	0.949	13.624	0.000	2.829	3.391

I am trying to control myself about being online	0.991	2.313	0.130	2.514	2.739
I feel like I am spending too much time online	0.971	7.482	0.007	2.664	3.070
I am trying to limit my time online	0.991	2.242	0.136	2.507	2.722
I feel lost without internet connection	0.995	1.294	0.256	3.229	3.409
I feel anxious without internet connection	0.986	3.689	0.056	3.186	3.496
I don't know what to do when I don't have internet connection	0.997	0.758	0.385	2.343	2.470
I am using internet more than it is necessary	0.964	9.461	0.002	2.907	3.348
I usually don't realize how much time I spend online	0.912	24.392	0.000	2.757	3.461
My work/school performance decreases because of internet	0.911	24.829	0.000	1.821	2.417
My relationship with my family had weakened because of internet	0.981	4.998	0.026	1.721	1.948
My relationship with my friends had weakened because of internet	0.995	1.379	0.241	1.771	1.904
I feel like I can spend enough time with people I care about because of internet	0.988	3.066	0.081	1.757	1.948
I lied to people around me (friends/family/therapist etc.) about my frequency of using internet	0.997	0.637	0.426	1.414	1.478
I lied to people around me (friends/family/therapist etc.) about my time frame been online	0.999	0.360	0.549	1.400	1.443
I use internet to avoid my problems	0.952	12.891	0.000	1.814	2.296
I use internet to avoid my responsibilities (school. work etc.)	0.966	8.779	0.003	1.843	2.209

I want to be online when I am troubled	0.981	4.905	0.028	2.614	2.965
I want to be online when I feel unhappy	0.980	5.057	0.025	2.479	2.826
I feel anxious unless I control my social media accounts frequently	0.936	17.225	0.000	2.421	3.026
I feel like I miss something unless I connect to Social media frequently	0.933	18.038	0.000	2.736	3.391
I got my smartphone because I want to be able to check my social media accounts everywhere	0.947	14.291	0.000	2.636	3.270
Even I am online. just not to show people around me that I am almost always online. I seem like offline on social media	0.950	13.341	0.000	1.664	2.070
I use social media to avoid my problems	0.975	6.556	0.011	1.750	2.078
I am aware that I am spending more time on social media	0.893	30.298	0.000	2.157	3.000
I am aware that I am sharing so many personal details about my life online	0.920	22.029	0.000	2.207	2.896
My work/school performance decreases because of social media	0.943	15.214	0.000	1.721	2.183
I think I should spend less time on social media	0.895	29.581	0.000	2.221	3.043
I feel more like sharing when people "like" my shares	0.923	21.161	0.000	2.407	3.070
I like to increase the number of friends/followers over social media	0.984	4.170	0.042	2.493	2.800
I need to speak up my thoughts online by using a nick name which I can't say in my real life	0.971	7.647	0.006	1.700	2.052

I like to be included to strangers life as a follower over social media	0.940	16.081	0.000	1.836	2.391
I feel happy when people "like"s my location check ins	0.982	4.631	0.032	2.129	2.443
I want to share every interesting thing I do or place I been to	0.897	28.966	0.000	1.729	2.417

Table 3: Test of Equality of Group Means

The Wilk's Lambda Sig. level is 0.000 which indicates the discriminant analysis meaningful to differentiate these two groups. The canonical Correlation coefficient is 0.595 which indicates %35.4 of the differences between these two groups could be explained by this discriminant function (1). Even though the explanation rate is not very high, the function is still significant for classification.

Table 3 shows that 26 of 37 items are significant at p=0.05 in order to discriminate two groups of internet users. Among 26 discriminating items 15 items are significant at $p = 0.000$ (3). Table 3 clearly indicates that social users have significantly higher means than business users of internet. Social media users have higher means which groups them as internet addicts.

Table 4: Correct Classification Probablities
$Classification Results^a$

	Predicted Group Membership		
	social	business	Total
Original Count business	115	25	140
social	28	87	115
% business	82.1	17.9	100.0
social	24.3	75.7	100.0

a. %79.2 of original grouped cases correctly classified.

Finally, the correct classification rate of business group by the function is %82.1 while social group %75.7 and overall %79.2 from discriminant function determined. (Table 4) This result indicates that discriminant functions correct classification rate is significantly higher than the correct classification rate of random probability model at $p = 0.000$ (random classification model gives %50.6 correct classification probability) This means that discriminating function model has a very strong prediction power. Therefore, it can be used for predicting internet users' benefit seeking behavior from internet namely business or social.

5   Conclusion

When the test of equality of group means are examined, the addictive red flag items like ?I am trying to limit my time online?, ?I lied to people around me (friends/family/therapist etc.) about my time frame been online? or ?I am trying to control myself about being online? found not to be significant. Even though the lying behavior pattern is very rarely seen in both group, the limiting of internet, or feeling the withdraw when the user is without internet seems to be in the middle range.

Most significant differences between groups observed to be on the items like; ?I don't feel satisfied when I use internet less now?, ?I usually don't realize how much time I spend online?, ?My work/school performance decreases because of internet/social media?, ?I am aware that I am sharing so many personal details about my life online?, ?I got my smartphone because I want to be able to check my social media accounts everywhere ?, ?Even I am online, I just not to show people around me that I am almost always online. I seem like offline on social media? or ?I use internet to avoid my problems/responsibilities?. These significant differences show that the Social purposed internet users are more keen on Social media and started show symptomatic results of overuse or addiction. Social users express the withdraw feeling with less usage, the time consumption of their behavior and avoiding the problems or responsibilities with the stimuli of internet.

The differences between these two groups based on their purpose of usage seem to be a good classification of these groups. The groups show similarities on not lying about their behavior, but the need and the attitude is clearly differentiates these two segments of internet users.

This research clearly indicates that benefit based segmentation of internet users; namely social and business is a viable approach to segment the internet users. Since the model has a very significant predicting power, we advise the researchers to look and use benefit perceptions of users in addition to classical segmentation methods based on users' characteristics. Although this method of using the benefits is more complex, it gives us more insights of this phoneme of addictive behavior.

Although this study is limited to internet addiction with a limited sample size of 255, studies with larger and different sample sizes and sample profiles are encouraged to retest the findings of this research. Therefore, further research is recommended to test this hypothesis of very high significance predicting the power of benefit based segmentation not only in addictive behavior but also different consumer choice behaviors.

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Consumers' Willingness to Pay for Environmental Attributes of a Cut Flower in Ethiopia: A Choice Experiment Approach

Ahmed Seid Hassen*

Abstract

The paper aims at valuing consumers' willingness to pay for environmental attributes of a cut flower using choice experiment and hence identifying the presence of a hypothetical market for environmental friendly flowers. Considering the local and global environmental impacts of floriculture, two environmental attributes of a cut flower namely, Eco-labeling (EHPEA-CP label) and Carbone footprint together with a price attribute were selected for choice experiment. Survey data from 200 randomly selected consumers were employed and two multinomial logit models and a random parameter logit model were used for estimations. The estimated results from all models reveled that respondents had the willingness to pay for both environmental attributes of a cut flower and they were willing to pay 1.98 birr and 10 birr for eco-label and carbon footprint attributes of a cut flower respectively, valuing carbon footprint more than eco-labeling. Based on the welfare estimates, consumers were willing to pay 10.47 birr for a bronze labeled and carbon neutral cut flower; 12.45 birr for a flower with silver brand and medium (neutral) carbon footprint and 24.43 birr for brand gold and carbon saving (low) flower. Thus, environmental friendly flowers may find a niche market in Ethiopia.

Key Words: Environmental attributes; choice experiment; willingness to pay (WTP); cut flower

1 Introduction

Floriculture is an emerging industry in the world and has become a very important source of export products for several developing countries in East Africa, South and Central America and the Middle East. The demand for cut flowers in international markets of Europe, North America, and East Asia, which accounted for %90 of world demand in 2012, has been growing rapidly over the last few years. At global level, the export of cut flowers has been growing recently by %10 each year and it reaches 25 billion USD in 2012. (International-Trade-Center, 2012)

The suitable and diverse agro-climatic conditions make Ethiopia the right place to engage with floriculture sector. It is a country with 12 river basins, 18 national lakes and 3.7 million hectares of potentially irrigable land together with weather condition and well-drained soil suitable for growing horticultural products including cut flowers. (Embassy of Ethiopia in USA, 2006)

Floriculture develops as one of the booming sub-sectors in Ethiopia with extremely fast growth and successful diversification to non- traditional export products. (Gebreeyesus and Iizuka, 2012) Supported by government incentives, private investment in the Ethiopian floriculture industry has been rising and its contribution to the national economy has become significant in recent years. In 2011/12, the country has earned around 170 million USD by exporting more than 1.7 billion cut flowers, produced by 80 flower farms. Besides, more than 350,000 people have benefited from the horticulture

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where floriculture has the lion's share. This is a big potential not only in earning foreign exchange but also in diversifying exportable products and opening huge job opportunities (Beza, 2012; EHPEA, 2012).

However, the floriculture industry undesirably and adversely affects the natural environment despite its economic role. Firstly, excessive use of chemical inputs and disposal of waste residual are extremely hazardous for the local environment. According to Ministry of Agriculture, Ethiopian floriculture industry has been applying more than 300 types of chemical pesticides and fertilizers (Sisay, 2007). But it is estimated that only %0.1 of the applied pesticides reaches the target pest, discharging %99.9 as pollutant in to the environment (Pimentel, 1995). According to a study by Malefia et al. (2009), the high level of fertilizer residuals releasing to Lake Ziway reduces the irrigable capacity of the Lake.

Secondly, the production and transportation of cut flowers emits greenhouse gases and hence affect the global environment. Flower production uses excessive energy, especially when cultivated under greenhouses, causing air pollution and global warming (Michaud et al., 2012). Moreover, more than 90% of pesticides can be volatile, i.e. evaporates and contaminate the environment within a few days of application (Glotfelty and Schomburg, 1989; Majewski and Capel, 1996)

Although Ethiopian Horticultural Producers and Exporters Association (EHPEA) Code of Practice was introduced in 2007, almost all growers that comply with the practice are of only at Bronze level which set a much lesser standards than internationally recognized codes such as International Code of Conduct (ICC), Floriculture Environmental Program (MPS) and Fair Flowers Fair Plants (FFP)(Mulugeta, 2009; EHPEA, 2011). In addition, this is not a label that communicates producers with end users but only a certificate that communicates producers with buyers. Furthermore, compliance with the code and cultivating under the standards reduces productivity and hence raises cost of production causing price difference among flowers. Thus, a grower who complies with the standards will transfer the extra cost to consumers by labelling its cut flower and adding a price premium.

Thus, in providing valuable information to mitigate the environmental impact of floriculture industry, the study tries to identify the presence of a hypothetical market for environmental friendly flowers by valuing consumers' willingness to pay (WTP) for environmental attributes of a cut flower using choice experiment approach. It aims to estimate consumers' marginal willingness to pay for environmental attributes of a cut flower in Ethiopia; and also to determine the socio economic characteristics that influence consumers' willingness to pay for environmental attributes of a cut flower.

2   Literature review

2.1   Environmental Valuation Techniques

Environmental valuation of non-marketable goods and services is a technique employed to attach a value for the benefit obtained from the environment and natural resources. Valuation of natural resources like forests, water sources and fishery; and environmental services like clean air, recreations and amenities is useful as such resources yield flows of service to people in increasing its welfare. (Freeman, 1993) The non-market value of environmental attributes of a cut flower needs to be determined and expressed in monetary terms so that policy makers can use it in attempting to mitigate environmental impacts of floriculture industry in Ethiopia. Information on WTP of consumers for environmental friendly flowers will also be used as an input for cost benefit analysis of flower farm projects.

Various valuation techniques have been developed and employed by environmental economists. As one of the direct stated preference techniques, contingent valuation method is used in assessing perception of respondents about their willingness to pay for a hypothetical scenario. This is used to estimate the use and non- use values of environmental resources. The method consists of designing the survey instrument and construction of scenario; collection of data about ?willingness to pay or accept'; assessing and analyzing the surveyed data including estimating values of ?willingness to pay or accept';

calculating aggregate ?willingness to pay and accept' and implementing sensitivity analysis. (Perman, 2003)

As an alternative to contingent valuation method, choice modelling is employed. This is a survey-based methodology where respondents are presented with various alternative descriptions of a good differentiated by their attributes and attribute levels. Respondents, then, are asked to choose, rank and rate attributes and attribute levels in accordance with their preference. It can be used to estimate both use and non-use values of environmental goods. Selection of environmental attributes; assignment of attribute levels; choice of experimental design; construction of choice sets to be presented to respondents; measurement of preferences as either ranking, rating or choice; and estimation procedure are the steps in using choice experiment. Choice modelling is advantageous to contingent valuation as it is apposite with situations where changes are multi-dimensional and the trade-offs between them are of particular interest. (Hanley et al., 2001) It is also relatively more efficient since it reduces potential sources of biases, and enables welfare estimates and benefit transfers and eases context flexibility. (Alpizar Rodriguez et al., 2001)

Travel cost method is another variant form of revealed preference valuation technique which is employed to value recreational uses of natural resource system. The method is mostly used to value recreational sites like parks and is based on the idea that environmental good is approximated by the cost that visitors incurred in order to enjoy the service rendered by the good. Hence, the survey data about the number of trips to and the total cost from a recreational site is used to estimate values of parameters of compensating demand function via ordinary least squares. Then from these surrogate demand functions, which depict the relationship between number of visits and admission fee, marginal consumers' surplus is determined. (Freeman, 1993)

2.2   Empirical Evidence

There are many researches done on valuation of environmental goods and services in Ethiopia. Nevertheless, a single study couldn't be found that estimate willingness to pay for environmental attributes of a cut flower in the country. In Netherlands, however, Michaud et al. (2012), on their study entitled "Willingness to Pay for Environmental Attributes of Non-Food Agricultural Products: A Real Choice Experiment" investigates consumers' willingness to pay (WTP) a price premium for two environmental attributes of a non-food agricultural product. The study investigates individual's preferences for roses associated with an eco-label and a carbon footprint attributes using an economic experiment combining discrete choice questions and real economic incentives involving real purchases of roses against cash. It analyses data with a mixed logit model and reveals significant premiums for both environmental attributes of the product. The study finds that individuals positively and significantly value for environmental attributes of roses, i.e. carbon footprint and FFP (Fair Flowers Fair Plants) label but they interestingly value a low carbon footprint than the FFP eco label. The study divulges that individual respondents were willing to pay €1.73 for the attribute of FFP eco-label while they showed their willingness to pay €4.09 for the attribute of carbon footprint. Moreover the study finds that being male and organic purchaser had a significant effect on probability of choice.

There are various studies conducted to value environmental goods and services in Ethiopia and elsewhere. A study conducted by Chengyan et al. (2010) estimated the premium that floral consumers are willing to pay for biodegradable plant containers using choice modelling. Sangkapitux et al. (2012), on the other hand, conducted their research on consumers willing to pay for environmental and ethical attributes of fruit and vegetables in the highlands of northern Thailand. Daisuke (2006) employed choice experiments as a method to estimate tourists' willingness to pay for the development of ecotourism in Uaxactún, Guatemala.

Metkel (2011) used choice experiment in order to estimate non market welfare gain from various improved solid waste management alternatives for households in Axum Town, Ethiopia. Nega (2012)

on his thesis analysed the determinants of households' willingness to pay for irrigation water supply in South Gondar using contingent valuation and choice experiment methods. Using choice experiment, Getnet (2012) identified four attributes i.e. biodiversity, water availability, recreational facility and monetary attribute to assign monetary value for the multi functions and services offered by Choke mountain wetland ecosystem, Ethiopia.

3 Methodology

3.1 Data Source and Sample Size

The data for the study was obtained from primary sources. It was randomly collected from a sample of respondents who were flower purchasers from a flower shop in Addis Ababa. The sample size for the study was limited to 200. In specifying a flower shop that the survey was conducted, Bole sub city was purposefully selected from among ten sub-cities in Addis Ababa. This is due to the reason that most flower shops with many customers exist in the sub city. Again from flower shops which were functioning in the sub-city, a big flower shop with many customers (Hirut Natural Flowers) was purposely chosen and its customers were selected as target population purposefully. In doing so, systematic random sampling technique was employed in collecting the data. Thus, the data was randomly collected from every second customer of the shop for four consecutive weeks in March and April, 2013.

After review of literatures around the topic, two environmental attributes of a cut flower together with a payment attribute were selected. These are i) Ethiopian Horticultural Producers and Exporters Association (EHPEA) - Code of Practice Certificate Eco-label; ii) carbon foot print and iii) price.

The attributes were determined based on environmental impacts of cut flower cultivation. The environmental impacts can be grouped in to two major classifications. The first one relates to the heavy use of pesticides, fertilizers, water and energy during cultivation. This results in soil and water pollution and thus harms the local environment. To mitigate such problems, flower are cultivated under specific standards and dedicated to eco-labels such as the American ?VeriFlora Certified Sustainably Grown' and the European ?Fair Flowers Fair Plants (FFP)' label which assures least environmental impact production. (Michaud et al., 2012) The Ethiopian equivalent is EHPEA Code of Practice. Thus, purchasers of a cut flower were faced with three alternative purchases plans for environmentally friendly labelled flowers, other than the status quo of unlabelled one. These were Bronze, Silver and Gold level of EHPEA-CP Eco-label.

The second environmental characteristics of flowers relates to the emission of greenhouse gases during production and transportation. Energy consumptive nature of flower cultivation under greenhouses emits carbon dioxide to the environment. Thus, carbon footprint attribute of flowers was assigned to capture such an impact. (Michaud et al., 2012) Regulation plan for lowering carbon emission embraces three alternative scenarios. High level of emission with no regulation (High); reducing emission by %25 (Medium); and reducing it by %50 (Low), thus, are the three attribute levels.

A price attribute was included and it is the price of a cut flower in Addis Ababa that includes the premium for its environmental attribute. Birr 1.5 per cut was the status quo price level and Birr 3, 4.5, 6 and 7.5 were presented to respondents as alternative price levels for flowers with environmental attributes of various kinds.

3.2 The Choice Experiment Model Specification

Random utility theory formulated by Luce (1959) and McFadden (1974) and consumer choice model formulated by Lancaster (1966) are foundations for choice experiment. These foundations are used in estimating the effects of product attributes and individual characteristics and in computing willingness to pay indicators. (Michaud et al., 2012) In such kind of method, various alternative descriptions of

the good with its attributes and levels will be provided to respondents to observe their choice. (Hanley et al., 2001). Thus, the total utility derived from consumption of a good is a function of the observable component whose value depends on the attributes of the good and the unobservable error term which is assumed to be independently and identically distributed (Louviere et al., 2000). The models I used for choice experiment were employed by Michaud et al. (2012).

3.2.1   Multinomoial Logit Model

By using Multinomial Logit (MNL) model, the choice probabilities can be estimated assuming i) the random components are independently and identically distributed (IID), implying that the options to be chosen are independent from irrelevant attributes (IIA), ii) the choice probabilities of the alternatives depend only on the differences in the systematic utilities of different alternatives and not on their actual values and iii) the probability range between 0 (when the utility of the alternative is very low relative to other alternatives) and 1 (when the utility of the alternative is very high relative to other alternatives). (Alpizar Rodriguez et al., 2001))

For a decision maker i, the utility (or net benefit or wellbeing) of choosing option j is a function of the characteristics of the alternative j. The utility function, U_{ij} is composed of a systematic part, V_{ij} which in turn is composed of environmental attributes of cut flower (Z_{ij}) and socioeconomic characteristics of the individual (S_{ij}), and a random part E_{ij} that stands for all unobserved random variables. (Michaud et al., 2012)

$$U_{ij} = V(Z_j, S_j) + E_{ij} \tag{1}$$

But it is impossible to predict and understand preferences perfectly because of the random component. Therefore, preferences are interpreted in terms of probabilities (Hanley et al., 2001). Thus the probability of choosing alternative j is expressed in equation (2).

$$P(i/C_n) = P(u_j > u_h) = P(v_{jn} - v_{hn} > \varepsilon_{jn} - \varepsilon_{hn}) \tag{2}$$

Expressing the systematic component of the utility function by vector of explanatory variables and their coefficients can be presented as equation (3) . (Adamowicz et al., 1998)

$$V_{jn} = \beta' x_{jn} \tag{3}$$

Inserting equation (3) into equations (1) and (2) and rearranging gives the probability that consumer n will choose an option in terms of the systematic and error components and hence enables to estimate the values of vectors of parameters (β's). (Adamowicz et al., 1998)

$$P(i/s_n) = P[(\beta' x_{jn} + \varepsilon_{jn}) > P(\beta' x_{hn} + \varepsilon_{hn})], \forall j \in c \tag{4}$$

The criterion for the utility maximizing consumer i of this flower with environmental attributes to choose option j from option h in the choice set C_n is that the systematic and unobservable components of option j is greater than that of option h. (Adamowicz et al., 1998)

The probability of choosing alternative scenario j in MNL model has the following expression, assuming the IID distribution of the random term and independence between alternative scenarios and individual attributes.

$$P(j) = \frac{\exp^{\lambda \beta x_j}}{\sum \exp^{\lambda \beta x_h}} \tag{5}$$

λ is the scale parameter. (Adamowicz et al., 1998)

The model can be estimated by maximum likelihood estimation taking the log likelihood function.

$$\log L = \sum_{i=1}^{N} \sum_{j=1}^{J} y_{ij} \log \left[\frac{e^{v_{ij}}}{\sum_{j=1}^{J} e^{v_{ij}}} \right] \tag{6}$$

y_{ij} is an indicator variable that takes a value of 1 if respondent i choose option j and 0, otherwise. (Hanley et al., 2001)

3.2.2   Random Parameter Logit Model (RPL)

The applicability of MNL model is limited as its assumption of independence of irrelevant alternatives (IIA) and taste homogeneity of individuals are mostly violated. Hence Mixed logit models such as random parameter logit (RPL) model and the error components logit (ECL) model are currently quite popular as they allow for heterogeneity of preferences while the IID behavior of random components is still assumed. Accordingly, random parameter logit model, among other mixed logit models, has been employed by recent empirical studies as it allows for random taste variations accommodating heterogeneity for observed attributes (Mariel et al., 2013).

By relaxing the assumptions of the conditional logit model, the utility of person i from choosing alternative j in the random parameter logit model is given by equation 7. (Mariel et al., 2013)

$$U_{ji} \equiv V_{ji} + \varepsilon_{ji} \equiv Z_j(\beta + \mu_i) + \varepsilon_{ji} \tag{7}$$

The utility (U) of a respondent i from choosing option j is a function of the systematic component (V) and random term (ε). The indirect component is functionally related to Z which represent k vector of observed attributes with β vector of mean attribute utility weights in the population that may vary across respondents by a random error μ_i. Socio-economic characteristics can be included in the model as constants.

Thus, the probability of choosing option j from each of the choice sets will have the following form. (Hanley et al., 2001)

$$P = \frac{e^{Z_{ji}(\beta + \mu_i)}}{\sum e^{Z_{hi}(\beta + \mu_i)}} \tag{8}$$

The RPL model allows for interaction between the socio-economic characteristics of respondents and the attributes or the alternative constant term (ASC) and thus, taste variation among respondents can be incorporated in to the model (Alpizar Rodriguez et al., 2001)

Moreover the RPL model is more superior to MNL model in terms of overall fit, welfare estimates and consideration of taste variation across populations. The systematic component can be written as follows. (Birol et al., 2006)

$$V_{ij} = ASC + \sum \beta_k Z_k + \sum \beta_m S_m \tag{9}$$

ASC is the alternative specific constant which captures the status quo bias i.e. the effect of attributes that are not included in the model (Adamowicz et al., 1998) or/and following Mogas (2006), Hoyos (2010) indicated that it is interpreted as utility premium for moving away from status quo to alternatives; k is the number of attributes; and m is the number of socio-economic characteristics of subjects; (Alpizar Rodriguez et al., 2001)

3.2.3   Estimates of Willingness to Pay Premiums and Compensating Surplus

The willingness to pay (WTP) premium for a unit change of a given attribute of a product can be computed as the marginal rates of substitution between the quantity expressed by the attributes and

the price of the product. (Louviere et al., 2000) Since utilities are modelled as linear functions of the attributes of the flowers, the marginal rate of substitution between two attributes is the ratio between their coefficients. (Michaud et al., 2012)

The WTP premium for environmental attributes of a cut flower is, thus, expressed as follows.

$$WTP = (\partial V/\partial X_k)/(\partial V/\partial Price) = (-\beta_k)/\beta_{price} \tag{10}$$

k's are the attributes and β's are the estimated coefficients of each attributes in the MNL and RPL models.

Given the indirect utilities obtained from status quo and changed plans as V_0 and V_1;

and β as price coefficient, compensating surplus, an estimate of welfare measure, takes the following form. (Birol et al., 2006)

$$\text{Compensating surplus} = -(V_0 - V_1)/\beta_{price} \tag{11}$$

3.2.4 Specific Equation for Choice Experiment Method

In both MNL and RPL models, three utility functions were estimated for three alternatives, i.e. status quo, environmental purchase plan 1 and plan 2. The basic and extended MNL models are expressed in the following general forms:

$$V_i = ASC + \beta_1 ECOL + \beta_2 CARBF + \beta_3 PRICE \tag{12}$$

$$\begin{aligned} V_i = ASC + \beta_1 ECOL + \beta_2 CARBF + \beta_3 PRICE + \theta_1 ASC_i * GENDER \\ + \theta_2 ASC_i * AGE + \theta_3 ASC_i * INCOME + \theta_4 ASC_i * EDUC \\ + \theta_5 ASC_i * MARITAL + \theta_6 ASC_i * ORGH + \theta_7 ASC_i * AWARN \end{aligned} \tag{13}$$

ASC_i is alternative specific constant and takes the value 0 for status quo option and 1 for purchase alternatives 1 and 2; β_1, β_2, and β_3 are coefficients associated with eco-labelling, carbon footprint and price attributes respectively. V_i is the indirect utility for alternative i, where i is between 0 and 2. $ECOL$ stands for eco-label and $CARBF$ for carbon footprint. Gender ($GENDER$), age (AGE), monthly income ($INCOME$), educational status ($EDUC$), marital status ($MARITAL$), organic purchase habit ($ORGH$) and environmental awareness ($AWARN$) were included as socio-economic variables. θ_i is the coefficient of the variables associated with these socioeconomic characteristics.

3.3 Experimental Design

The combination of attributes and levels yields choice sets. Accordingly, eco-label takes four levels, carbon footprint attribute has three levels and the monetary (price) attribute takes four levels. The number of cut flower purchase alternatives that can be generated from three attributes with five, four and three attribute levels is 60 (51*41*31=60). This is the complete factorial design that yields very large and non-practicable combination (Richard et al., 1994). Thus, fractional factorial design was employed and six choice sets were selected as optimal choice sets from 60 possible combinations. This was done using the SAS software in orthogonal design method using OPTEX procedure. Each respondent was asked to choose from six choice sets with three options, two with various combinations of attribute levels and one status quo. An example of choice sets is presented in Table 1.

Table 1: Example of a Choice Set

Attributes	Alternative 1	Alternative 2	Status quo
Eco-label	Bronze	Bronze	unlabelled
Carbone footprint	Medium (Emission reduced by 25%)	Low (Emission reduced by 50%	High
Monetary payment (Price)	Birr 3/cut flower	Birr 7.5/cut flower	Birr 1.5/cut flower

Source: Researcher's Compilation

4 Empirical data analysis

4.1 Descriptive Analysis

The descriptive statistics reveals that 58% of respondents were female and the rest are male. From the total of 200 respondents, 56% (112) of them came from Bole sub city since it is where the survey was conducted. The average age of the respondents were 30.4 years with a minimum of 16 and maximum of 58 years. Respondents have a minimum of 3 years and a maximum of 20 years of education with more than 45% of them hold their first degree. This is because literate people are expected to have flower purchasing habit than illiterate ones in Ethiopia. Married respondents constitute nearly 46% of the total, while 52% of them were single. Self-employment constitutes more than 35% of means of livelihood of respondents and the average monthly income was calculated as 6864.33 birr per month. Out of the total respondents, 77% of them have a purchasing habit of organic products and 66% of them frequently purchase flowers.

Information about attitude and perception of respondents were collected in the survey in order to capture their knowledge and observation about the impact of flower production and transportation on the natural environment. Following this, the surveyed data confirms that 85% of them have awareness about the impact, despite economic contributions, of economic activities on environment. More than 95% of respondents agreed on the statement that flower industries have environmental impact beside economic contribution. Furthermore, nearly 77% of them agreed on the presence and significance of the problem in the floriculture industry of Ethiopia.

Table 2: Descriptive Statistics

Variable	Mean	St. Dev.	Minimum	Maximum
AGE	30.4031	7.89994	16	58
EDUC	14.4447	2.52792	3	22
GENDER	0.425278	0.494454	0	1
INCOME	6864.33	9499.23	0	50000
MARITAL	0.459722	0.498444	0	1
ORGH	0.774722	0.417823	0	1
AWARN	0.85	0.357121	0	1

Source: Survey Data

The perception of respondents about environmental and health impacts of floriculture was ranked based on severity in terms of air pollution, water pollution, impact on aquatic life, reduction of amount

of water, impact on animal health, impact on workers' health, impact on soil organisms and soil quality degradation. Extensive literature review was done in pointing out the impacts. Accordingly, 31.9% of them rank the impact of flower production on health of workers and the community living around flower farms as the most severe problem. This is followed by the impact it imposes on the life of soil organisms and soil quality degradation. Following these, air pollution, water pollution, impact on animal health, reduction of amount of water and impact on aquatic life were also mentioned by respondents in respective of their severity.

Excessive use of chemicals such as fertilizers (specifically phosphorus and nitrogen) and pesticides (herbicides, fungicides and insecticides) on the farms and the limited care facilities provided by owners to workers are the major justifications for these problems. According to Ministry of Agriculture, Ethiopian floriculture industries use more than 300 chemicals as pesticides (insecticides, fungicides and nematocides) and growth regulators (Sisay, 2007)

In addition, the cultivation of flowers under greenhouses emits greenhouses gases causing air pollution and contributing to global warming. Moreover, cultivation of flowers is highly energy consumptive, especially when grown under greenhouses (Michaud et al., 2012). Waste materials when discharged from the farms to the nearby environment pollute water and degrade soil quality.

More than 44% of respondents considered government as the major responsible body for the presence as well as alleviation of the problem. Almost 40% of them mentioned both flower farm owners and government as responsible bodies for the environmental problems of flower farms and hence for the solutions.

To reduce the impact of flower production and transportation, respondents indicated major environmental protective measures. Majority of respondents pointed out that environmental regulation on the use of fertilizers and pesticides and on the emission of carbon dioxide as well as the recycling of waste products should be strictly taken into consideration by concerned bodies as a measure at least to reduce the environmental influence of flower cultivation and transportation caused by the use of chemicals, disposal of waste materials and cultivation under green houses. More than 26% of respondents emphasized on the use of organic inputs as a possible alternative.

Table 3: Respondents' perception on Possible Measures to be taken to mitigate the Problem

Measures	Frequency	Percentage (%)
Environmental regulation on the use of fertilizers and pesticides	125	22.7
Environmental regulation on the Emission of carbon dioxide	112	20.4
Recycling and proper disposal of waste products	135	24.5
The use of organic inputs	147	26.7
Abolishing flower farms from the country	5	0.9
Other measure	26	4.7
Total	550	100.0

Source: Survey Data

Respondents also indicated other solutions such as using non- fertile and non- farm land; limiting the number of farms to a specified number; using technologies towards organic production and bed growing; and locating farms in a way local farmers may not be displaced; and locating farms far away from urban dwellings. In addition, creating environmental compensation mechanisms to those the activity costs a lot; undertaking extensive research; and learning useful and feasible experiences of other countries and creating awareness to the community about environmental impacts of economic activities and environmental protection were also suggested.

4.2   Econometrics Results and Analysis

For estimation, LIMDEP8.0 NLOGIT4.0 econometrics software was employed and results from the basic and extended multinomial logit models as well as the random parameter logit model is presented in Table 4, Table 5 and Table 6 respectively.

4.2.1   The Basic Multinomial Logit Model

The estimation of the basic multinomial logit model reveals that all attributes, namely eco-labelling ($ECOL$), carbon footprint ($CARBF$) and monetary attribute ($PRICE$) possess the expected sign and significance. This reveals that a cut flower is more likely to be chosen if it is labelled at high level, if its carbon footprint is low and if it is cheap. This is to mean that an increase in the level of eco-label and carbon footprint attribute; and a decrease in the level of price attribute, will significantly raise the probability of choosing environmental friendly alternative flower with the higher levels of the attribute.

Additionally, estimation of the model reveals a negative and significant value for the alternative specific constant (ASC). This means that the utility of respondents decreases as they move away from the status quo to alternative purchase plans. According to Samuelson and Zeckhauser, such kind of result might be due to status quo bias. Status quo bias is a common economic phenomenon and is supported by lots of evidences from literatures. (Adamowicz et al., 1998) In our cases there were 26 respondents choosing the status quo option in all choice sets, valuing the current situation more than improved ones. This could be due to mistrust of concerned bodies to mitigate the local and global environmental impact of floriculture through standardizing production and reducing carbon emission. In addition, choosing among options might be complex to these respondents and they might be uncertain whether they are willing to make trade-offs or not. Choosing current conditions could also be considered as protest response. But ignoring such a clear preference for status quo and excluding from the model will definitely results in a bias estimation. (Adamowicz et al., 1998)

Table 4: Results of the Basic Multinomial Logit Model

Variable	Coefficient	St. Error	b/St.Error	P[|Z| > z]
ASC	-0.40521750**	0.13272937	-3.053	0.0023
$ECOL$	0.80947865***	0.12112121	6.683	0.0000
$CARBF$	6.13747642***	0.44340277	13.842	0.0000
$PRICE$	-0.6539125***	0.08384249	-7.799	0.0000
Log Likelihood Function				-476.1119
R-squared				0.35872
Number of Observations				1200

*** Significant at 1%; **significant at 5%*
Source: Survey Data

4.2.2   The Extended Multinomial Logit Model

The extended multinomial logit model incorporates variables of gender, age, monthly income, educational status, marital status, organic purchase habit and environmental awareness. These variables were allowed to interact with the alternative specific constant (ASC) to account for heterogeneity of preferences. (Metkel, 2011)

The inclusion of these variables improves the overall fit of the model as the likelihood function of the model decreases in absolute term and the pseudo R-square increases. But surprisingly, all coefficients for the interactions of ASC with socio-economic and demographic variables were found to be

insignificant although some of them have the expected signs in relating with the probability of choosing environmental friendly flower. This is to mean that socio-economic characteristics are not important sources of preference heterogeneity among respondents.

The estimated value of the pseudo R-square in the basic and extended multinomial logits models are 0.35872 and 0.35962 respectively. This dictates the overall significance and good fit of both models, for it lies between 0.2 and 0.4 which is a reference range. (Hensher et al., 2005)

Table 5: Results of the Extended Multinomial Logit Model

Variable	Coefficient	St. Error	b/St.Error	P[$|Z| > z$]
ASC	-0.21338417	0.57340502	-0.372	0.7098
$ECOL$	0.81079208***	0.12126015	6.686	0.0000
$CARBF$	6.14513623***	0.44389745	13.844	0.0000
$PRICE$	-0.6549925***	0.08393559	-7.804	0.0000
$ASC*INCOME$	0.895973D-06	0.94753D05	0.095	0.9247
$ASC*EDUC$	-0.00651828	0.03342840	-0.195	0.8454
$ASC*AGE$	0.00418424	0.01228081	0.341	0.7333
$ASC*GENDER$	-0.14807242	0.17063126	-0.868	0.3855
$ASC*MARITAL$	-0.05577831	0.18634234	-0.299	0.7647
$ASC*ORGH$	-0.11366835	0.21619036	-0.526	0.5990
$ASC*AWARN$	-0.05660912	0.24265636	-0.233	0.8155
Log Likelihood Function				-476.1119
R-squared				0.35872
Number of Observations				1200

*** Significant at 1%; **significant at 5%*
Source: Survey Data

4.2.3   The Random Parameter Logit Model

As indicated in Table 6, the pseudo R- square is higher and the absolute value of the log likelihood function is lower than that of the multinomial logit models. This validates the better explanatory power of the random parameter logit model, still allowing for heterogeneity of preferences while the IID behaviour of random components is assumed.

The estimates demonstrate that the attributes of eco-label ($ECOL$) and carbon footprint ($CARBF$) retain the expected sign and 1% significance. This confirms that respondents had the willingness to pay a premium for environmental attributes of a cut flower. Though incurs extra money, respondents gain more utility by purchasing and consuming labelled flowers produced under specific environmental standards and carbon saving (low) technology. The coefficient of price attribute ($PRICE$) tells a fact about significant and inverse relationship between the price of a cut flower and the utility obtained from consuming labelled flowers with low carbon footprint. In addition, the significance of the standard deviations shows an important heterogeneity in consumers' preference for the eco-label and carbon footprint attributes (Michaud et al., 2012).

Contrary to estimation of the MNL model, the sign of coefficient of the alternative specific constant (ASC) is positive, adding an evidence for the superiority of RPL model over MNL model in terms of overall fit, welfare estimates and consideration of taste variation across populations. Therefore, the utility of respondents increases as they move away from status quo to alternative purchase plans. In

Table 6: Results of the Random Parameter Logit Model

Variable	Coefficient	St. Error	b/St.Error	P[|Z| > z]
ASC	0.02525411	0.30084860	0.084	0.9331
BECOL	1.92821559***	0.32595546	5.916	0.0000
BCARBF	9.74112817***	1.00985968	9.646	0.0000
BPRICE	-0.9737419***	0.15445791	-6.304	0.0000
Log Likelihood Function				449.4603
R-squared				0.39462
Prob[χ^2 > value]				0.0000
Number of Observations				1200

***Significant at 1%

Source: Survey Data

other words, respondents will be well off by consuming environmental friendly flowers than unfriendly ones.

4.2.4 Estimates of Marginal WTP Premiums

Marginal willingness to pay represents the rate at which subjects are willing to pay a premium for increased level of attributes and thus exposes the relative importance of the attributes to respondents. (Hanely et al, 2001)

Table 7: Estimates of Marginal WTP Premiums (in Birr/Cut Flower)

Attributes	MWTP in Birr/cut flower	St. Error	b/St.Error	P[|Z| > z]
ECO-LABEL	1.98021222***	0.29057130	6.815	0.0000
CARBON FOOTPRINT	10.0038093***	1.25217558	7.989	0.0000
Wald Statistic				77.60052
Probability from Chi-squared[2]				0.00000

***Significant at 1%

Source: Survey Data

Table 7 provides a brief presentation of the marginal WTP premium estimates from the random parameter logit model. Accordingly, respondents' marginal WTP a price premium for carbon footprint and eco-label attributes of a cut flower is 10 birr and 1.98 birr respectively. The values of these premiums endorse that the presence of theses environmental attributes generally raises the overall utility from consuming a cut flower (Michaud et al., 2012). Consumers have the enthusiasm to pay a price premium for both attributes but they value the attribute of carbon footprint more than that of eco-label. Such kind of concern for the global impact of carbon-dioxide emission more than the local (distant) effect of flower production might be due to various reasons. Firstly, the lower price premium of eco-label attribute may be interpreted as respondents were living in Addis Ababa and thus may not be much concerned about and are not directly confronted with the local environmental impact of flowers produced outside the city. In the second place, the current global concern and media coverage about climate change and global warming might force individuals to pay higher for low carbon footprint characteristics of flowers. The third justification may be related to lack of awareness and experience of environmental labelling of products in Ethiopia. In addition, the information on carbon emission and its regulation seems accurate and promising but there is only incomplete information that might be obtained to value and control carbon emission (Michaud et al., 2012)

4.2.5   Welfare Estimates of Alternative Purchase Plans

Estimation of consumer surplus allows deriving welfare of consumers that comes from the change in alternative purchase plans. In our case, economic welfare estimates the compensating surplus and is the change in income that will leave the purchaser indifferent between purchasing unbranded flower with high carbon footprint; and buying environmentally friendly flower characterized by various environmental attributes.

Table 8: Estimates of Compensating Surplus

Alternative Plans	Purchase	Willingness to Pay for environmental friendly flower under alternatives (in birr)
Environmental Plan-1	Purchase	10.47
Environmental Plan-2	Purchase	12.45
Environmental Plan-3	Purchase	24.43

Source: Survey Data

Economic welfare measures for three scenarios were derived and compared with the status quo. The status quo is the current situation where the cut flower is unlabelled and the production and transportation of the flower emits high level of carbon. The first scenario introduces Environmental Purchase Plan-1 in which the cut flower is supposed to be produced under Bronze standard set by EHPEA Code of Practice; and the emission of carbon from production and transportation set to be reduced by 25%. The second scenario involves with Environmental Purchase Plan-2 that allow the flower to meet Silver standard and the emission of carbon-dioxide to be reduced by 25%. Lastly, Environmental Purchase Plan-3 assumes the cut flower to entitle the Gold label (the highest) and thus produced under the safest way in mitigating local environmental impacts; and the emission of carbon-dioxide to be reduced by 50%.

The estimates of consumers' surplus reveal that welfare of respondents improves as they move away from the status quo condition to alternative purchase plans. In other words they are willing to pay for flowers with environmental attributes. As can be easily shown from Table 8, respondents were willing to pay 10.47 birr for a bronze labeled cut flower with medium carbon footprint. This is to mean that respondents were willing to pay 10.47 birr to move away from status quo option to environmental purchase plan 1. Similarly for silver branded and medium carbon footprint flowers, respondents were willing to pay 12.45 birr per cut flower. For flowers produced under restrictive environmental standards of brand gold and low carbon emission, respondents showed their willingness to pay 24.43 birr per cut flower, which is the highest.

5   Conclusions

The welfare estimates demonstrate that respondents were willing to pay for flowers produced under specific standards that mitigate the local and global environmental impacts of floriculture. Thus, it can be said that environmental friendly flowers may find a niche market in Ethiopia. This has a meaningful implication in attempting to solve environmental influences of floriculture by creating local markets for environmental friendly flowers.

The estimated values of marginal willingness to pay and compensating surplus and consumer side information about environmental impacts of floriculture should be considered in formulating and im-

plementing environmental standards towards mitigating environmental impacts of floriculture industry in Ethiopia. The hypothetical market created for environmental friendly flowers should be put into reality to alleviate environmental impacts of floriculture. Environmental regulations and EHPEA Code of Practice should be effectively enforced and monitored and a more sustainable and internationally acceptable cultivation of flowers should be assured to the extent of complying with Silver and especially Gold standards of EHPEA-Code of Practice. Suggested measures such as application of technologies towards organic production, locating the farms in a way farmers are not displaced and which are far away from urban dwellings, creating environmental compensation mechanisms to whom the activity costs a lot, undertaking extensive research and learning useful and workable experiences of other countries and creating environmental awareness to the society should also be considered towards alleviating environmental impact of floriculture industry in Ethiopia.

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Acknowledgements

Reason, Passion and Participation: Paradoxes of Deliberative Democracy

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Abstract

Deliberative democrats' understanding of democracy includes both participation and discussions before making collective decisions. However, there is a tension between the particular ways they conceptualize participation (as extensive and active) and public discussions (as deliberations under the precepts of public reason). This paper challenges the feasibility of deliberative democracy in the following ways: 1) by demonstrating the inability of deliberative democrats to provide a convincing account of why their conceptualizations of participation and deliberation should occur simultaneously; 2) by delineating, through historical and theoretical evidence, that what should reasonably be expected to occur simultaneously with active and extensive participation is not reason governed, but passion-driven public deliberations; and, 3) by arguing that these two aspects (extensive participation and public reason) may have adverse effects on each other.

Keywords: *Deliberative democracy, Passions, Public Reason, Participation*

1 Introduction

John Rawls (2001, p. 1) in his book *Justice as Fairness: A Restatement* distinguishes four roles that political philosophy may play in the 'public political culture' of society. He argues that the fourth of these roles is that "we view political philosophy as realistically utopian: that is, as probing the limits of practicable political possibility." (Rawls, 2001, p. 4) This paper investigates the following question: can the ideal of deliberative democracy be constituted as realistically utopian? In other words, is it possible that deliberative democracy will be realized under "reasonably possible but still favorable historical conditions?" (Rawls, 2001, p. 4). My central claim is that realizing deliberative democracy entails contradictory requirements from modern citizens, and that these contradictory requirements are beyond the limits of favorable conditions; consequentially the deliberative democracy ideal is not *realistically* utopian.

Deliberative democrats' understanding of democracy, like many others before, includes both participation and discussions before making collective decisions. However, the feasibility of their theoretical construct becomes tenuous because of the tension between the particular ways they conceptualize participation - as extensive and active[1] - and public discussions - as deliberations under the precepts of public reason. This paper challenges the feasibility of deliberative democracy by demonstrating: 1) the inability of deliberative democrats to provide a convincing account of why their conceptualizations of participation and deliberation should occur simultaneously; 2) that what should reasonably be expected to occur simultaneously with active and extensive participation is not reason governed but *passionate* (understood as being in opposition to reason) public deliberations; and, 3) that these two aspects (extensive participation and public reason) may have adverse effects on each other.

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[1]By active, I mean something more than one's mere participation by being present. It should involve some way of forcing the limits of one's abilities while deliberating.

I begin by briefly outlining how deliberative democrats conceptualize participation and public reason, and how they require both for the realization of their theoretical construct. I argue that these theorists provide no compelling argument about why we should assume that extensive participation should be accompanied by reasoned argumentation. In the following two sections, I present historical and theoretical evidence that shows that what is plausible is not the union of participation with reason, but the opposite: the coupling of extensive and active participation with passion. First, in examining the case of Athenian democracy, where both participation and deliberation were present, the public debates that took place were in complete opposition to the conceptualization of deliberative democrats: participation was extensive but public deliberations were passion-governed rather than reason-governed. Second, political theorists as diverse as Plato and Madison, who operated with similar notions of democracy, coupled democracy with passion not reason. I contend that the arguments they offered to curtail passion (to acquire reason based government) are either consciously linked to, or at least have co-existed with, different mechanisms to curtail either participation or public deliberation. These two sections together demonstrate that the feasibility of deliberative democracy is a serious concern, because passions are indeed an integral aspect of any conception of democracy that includes both active participation and "sions. In other words, historical and theoretical evidence suggests that extensive and active participation is coupled by passion not reason.

Finally, building on these insights, I provide a conceptual analysis of the possible challenges to deliberative democracy in contemporary societies. Drawing on a taxonomy offered by Diego Gambetta, I argue that in both of his ideal type societies (indexical knowledge and analytical knowledge societies), the tension between the participatory requirements of deliberative democracy and the process of public reasoning render such democracy impracticable. Further, by avoiding the role of passions, deliberative democrats overlook their potential function as a motivational force for active participation in democratic political processes when compared with the cool, and often indifferent impartiality associated with reason. In other words, this section suggests a causal link as to why passions, not reason, might constitute a motivation for participation.

2 Participation and Reason in Deliberative Democracy

In the last three decades, deliberative democracy has established itself in academia as one of the main conceptions of democracy, in spite of its apparently much longer historical and conceptual lineage (Elster, 1998b). As opposed to the conceptions of democracy that take people's interests as given (the utilitarian approach, the economic conception of democracy, elitist and pluralist theories), the deliberative view is mainly concerned with transforming these preferences (Nino, 1996; Shapiro, 2002b). According to deliberative democrats, democracy cannot be reduced to preference aggregation. An aggregative, fixed preferences model sees democracy as the arena where people enter and compete via fair mechanisms of assembly. Deliberative democracy places emphasis on the communicative processes of opinion and will formations that precede voting[2]. The next two sections deal with questions of how these processes (of opinion and will formation) occur and who carries them out.

2.1 Public Reason

Bohman (1996, p. 402) argues that, "deliberative democracy is a complex ideal with a variety of forms but whatever form it takes must refer to the ideal of public reason" (also for a very similar idea see: Cohen (1997, p. 413); Cohen (1997, p. 193)). Whatever their differences in terms of the value they ascribe to deliberative democracy, all deliberative democrats will adhere to one form or another

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[2]Most deliberative democrats will adhere to this definition; however, a few writers operate with less demanding definitions such as the idea that deliberation is discussion before voting (Fearon, 1998).

of public reasoning. In this section, I deal with the common core of this divergently defined central concept, placing the emphasis on the motivational or moral requirements that deliberative theorists expect from participants.

The deliberative conception of democracy entails that in the face of the fact of inescapable pluralism of moral and political ends over life, people engage in public reasoning for the attainment of the common good. In its general form this means that citizens have a moral duty (and sometimes incentives depending on the conception) to refer to public reasons in their public deliberations. Public reasons as opposed to private ones are considerations that all deliberating citizens as reasonable persons can accept. Mainly, what distinguishes public from private reason is the concern of the latter for the common good.

Although Rawls' relation to deliberative democracy is problematic, (compare Freeman (2000) with Chambers (2003) and Manin et al. (1987)) we can argue that his conception of public reason is crucial because it was instrumental in the formulations of public reason by some deliberative democrats. According to Rawls, "an essential feature of a well-ordered society is that its public conception establishes a shared basis for citizens to justify to one another their political judgments." Further, "[public] justification proceeds from some consensus: from premises all parties in disagreement, assumed to be free and equal and fully capable of reason, may reasonably be expected to share and freely endorse"(Rawls, 2001, p. 27). In sum, consensus on the essentials, coupled with an already established consensus on the values of public reason (Rawls, 2001, p. 91) will breed agreements on the actual political issues. At least they will circumvent conflictual politics enough to ensure agreement among reasonable people[3]. Although Rawls excludes deliberations over comprehensive moral doctrines, he makes no epistemic claim about the public deliberation (Rawls, 1993, p. 97-105). In this context, deliberative democracy should be seen as a moral requirement for legitimacy, because for institutions to be legitimate they should be justifiable to all. And these justifications should rely on reasons that all citizens can reasonably accept.

Like Rawls, all proponents of deliberative democracy presuppose reason-based discourse; however, there are differences among their conceptions of public reason. For example, (Habermas, 1984, p. 42)' conception of public reason is different from that of Rawls in two fundamental senses. First, he does not exclude comprehensive moral doctrines from deliberation, and he argues that the rightness of moral norms are natural components of proper public discourse, hence they can be tested in them . Second, Habermas makes the epistemic claim about rationally motivated deliberations. "...in relation to some matter requiring regulation, an interest *common to all* those affected and must be capable in principle of meeting with rationally motivated approval of everyone affected under conditions that neutralize all motives except that of cooperatively seeking the truth" (Habermas, 1984, p. 19).

(Cohen, 1998, p. 195-196)'s views are somewhat closer to those of Rawls. He also argues for the exclusion of deep comprehensive moral reasons , and that in an ideal deliberative procedure, participants regard each other as free, equal and reasonable: "reasonable in that they aim to defend and criticize institutions and programs in terms of considerations that others, as free and equal, have *reason to accept*, given the fact of reasonable pluralism" ((Cohen, 1998, p. 194), *his emphasis*). Gutmann and Thompson (2000, p. 167) differ from both Rawls/Cohen and Habermas, in the sense that they try to incorporate an appeal to comprehensive views in their conception of deliberation by putting the emphasis on reciprocity[4] in their understanding of public reason. Reciprocity suggests a purpose to seek agreement with respect to principles that can be justified to others who share the same purpose of reasonable agreement. In this conception, when citizens pursue moral lines of argumentation, "they do so by justifying the policies that they find most morally defensible in a way that minimizes rejection

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[3]Public reason does not necessarily deal with non-fundamental issues. "This means that political values alone are to settle such fundamental questions..." (Rawls, 1993, p. 214). However, Rawls concedes that sometimes daily issues have fundamental components (Rawls, 1993, p. 214-215).

[4]Together with publicity and accountability, but reciprocity is the core concept.

of the reasonable positions that they nonetheless morally oppose on moral grounds" (Gutmann and Thompson, 2000, p. 168), (Gutmann and Thompson, 2002, p.158-165). Therefore, in such a situation of moral disagreement, deliberators are still expected to be open to the reasons of others and mutually respect each other -consistency and sincerity being other associated values.

We should, however, not place undue emphasis on these differences, because when evaluated from within the larger field of democratic theory, the commonalities between deliberative democrats in terms of how they conceptualize proper deliberation are striking. When Elster (1998b, p. 5) argues that "reason is impartial, both disinterested and dispassionate. Arguing is connected to reason, in the sense that anyone who engages in argument must appeal to impartial values", he ends up positioning himself on the strongly rationalistic side of the different views on public deliberation. However, deliberative democrats often require discussants to take the standpoint of impartiality - what Benhabib (1996) calls the *generalized other* - or to engage in argumentation with each other "by the intention of convincing a universal audience", taking the perspective of all (Habermas, 1984, p. 26); (Benhabib, 1996, p. 72). The winner (if there is one) of this reason-governed process is determined by "excluding all force, except the force of better argument" (Habermas, 1984, p. 25).

In short, deliberative democrats differ on whether to include comprehensive moral doctrines, or if yes, on how to include them, and on epistemic claims about the procedure. Still, all share the conception that deliberation is a reason-governed process, characterized by civility, impartiality, a lack of passion, and which is "...proper for *free, equal and rational agents*" who are ready to "reason together in the right spirit" ((Elster, 1998b, p. 5), *his emphasis*).

2.2   Participation

To support the claim that deliberative democracy has serious feasibility problems, it is necessary to establish that deliberative democrats do not envision this type of public reason giving process for selected political elites on a few issues, but for large segments of the citizen body on an extensive range of issues.

As an ideal conception, deliberative democracy aims at the free public deliberation of 'all affected parties' about matters of 'public concern' (Benhabib, 1996). Although most deliberative democrats will agree that deliberation should involve public policy-making (as in (Przeworski, 1998; Gambetta, 1998; Elster, 1998b)), they will not generally limit it to just this function. It is even possible to argue that some idea of self-government is intrinsic in the ideal of deliberative democracy ((Habermas, 1997, p. 57-60); (Nelson, 2000, p. 187-188)). In a less controversial manner, most deliberative theorists believe that when there is a disagreement, deliberation is required. The disagreements may be: 1) about specific policies and the means to achieve them; 2) about the procedures of deliberation itself (Benhabib, 1996); 3) about how to advance common goals; or 4) about moral questions involving goals themselves (Gutmann and Thompson, 2000, p. 163-167), 163-167; (Gutmann and Thompson, 2002, p. 165-169).

How should deliberations on such matters occur in a democracy? (Habermas, 1997, p. 57) proposes that "...the normative expectation of rational outcomes is grounded ultimately in the interplay between institutionally structured political will-formation and spontaneous, unsubverted circuits of communication in a public sphere..." . Based on a basic system of rights, arenas in which these deliberations will be held are formal spheres of legislative and court processes (of will-formation) and the broader less formal public sphere of civil society (of opinion formation) (Habermas, 1997; Chambers, 2003; Brooke, 1998).Benhabib very clearly articulates these arenas: "this [deliberative] model privileges a *plurality of modes of association* in which all affected can have the right to articulate their point of view. These can range from political parties, to citizens' initiatives, to social movements, to voluntary associations, to consciousness raising groups, and the like. *It is through the interlocking net of these multiple forms of associations, networks, and organizations that an anonymous 'public conversation'*

results ((Benhabib, 1996, 74-75),her emphasis)[5].

In light of these claims, we can argue that the process of deliberation minimally involves, or even more strongly *requires* the active participation of free and equal citizens at multiple stages of the democratic process. Therefore, for deliberative democracy to be feasible, 'all affected parties' should actively participate in a reason-governed public deliberation process -although at various layers and in different forms.

2.3   Participation and Public Reason

Because of its requirement of public reason, deliberative democracy is criticized from different points of view; still, these criticisms can be differentiated from the one presented in this paper. In one line of criticism, the central role is played by the problematic exclusion of self-interest from public deliberation. According to a number of authors who make use of rational/social choice theories, such an exclusion may not only be impossible (requiring too much from the participants) but may also have ominous affects ((Johnson, 1998); (Przeworski, 1998); (Dryzek, 2000, p.35-38);(Shapiro, 2002a, p. 208-211)). A second line of criticism focuses on the problem of power in the conceptualization of public deliberation, focusing on the infiltration of power hierarchies in deliberative processes often neglected by deliberative democrats. Some of these authors question the desirability of deliberative democracy (Mouffe, 1996, 2000), while others - after critically evaluating hierarchy inducing public reasoning processes - try to render deliberative processes free from domination by embracing difference (Young, 1997; Fraser, 1996; Sanders, 1997; Chambers, 1996).

While these two lines of criticism focus on interests and power, my account focuses on problems of the *feasibility* of deliberative democracy in the face of *passions*[6], and as a result differs from the other two because they argue that the difficulties in the deliberation process occur because of the intervention of other factors - interests and power. Also, my criticism not only emphasizes this same drawback for passions (i.e. passions will intervene negatively with deliberation process) but also questions the assumption that without passions, the participation of all (or full dedication when participating) is still secure[7].

For deliberative theory, passionless reason of some form should be able to explain why participation occurs because for this theoretical construct to hold, ensuing public deliberation should be based on reason. In other words, if dispassionate reason cannot explain why people participate, it will be problematic to require people to discuss under the precepts of reason when participating. Nevertheless, deliberative theorists may provide arguments which will explain why people will be driven to argue under the precepts of reason when participating. In other words, there might be independent causal mechanisms "sions provide that will oblige people to deliberate under the auspices of reason

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[5]It should be noted that different authors privilege different institutions for deliberation. For example, Cohen and Manin put primary emphasis on political parties ((Cohen, 1997); and (Manin et al., 1987)), whereas Gutmann and Thompson emphasize a diverse range of institutions such as work place, cultural institutions, etc. (Gutmann and Thompson, 2000, 2002).

[6]Passion and self-interest have very interesting entangled histories. For a comprehensive discussion please see: Holmes (1995, p. 13-69). In addition, it should be noted that post-structuralist critiques also focus on passion, however, only insofar as passion pertains to power relations.

[7]It should also be noted that I am neither questioning desirability of the deliberative model nor am I conducting an empirical investigation. The argument may be read as anticipating potential challenges to the feasibility of deliberative democracy. An essay that questions the feasibility of deliberative democracy has an affinity with an empirical challenge, however, they are arguments of different kind. There are a number of studies that constitute empirical challenges to deliberative democracy. For example, some form of drive towards consensus, although not necessary, is expected by deliberative theorists, however, Sustein (2001)'s study shows that it may well be the case that deliberation promotes more polarization.Sanders (1997)' study demonstrates that empirical realities (inequality) create very strong barriers against desirable deliberation . However, at the end, the empirical literature's findings are quite mixed (also see, (Ackerman and Fishkin, 2002; Fishkin and Luskin, 2005))

-independent from the reason of their participation. Therefore, from the vantage point of feasibility, there are three relevant questions: 1) do people participate?; 2) if they participate, why? (does reason provide a good explanation of why they participate?); and, 3) if reason does not motivate participation, are there mechanisms intrinsic in deliberative processes that will force people to discuss under the guidance of reason? Below I address each of these questions in turn, arguing that in no case is an affirmative response secure.

Finley (1985, p. 1) states that "perhaps the best known, and certainly the most vaunted, 'discovery' of modern public opinion research is the indifference and ignorance of a majority of the electorate in western democracies. They cannot state the issues, about most of which they do not care about anyway..." . The issue of why people participate is not a subject elaborated enough among deliberative theorists. This is quite surprising because unlike many other contemporary democratic theories, where only moderate levels of participation or apathy are acceptable, theirs requires a high level of citizen participation in democratic deliberations. Alternatively, deliberative theorists may believe people will participate because they will want their voices to be heard. However, this is just an assumption and we certainly have enough reason to doubt that this is the case: widespread apathy alone provides an important example countering this assumption. In short, at the first level, participation cannot be assumed to be secure even if deliberative forums are instituted, and deliberative democrats do not problematize this issue enough.

Even if citizens participate, it is highly questionable that rationality alone could motivate them to dedicate a considerable amount of their time. On this point, deliberative democrats can argue that exchange of information and distribution of the knowledge aspects of deliberation processes will provide a reasonable incentive to participate. This argument is part of the more general argument that goes as follows: deliberative democracy "improves the moral, or intellectual qualities of participants" (Elster (1998b, p. 11), having its sources in Mill (1865), and also;Manin et al. (1987, p. 354); Gambetta (1998, p. 22); Fearon (1998, p. 45); Cooke (2000, p.848); Freeman (2000, p. 383);Bohman (1996, p. xiii)). This happens because deliberation -understood as free discussion- allows information to be better distributed, enhanced, and exposes faulty arguments. If we take this as an argument for participation in general, and as long as we accept that people will prefer this method to other methods of receiving information and improving intellectual qualities, we can say that it makes sense. However, this argument holds for all kinds of participation, not for participation in the sense deliberative democrats envision. All of these qualities that are furthered for deliberation are reasons for participation in democratic politics, not to reason-governed deliberative processes. Also, if these qualities are unintended consequences of the reason-governed deliberation processes, then we cannot explain the reasons behind why people participate with this line of argument.

On the other hand, it is possible to argue that, assuming people participate, there are compelling reasons that will drive people to deliberate in light of reason. Deliberative theorists provide such an account. According to this account, we should expect the coupling of participation and reason-governed "sions because when individuals participate - whatever the reasons for their participation - pragmatically they will be pressured to take the view of all, or will feel compelled to give public reasons because persuasion is impossible with private reasons. Along these lines Benhabib (1996, p. 71-72) argues that public deliberation "forces individuals to think of what counts as a good reason for all others involved" or Cohen (1997, p. 75-77) argues that self-serving arguments are incompatible with deliberation, because reasons should be demonstrated as an outcome that is in the interests of all . However, this pragmatic line is self-referential because for this pressure to constitute an effective incentive for people to argue in light of reason, we already need to assume a reason-governed polity where people have already bracketed passions. Because, if participants do not assume that other participants are publicly motivated through reason, they themselves will not need to refer to public

reason; instead they will be able to tempt others by referring to their passions[8].

For instance,Manin et al. (1987, p. 353) argues that argumentation (the form of "sions in a deliberative democracy) is an exchange of propositions aimed at producing agreement in the listener (persuasion), and it is in this sense 'a discursive and rational process' . However, as he indicates, this determination for persuasion is always relative to the audience (Manin et al., 1987, p. 353-354), so if passions are an integral part of the human/social life, persuasion may well work through them. In other words, to obtain agreement with the argument that people will be compelled to carry out reason governed argumentation for persuasion, deliberative democrats need us to assume that citizens: 1) actively participate; and 2) are free of passions, or at least primarily driven by reason. It is in this sense that their arguments are self-referential. Constructing the argument positively: if people need to convince others that their views are the right ones, they may not be compelled to give public reasons, because as long as it is public knowledge that (at least for some) people's passions are an important factor in politics, appealing to people's passions strategically, or even unconsciously will prove to be successful[9].

Moral arguments constitute another line of thinking furthered by some deliberative theorists to shed light on reason-governed deliberations, or why people are compelled to give public reasons when they participate (Cohen, 1997, p. 407-437). According to these accounts it is almost a moral requirement that citizens give public reasons (e.g., the reciprocity argument, see (Gutmann and Thompson, 2000), however, these categorical arguments (that requires citizens to behave one way, independent of behavior of others) should be seen as an attempt to solve an empirical problem by referring to ideal conditions. Instead, an account that concerns itself with the feasibility of deliberative democracy will need to explain why it is plausible to expect people -in a world where power, interests and passions are central in politics- to both participate *en mass*, and to behave morally as such (such as public reason giving, reciprocity) in the deliberation process.

In short, deliberative democracy does not provide any account for why people will participate, and no compelling reasons why participants in deliberative processes will be necessitated to comply with the rules of public reason giving. Below, I aim to substantiate my claim that passions are an integral part of the participatory democratic processes.

3   Participation and Reason in Athenian Democracy

The Athenian democratic system can be construed as a political system that made its executive decisions with passion-governed rather than reason-governed discussions, while trying to realize active participation and public discussions.

For those who were included, the Athenian political system entailed substantial amounts of participation. Its participatory ideals are well depicted by Pericles when he states:

"Our public men have, besides politics, have their private affairs to attend to, and our ordinary citizens, though occupied with the pursuits of industry, are still fair judges of public matters; for, unlike any other nation, regarding him who takes no part in these duties not as unambitious but as useless, we Athenians are able to judge at all events if we cannot originate, and, instead of looking on discussion as a stumbling-block in the way of action, we think it an indispensable preliminary to any wise action at all. Again, in our enterprises we present the singular spectacle of daring and deliberation, each

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[8]Elster (1998a, p. 105-116) proposes an interesting way to salvage some of what this account argues in the idea of the *'civilizing force of hypocrisy'*. However, in and of itself, I don't think this force is desirable for most deliberative democrats; besides if the main causal work is carried out by the *civilizing force of hypocrisy*, the system constituted would not be a deliberative democracy.

[9]Appeal to self-interest is also subject to the same criticism: what will be considered self-interest may be constituted by passions.

carried to its highest point, and both united in the same persons; although usually decision is the fruit of ignorance, hesitation of reflection" (Pericles, Funeral Oration, from Thucydides)[10].

These ideals are concretized with a number of principles and mechanisms that distinguished democracy from other forms of government. According to Aristotle (1996, p. 154-155), some of those were as follows: each should rule over each other in turn; selection of offices by lot; no property qualification; no holding offices twice; short office terms; all men should sit in judgment; the assembly should be supreme; payments for services. Therefore, democracy was fulfilled by the active citizen participation through the mechanisms enumerated by Aristotle. Additionally, according to Athenians, processes of democratic decision-making needed to be based on discussions, guaranteed by *isegoria*, an equal right to speak in the assembly (Finley, 1985, p. 18-19). Accordingly, democrats thought of the *polis* as a transformative political unit that brings together men of different backgrounds and enables them to transform themselves via intense political interaction (Farrar, 1992, p.38). Therefore, in this system, where "politics was the expression of the freedom to participate in ordering one's own life" (18), apathy is seen as a liability, although not self-control ((Finley, 1985, p. 30-32), also (Manin, 1997, p. 13-14)).

This particular combination of extensive participation and public discussions also had unique expressions. For example, Finley (1985, p. 53) tells the story of a farmer who is sitting in the Pnyx, waiting for the assembly to begin, and saying to himself how he hates the city and everyone in it, and how he intends to shout down any speaker who proposes anything except peace. Therefore, one needs not be entirely convinced by the philosophers of the time who were critical of democracy - such as Plato, and Aristotle - to see the lack of public reasoning in Athenian democracy in the sense aspired to by deliberative democrats.

Finley (1985), for example, after cogently describing the arbitrariness (unpredictability) of the game of politics in Athens, and the constant tension it creates for the politician (demagogue), indicates that: "Athenian politics had an all-or-nothing quality. The objective on each side was not merely to defeat the opposition but to crush it, to behead it by destroying its leaders. And often enough this game was played within the sides, as a number of men maneuvered for leadership" (Finley, 1985). Politics was the arena where 'difference' was getting accentuated, extraordinarily competitive, and intensive (Held, 2006, p. 27). "The public arena at Athens was vigorously, bitterly contested ground" (Rahe, 1994, p. 193). Full participation depended on oratory skills, clashes between rival groups of leaders, informal networks of communication and intrigue, and the emergence of strongly opposed factions which were prepared to push for quick and decisive measures (Held, 2006, p. 24-27). This fact was well known to Athenians. For instance, young Pericles reportedly complained that, "[Athenians] are more abusive of each other and more envious among themselves than they are towards other human beings. In both private and public gatherings they are the most quarrelsome of men" (Rahe, 1994, p. 177). In the end, although Athenians were participating *en mass*, some of them were present in the public sphere for emotional reasons, and booing, hassling the speaker, taking emotional sways, and consequently, crowd psychology was a significant characteristic of deliberations.

Therefore, as Finley (1985) emphasizes after depicting a very spontaneous debate and decision process: "...the last thing I wish to imply is the activity of a free, disembodied rational faculty" (1993, 57). From the vantage point of deliberative theorists then, Athenians were by no means following the precepts of public reason. However, Athenians were not at all apathetic. As Plato describes them "each type of human being [living in Athens] was different in character, and each type was governed by an economy of desires peculiar to a particular political regime. Moreover, where the Spartans were so cautious, so self-restrained and reticent that the term laconic came to be synonymous with taciturn, the Athenians were like drunkards: so convinced of their wisdom and the capacity to rule that they were notoriously willing to talk and so reveal themselves" ((Rahe, 1994, p. 176) , referring to Plato's

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[10]From the Ancient History Sourcebook: Thucydides: Pericles' Funeral Oration from the Peloponnesian War (Book 2.34-46)

leg. 1.641e-642a). In other words, because passions were highly involved, "it would be easy to preach about the irrationality of crowd behavior at an open-air mass meeting, swayed by demagogic orators, chauvinistic patriotism and so on. But it would be a mistake to overlook that the vote [in the Assembly to invade Sicily] had been preceded by a period of intense discussion, in the shops and taverns, in the town square, at the dinner table" (Finley, 1985, p. 22-23).

Therefore, active discussions and mass political participation were both realized in Athens. However, from a deliberative democracy point of view, the failings of such a system were the democratic calamities that are outcomes of the inescapable coupling of participation with passions. Also, although it is difficult to determine how big of a motivational force passions were in inspiring participation, historical/anecdotal evidence is suggestive. In short, people were actively participating and debating in Athenian democracy, and in contradiction to the deliberative model, they were very impulsive, loud, uncivil, and passionate.

4   Participation and Reason in Political Theory

In line with the Athenian case, political theorists who rely on a conception of democracy which includes both extensive participation and public discussions, not only take passions seriously in human behavior, but also conceptualize passions and participation[11] as inseparably entangled. Also, in their ensuing conceptualizations of politics, participation is curbed so that passions can be taken under control (except Rousseau whose method to control passions was different)[12]. Therefore, the idea that extensive participation and passions are entangled has major theoretical lineage.

From Plato up to contemporary times, democracy has been conceptualized and criticized as the form of government that involves people's active participation and extensive public debate. Only recently, from the 19th century on, has the particular model of modern constitutional representative government come to be called democracy ((Dunn, 1993, p.239-269); also see (Manin, 1997)). This new form of government neither envisioned extensive participation nor included public deliberation. Deliberative democrats are, in a particular sense, reviving the content of the earlier conception of democracy which includes participation and discussions before decision-making.

Before presenting the main claims of selected political theorists, it should be noted that this account does not maintain that all of these writers have similar views about an ideal form of government, or that they draw the same normative inferences from the perceived entanglement of passions and participation. Indeed, some opted for non-democratic forms of government, some others for mixed forms, while still others for representative government, later to be called democratic.

Plato believed that democracy was regrettable in many ways, including its lack of reason, its tendency to marginalize wisdom and be governed by impulses, excessive passions, and emotions of various kinds. The lack of justice in democracy (the system of full, unfettered participation) was mainly due to the preponderance of appetite over reason. The necessary hierarchical relationship between reason, spirit and appetite was inversed in democracy (Plato, 2000, p. 216-222)[13]. According to him, "to be free is to be ruled by reason" (Farrar, 1992, p. 31) and reason in the ideal state should tame passions in such a way as to transform them into virtues. In a democracy, however, just the opposite is true: untamed passions, unnecessary desires are accentuated. Of course, his solution to this

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[11]Because they refer to Athenian democracy when they use the concept democracy, some of the writers reviewed simply couple democracy with participation.

[12]Some writers, such as Madison, curb participation directly because of the perceived ominous (reason-detracting) effects of passions, so it is easy to see the causal link; in some others' writings, although they take passions seriously, this direct link is not there (such as Hobbes).

[13]Plato does not think that passions' effects are all ominous; in fact he believes that when they are controlled by reason, they can be turned into virtues (for example, Plato's guardians would be fierce abroad and gentle at home, but of course such passion also leads to civil fights).

(and other) passion-provoking system(s) is the infamous enlightened despotism erected on his moral objectivism (virtue is knowledge), where democratic participation is completely crippled (Plato, 2000, p. 117-202).

Aristotle (1996, p. 11-16)'s conception of passion is also negative, and he believes that *eudemonia* (good life) can be attained only through the prevalence of reason over passion. Aristotle claims that, "It is clear that the rule of the soul over the body, and of the mind and the rational element over the passionate, is natural and expedient, whereas the equality of the two or the rule of the [naturally] inferior is always hurtful" (Aristotle, 1996, p. 16-17;also 187). The democratic form of government then is classified among perverted forms of government because it is not conducive to such an ordering[14]. Although for Aristotle the link between the ideal and the feasible is sometimes weak, given the non-existence of clearly superior human beings (philosopher kings), from among true forms he sides with the most practicable and enduring government: the *polity* (constitutional government). In this form of government, in addition of the governance of law, different features of oligarchy and democracy are mixed. This mixture is not only a barrier against class rule for itself, but also, it will prevent many to be swayed by passions, and still will retain beneficial features of people's involvement with politics (Aristotle, 1996, 86-87 and 99-100). However, how this mixing occurs is quite telling for our purposes, because Aristotle (1996, p. 104-105) enumerates three possible ways and all involve curbing participation in one way or another: property barriers, elections, and no pay for participation. On the one hand, in this form of government there will be mechanisms that will make people think that they are ruling (Aristotle, 1996, p. 106), and on the other hand the equal participation of all will be curtailed enough that we should not fear the involvement of passions and passion-provoking, faction-inducing demagogues (Aristotle, 1996, p. 98-99)[15].

Passions are also taken very seriously in the earlier liberal tradition that utilizes, but does not adhere to the same notion of democracy that includes participation and public discussions. Although Hobbes is not a liberal, I initiate my discussion with his ideas on passion and participation because he is one of the most influential figures in the later development of the tradition[16]. In the latter two parts of Leviathan, it is evident that zeal (in the religious form) is a very strong passion that plays a crucial role. But passions are integral in Hobbes's account all along: even without passion-inducing communication it is "our natural passions, that carry us to partiality, pride, revenge, and the like" (Hobbes, 1994, p. 106). Or as Holmes put it, for Hobbes "individuals are compulsive, creatures of habit and victims of emotional frenzy. Moreover, most people, as classical liberals followed Hobbes in describing them, turn out to be obsessively concerned with social status and hypersensitive to social slights and humiliations. Dispassionate assessment of their current situation is seldom within their reach" (Holmes, 1995, p. 3). These passions seem to become even more potent and more ominous in deliberative processes since "the passions of men, which asunder are moderate (as the heat of one brand), in an assembly are like many brands, that inflame one another (especially when they blow one another with orations) to the setting of the commonwealth on fire, under the pretence of counseling it" (Hobbes, 1994, p. 171). What does this account of passion mean vis-à-vis his conception of democracy as a form of government? Hobbes connects passion and democracy in Chapter XIX of *Leviathan*. In a fashion in line with Bodin, he classifies all forms of government according to the locus of sovereignty as monarchy, aristocracy, and democracy. And in his ensuing account, although all forms of government can be absolutely sovereign, there are some practical reasons for him to prefer monarchy

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[14] Actually, the more immediate reason that makes democracy perverted is that it is based on partial justice.

[15] It should be noted that Aristotle's conception of participation in politics is different than that of deliberative democrats. Aristotle does not envision a transformative democratic participation process; instead his endorsement for participation is centered on practical and justice-related reasons (for example: many are less corruptible).

[16] The account of Hobbes utilized here is built on the insights developed by non-standard interpretations of Hobbes ((Lloyd, 1992; Pasquino, 2001; Johnston, 1989)). Still, for my purposes, it is sufficient to show that he took passions seriously and in his narrative, he conceptualized deliberative processes as enhancing and/or triggering them.

or to reject democracy and aristocracy based on their ability to provide peace and security. His most important objections to democratic sovereignty rely on the infringement of passions into democracy since "the passions of men are commonly more potent than reason" (Hobbes, 1994, p. 20) and "for the understanding [in assemblies] is by the flame of the passions never enlightened but dazzled" (Hobbes, 1994, p. 120).

Locke, like Hobbes, gives centrality to passions juxtaposed to reasons in his account of man. Although Locke does not connect passions with deliberative settings, he provides a good connection to the later tradition of liberalism that links these two very clearly. According to Locke, reason should be man's "only Star and compass" (Locke, 1988, p. 182) while following the precepts of moral and political rights and duties. In his relatively peaceful state of nature, inconveniences arise because people sometimes utilize their executive rights over transgressors not by "calm reason and conscience" (Locke, 1988, p. 272) but by "self-love [that] will make men partial to themselves and their friends: and on the other side, that ill nature, passion and revenge will carry them too far in punishing others" (Locke, 1988, p. 275 also 350-351). From these inconveniences arise the need of the impartial judge, i.e. the government. However, as the government gets established, the problem becomes limiting it, because holders of the office are not different than the human beings above, and they may well be swayed by their passions and private interests. Even his supreme legislative power needs to be restricted by standing laws because it is highly probable that the laws of nature being unwritten "but in the minds of men, they who through passion or interest shall miscite, or misapply it" (1982, 388)[17].

The connection between passion and public discussion are more clearly articulated by first Montesquieu and then Madison. Montesquieu has a slightly more positive understanding of passion and is slightly less enthusiastic about reason than Locke (Montesquiedeu, 1989, p. 166) but similarly he reserves a central place for passions in his account of human beings. In his account, passions are firmly entrenched properties of individuals (as in Locke) and people as collectivities. Because of this: "people whose nature is to act from passion" are "not at all appropriate for such [public] discussions" (Montesquiedeu, 1989, p. 14). Instead, in a proper form of government, people "should not enter the government except to choose their representatives" (Montesquiedeu, 1989, p. 160) about which they are quite perceptive, but "they are not suited to manage by themselves" (Montesquiedeu, 1989, p. 12). Therefore, in his moderate government, a number of social (aristocracy), institutional and legal/constitutional checks are in place, and only through these checks liberty can be realized.

Madison builds on these themes and develops an even more rigorous account of passions and the ways to limit them. As we have seen in the earlier liberal tradition, passions have a fundamental place in Madison's conception of human beings and society as well. Given the passions of the people, in times of collective decision-making (participation and discussion), "the passions, therefore, not the reason, of the public would sit in judgment" (1982, 133). This is in turn calling for lack of stability and turbulence (56). Therefore, it is "the reason, alone, of the public that ought to control and regulate the government. The passions ought to be controlled and regulated by the government" (133). In Madison's conception people cannot seem to deliberate without being ruled by passions and whenever they participate passions automatically follow (124-125). Therefore, not only their participation should be limited, but also the power of their institutions (the legislature) should be checked (124-141). Also, Madison argues for the utilization of the passions of people in positive ways by instituting a homeostatic system of checks and balances (that do not need the people's involvement for alterations). In this way, the perception of defect in the government will be avoided; instead, veneration of the people will be taken to the constitution's side because even "the most rational government will not find it a superfluous advantage, to have prejudices of the community on its side" (131).

All in all, theorists in the liberal tradition like Plato and Aristotle were very much aware of passions

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[17]Locke does not discuss the problem of passions in his own system, most probably because he had a very limited conception of democratic participation.

and they generally depict them as an inescapable component of human nature. Based on a more or less unequivocally negative conception of them, they devised diverse social or institutional mechanisms to avoid them (or turn them to the benefit of the good as in Madison) in order to attain reason-based government. Although mechanisms were diverse, they generally included minimizing active citizen participation in the government and restricting passion-inspiring non-elite public deliberations.

The final theorist that I deal with is Rousseau. He departs radically from the liberal tradition in many ways; however, an account of his approach is called for because although his democratic theory radically differs from all the other theorists, he also offers a different way to deal with passions[18]. Rousseau and Cress (1992, p. 16-33)'s account of reason and passion is complicated since he is not certain about the positive qualities of reason, or about the negative qualities of passion. In the *Discourse on the Origin of Inequality* passions like *amour de soi* (self-preservation), and *pitie* (pity) play favorable roles. Only through the interference of perfectibility and the later development of reason do these relatively beneficial passions leave their place and turn into more ominous forms of passions such as self-regarding, appearance-oriented *amour-propre*. Therefore human beings transform through social interaction and changing environmental conditions into beings that embody superior forms of reason and different forms of passion. For our purposes, we can argue that these transformed human beings are those that should deliberate (in the sense of decide not discuss, see: (Manin et al., 1987)) for the common good, and they need to be giving primacy to their reason not to their passions: "in the civil state...duty replaces physical impulse, right replaces appetite...[man] find himself forced to consult his reason before listening to his inclinations" (Rousseau, 1978, p. 27-28). Therefore reason should be 'sublime' and should control passions. However, differently from the tradition I reviewed above, Rousseau in *Social Contract* does not take the road of curbing participation via institutions to curtail special interests and ominous passions in the formation of General Will. Instead, he focuses on banning public deliberation (in the sense of public discussions before making a decision), where factional politics and orators will provide the fertile ground for the domination of special interests (and ominous passions). Therefore, although he does not give precedence to passions in his *Social Contract* (see Rousseau (1978, p. 38-39 and 27)), we can still argue that he at least circumvents the equilibrium of participation plus public discussions equals passions by eliminating public discussions before decision-making.

A number of insights can be drawn from this discussion that would be useful in evaluating deliberative democracy. First, despite this long and strong tradition that operated with a conception of democracy entailing participation and discussion, and centrally dealing with passions, passions are not taken seriously enough by deliberative democrats. Second, although it is traditionally thought that participation is coupled with passion, and deliberative processes enhance involvement of passions, deliberative democracy depends not only on participation, but also it needs participation and deliberations coupled with reason -creating serious doubts for its feasibility. Third, combining the first two, it is clear that although deliberative democracy seems to be demanding what has been thought of as impossible, it does not acknowledge it as a central problem: it does not give an account of how to get rid of passions. In short, deliberative democracy does not adequately explain its own coupling of extensive participation and public reason.

5 Participation and Reason in Contemporary Societies

Based on the insights provided above, I pinpoint feasibility problems for deliberative democracy in two ideal-type contemporary societies by anticipating possible empirical problems. For the conceptual

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[18]Although, it should be noted that he does not operate with the exact same notion of democracy: "Athenian democracy ought not to be brought up against me, because Athens was not in fact a democracy" (Rousseau, from(Manin et al., 1987, p. 346)).

framework to explore these arguments, I mainly rely on a critical reading of Diego Gambetta's insightful article, which provides a sociologically relevant conceptual framework to discuss reason and passion in the context of deliberation in contemporary societies.

To recap, the main insights proposed in this paper thus far include: 1) Participation in a setting that reason-governed discussions will take place cannot be considered secure; 2) Arguments that claim that public deliberations include mechanisms that force people into reason governed argumentation processes are not compelling; 3) Extensive participation and public discussions will plausibly generate passion governed discussion processes; 4) Passions in a setting of mass participation and public discussions have been (in Athens) and are often thought to be imperialistic: deliberative settings have multiplication effects on passions. In this section, I force to its extremes the conceptualization of modern societies of Diego Gambetta. I imagine a passion-free society, in which deliberative democracy would not confront most of these problems. Then by developing the idea of passion as a motivational force for active participation[19] , I argue that even in a passion-free society, deliberative democracy will face feasibility problems because a lack of passion renders problematic the issue of participation[20]. I further elaborate on the issue, suggesting that there might be something more than a mere correspondence between passion and participation. I suggest a causal link that works through the mechanisms of social rewards and punishments.

Gambetta (1998, p. 24) explores the possibility of deliberation and deliberative democracy in two distinct ideal-type societies (symbolizing two poles of possible deliberative settings). His main concern is to examine the possibility of deliberative democracy in one of these: a particular kind of society where indexical knowledge is dominant. He describes an indexical knowledge (IK) society by contrasting it with another ideal type: an analytical knowledge (AK) society[21]. In the society where analytical knowledge is dominant, he argues that "knowledge is not necessarily seen as professionalized or even specialized, but it is thought to be the result of a combination of good reasoning, empirical verification, and generally hard work. Furthermore it is believed to be tentative rather than definitive". Therefore, in this society, ignorance about one subject is not seen as an indicator of ignorance in all subjects. His analysis of this society seems to be accompanied by a subtext of praise because of its conduciveness to deliberative democracy. Instead the argument that he strongly pursues is the impossibility of deliberative democracy in the opposite ideal type: that of an IK society. In an IK society, "knowledge is assumed to be *holistic* : knowledge or ignorance about x is taken as a sign of knowledge or ignorance of the whole. It reveals more than a local failure; it stands for lack of Kultur" (Gambetta, 1998, p. 25)[22].

Gambetta argues that AK societies are characterized by equality of resources, equal access to information, civil discussions, and logical arguments. He argues that because one's lack of knowledge on one subject does not create social humiliation for that person, in these societies the social pressure for winning the argument is not strong, and information sharing is possible. On the contrary, because of the immense social pressure created by the existence of the holistic attitude towards knowledge,

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[19]The suggestion is that passion will be influential on both of the terms of active participation. Which means it will not only provide an incentive for people to be there, but also to think hard, forcing one's limits -being active when participating.

[20]However, it should be noted that I do not mean to reduce the desire to actively participate into passions. Admittedly, there might be a number of different reasons to actively participate in public deliberations.

[21]Certainly, IK and AK societies and IK and AK subjectivities are ideal-types in Gambetta's article and they are used as such in this analysis because by epitomizing two mutually exclusives poles, they provide clarity to my argument. In practice societies and individuals will show features of both, also passion and reason will be more entangled.

[22]It should be noted that his empirical reference for building the IK ideal-type are contemporary Latin American countries and Italy, and for the contrasting AK societies, mainly contemporary Anglo-Saxon countries. As in the construction of all ideal types, these categories are exaggerated versions of concrete empirical cases. In my analysis, I further exaggerate one quality of both of these societies to better clarify my point: passion-dominated IK societies versus passion-free AK societies

emotions dominate the discussions in IK societies, and those who shout more win the argument. In consequence, information sharing and development through discussion are beyond the realm of possibility. Two points that come up recurrently in his critical observations against IK societies are that the accumulation of knowledge is harder in IK societies and that the desire to participate is minimal (Gambetta, 1998, p. 33).

This insight holds well *prima facie*. However, if we assume that the participatory mechanisms are present in IK societies, that is, they are not eradicated by a political actor that makes use of some of these passions (such as anger and fear), perhaps it misses an important aspect of IK, passion-dominated societies. The winner of discussions in such societies, may not be determined merely by the decibel of his/her voice, but necessarily and inescapably through his/her knowledge over factual details, and a number of other content-related tangential factors as well. This means that at least some people will try very hard to participate in the discussions, struggling to interpellate knowledge that they have on the subject, and if such knowledge does not exist, they will try to find a way to compensate for that. Moreover, if the subject matter is a public issue, they will be more attentive to public issues. All in all, staying very much in the realm of Gambetta's description of IK societies, I believe that he is right in pinpointing the difficulties of public reasoning in IK societies, but with one caveat: although discussions may not be occurring in the way envisioned by deliberative democrats, there is still an incentive to participate in them. Because on the one hand, participating has the potential to bring the subject glory, respect and recognition; on the other, failing to participate or a bad performance may mean humiliation, and the perception of generalized ignorance.

In passion-free AK societies on the other hand, specialization of knowledge and the acceptance of localized ignorance retracts this specific incentive to participate in discussions. In addition to that, the fact that one does not know something does not have any cost for him or her either -no honor, no humiliation or no incentive for participation, and no cost for not participating. And given that participation because of reason cannot be easily substantiated (as I argued earlier), unless the discussions are heavily structured and specifically connected to a reward mechanism, participation of any kind may be in jeopardy in AK societies. For example, the Athenian farmer who hates the city and everyone in it and is determined to shout down any speaker who proposes anything except peace, would harm the deliberative process, but would still be a willing participant in public discussions.

In short, Gambetta furthers a number of arguments for the impossibility of fruitful deliberations in IK societies and in almost all of his arguments he relies on the contrasting case of AK societies for his explanations. However, he fails to pinpoint possible problems with AK societies in relation to deliberative democracy. AK societies lack the reward and punishment mechanisms that are provided by IK ones (through passions of pride and humiliation) for the active participation of citizens into the process of deliberation (or when they are in the process, of fully committing themselves to it). In IK societies where passions are the overriding force in political life, people have motivations to participate, in contrast to more politically apathetic AK societies. So to Gambetta's classification of passionate/rational we can add active/passive, political/apathetic. Therefore, in IK societies, deliberative democracy will fail due to obvious reasons - in terms of its inadequacy to meet the requirements of public reasoning. On the other hand, in passion-free AK societies, in which understanding will not happen 'by the flame of the passions', active participation will be more problematic.

My central claim in this paper is that passions not reason should be plausibly expected to correspond with participation. I add to this argument that even under an imaginary situation, where a passion-deprived society is available (like in AK), deliberative democracy will still confront feasibility problems. Because reason -lack of passion- may produce adversary effects against active participation.

6   Conclusion

I argue that deliberative democracy is not realistically utopian. However, I do not question its desirability, and I have not argued that these problems cannot be solved theoretically. But as a normative theory, deliberative democracy makes a number of behavioral assumptions, some of which are not sound enough to render the theory feasible.

For deliberative democracy to be feasible, at the very least its theorists need to give an account of passions, and they need to problematize the issue of the participation of all affected. Or perhaps, like Thucydides, they need to accept "the possibility of conflict, of the triumph of desire over reason, in order to preserve the slender chance that a *polis* could realize its full potential to both express and transform the beliefs and capacities of its citizens" (Farrar, 1992, p.34).

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Bertrand Competition with Network Effects and Switching Costs: An Agent-based Computational Approach

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Abstract

Economics is a complex system that requires different approaches for analysis. I analyzed switching costs and network effects together with a new simulation approach to modeling systems composed of autonomous and interacting agents. Agent based computational economics is one of the simulation tools and an efficient tool box for complex economic systems. I developed an agent based computational model of duopolistic competition to analyze how the network effects and switching costs shape competitive outcomes by simulation methods.

Keywords: Agent-based Computational Economics, Switching Costs, Network Effects, Simulation

1 Introduction

Switching costs [1] and network effects [2] not only play a major role in high-tech industries but also play a fundamental role in shaping business strategies in the high tech producing industries (Shapiro and Varian, 1998). In many parts of modern economies; competition is increasingly characterized by switching costs and network effects phenomenon of incompatible products. Switching costs and network effects bind customers to vendors if products are incompatible in high-tech industries such as hardware-software industries, telecommunication industries etc. [3].

Separate purchases are the main characteristic for high-tech assets. Both switching costs and proprietary network effects arise when consumers value forms of compatibility that require otherwise separate purchases to be made from the same firm (Farrell & Klemperer, 2007, p.1971). To obtain best market outcome, customers should coordinate their expectations for each separate purchase period. Producers also take into account these essential features of the market to generate present and future price strategies to maximize their profit or customer base. Due to the possibility of shifting market outcome towards low-level equilibrium, both switching costs and network effects have attracted concerns in competition policy regarding its effectiveness [4].

The value which comes from consuming the good received by consumers can be separated into two distinct parts. The first component, labeled as the autarky value, is the value generated by the product even if there are no other users. This autarky value contains both switching cost and individual utility. The second component, which is called synchronization value, is the additional value derived from being able to interact with other users of the product. It is the latter value represents the essence of network effects. Both of these parts exist in a costumer's utility function if there are no externalities regarding network (Liebowitz and Margolis, 1998, p. 1). In spite of this utility functional form, there are a few works concerning both switching cost and network effect (see, e.g., Chen & Forman, 2006, Farrell & Klemperer ,2007, Maicas & Polo & Sese, 2009, Suleymanova

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[1] Switching costs are the real or perceived costs of changing to another firm's products, even when those products may be functionally identical. There can be lot of different forms of switching cost like transaction cost, learning cost etc. Switching costs create various incentives for firms to change their price decisions (see OFT, 2003).

[2] Utility of product which user derives from consumption of the good increases with the number of other agents consuming the good (see Katz & Shapiro, 1985)

[3] The empirical literature on switching costs and network effect is situated in many other areas such as computer software, supermarkets , air travel, alliances of airlines in different frequent-flyer programs, phone services, television, electricity, automobile insurance, telecommunications, video recording etc (see Farrell & Klemperer, 2007).

[4] This competition effectiveness is not just about maximizing mutual utility. Antitrust policy, innovation issues, intellectual property rights, international policy issues are all key policy aspects of network effect and also switching cost (see Gandal, 2002).

& Wey, 2011, Doganoglu & Grzybowski, 2013, Weiergräber, 2014, Chen, 2015/a, 2015/b). Most literature is focused entirely on either one of the two cases exclusively.

Klemperer (1987a/b) shows "bargain and rip off" structure [5] in a two-period market environment with consumer switching costs. This pricing strategy expresses "low to attract business, high to extract surplus". A firm with a larger customer base puts relatively more weight on harvesting this base than on winning new customers (fat-cat effect): "Large shares tend to shrink and small shares tend to grow" (Farrell & Klemperer, 2007, p.1974). This behavior changes market shares (Beggs and Klemperer, 1992). However, Klemperer and his followers have usually used this structure for switching cost, synchronization value creates same incentives for firms (Farrell and Shapiro, 1988). Firms deal with the trade-off issue between harvesting and investing which are the main strategies for firms in multiple-period models. The main goal of investing strategy is to get customers locked into relevant technology or goods. Locking-in customers or even markets in to early choices makes it possible to obtain extra profit from locked-in customers in later periods. Extra profit within current periods is possible with harvesting strategy.

As with switching cost literature, network effects literature has also become very popular. These works usually focused on markets in regards to consumer adaptation decisions and to the result of these decisions. Adaptation can occur sequentially or simultaneously and customer lock-in typically leads to a monopolization outcome as well as several dynamic inefficiencies (see, e.g. Farrell and Saloner, 1986, Katz and Shapiro, 1986, 1994, Arthur, 1989, Mitchell and Skrzypacz, 2006). From a cooperative game theory perspective, coordination failures are one of the most controversial topics in network effect literature (Suleymanova, 2010, p.5-6). If the size of the coalition increases, buyer's surplus will increase (and vice versa). But the coordination on most effective outcome is not an easy issue that some communication devices, initial adoptions and expectations form the coordination level. These conditions affect the performance of competition among networks.

Both switching costs and network effects literature contains analytical and empirical analyses which always use general assumptions that are unable to encapsulate entire real world issues like other economic topics. So the complexity surrounding our environment requires us to seek new methodologies and disciplines. Our environment cannot be clarified by only a singular discipline. It also requires multiple disciplines analysing relevant questions. Looking from the viewpoint of economics, computer science plays a key role in exploring real world issues which should be studied without unrealistic assumptions. Conventional economic theory, following the style of mathematics in general and real analysis in particular, begins with a set of definitions and assumptions (Judd, 2006). This ensures the inclusion of the environmental aspect and a model less complicated. Complex structures with their interacting parts cannot be predicted easily therefore classical techniques which usually prefer a reductionist approach become ineffective. The reductionist approach represents the system equal to the sum of its components. Even if the components are not complicated, their interactions transform the main structure into complexity. For example in network effect cases, even though coordination cases are analyzed, interactions between adopters, which is the key term for emergence property, are usually ignored.

A model is a prototype that describes real world structures. Modelling includes the process of mapping the problem from the real world to its model. To handle complicated issues in models, new approaches should be considered. The newly developing field of agent-based computational economics (ACE) is defined as the computational study (simulation) of economies modelled as evolving systems of autonomous, interacting agents (Tesfatsion, 2000, p.1-4). ACE begins with initial agent conditions and their interactions but these conditions do not like assumptions generally used by analytical models. These conditions are made more flexible in order to test model with different situations. This enormous testing environments requires computer systems to simulate these different conditions which generate dynamic consequences. Distinguishing between analytical and simulation models may be useful since analytical ones can often be insufficient for complex systems.

Borshchev and Filippov (2004, p.1) explain simulation model as set of rules which define model characteristics and how it will change during the simulation , given its present state. These rules can be equations, flowcharts, state machines, cellular automata and agent based rules. A simulation is the process of model execution that takes the model through state changes over time. For complex problems, simulation modelling is a better approach than conventional ones. This approach can be useful for analyzing together both switching costs and network effect issues. A simulation is useful for understanding how macro scale effects arise from the micro processes of interactions among many agents. So network effect can be simulated not just like a micro

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[5]Switching costs impact on the structure of prices on multiperiod repeated purchases that allow firms to price above cost to consumers once they have purchased the product and are locked-in, as the consumer would incur a cost to changing supplier. These customers become extremely valuable for firms. As a result, competition can mean that firms price very low, even below cost to attract new customers (see OFT, 2003. part 1.3).

process, but also a macro one that shows feedback structure. A simulation does not prove theorems directly as in deduction but as deduction starting with a set of explicit assumptions (conditions). A simulation is also suitable for induction by generating its own data dynamically. Simulation differs from deduction and induction process in both its implementation and goals and provides understanding of systems through controlled computational experiments (Axelrod & Tesfatsion, 2005, p.3-4).

Tesfatsion (2005, p.4) expresses local interactions as a major role in giving rise to global patterns. Large numbers of micro local agents interact repeatedly (simultaneously or sequentially) so that these interactions cause global regularities which feed back into the determination of local interactions. The result is an intricate and complex system of interdependent feedback loops connecting micro behaviours, interaction patterns, and global regularities. Economies are complex dynamic systems, which is why complex modelling concepts are being discussed in economic literature. Mainstream economic models are inadequate in embedding real world facts. First of all this deficiency must be overcome by new toolboxes. In this regard agent based modelling is a new approach to simulating complex systems composed of cognitive, heterogeneous, interacting, autonomous agents which are powerful candidates for dealing with real world issues. These agents may be consumers, sellers, firms, banks, social groups, political groups, investors and policy makers. Social science is not only composed of individual agents but also interactions that are created by these individuals. Interactions enable models to have an opportunity to analyze crowding effects. Unexpected situations arise from this crowding effect which cannot be modelled, programmed or predicted with an agent's own properties. There is no oppurtunity to properly code this effect explicitly. Consequently, agent based modelling offers a way to model social systems that are composed of agents which interact and influence each other and learn from environmental, interactions and experience and that provide an opportunity to adopt their behaviors (Macal & North, 2010). This modelling concept is based on bottom-up simulation rather than top-down macro decision-making. Behavior at the individual level (buttom) generates higher level structures (up) which feed back to the lower level.

In this paper I have developed an agent based computational model of duopolistic competition to analyze how the network effects and switching costs shapes competitive outcomes by simulation methods I have attempted to express above. In this model both network effects and switching costs are essential features of the market. This paper differs dramatically from main stream literature in that it does not make strict assumptions of agent homogeneity [6], learning, rationality [7] and global network effect [8]. The customer's utility function has a "distance" variable that is randomly set for every customer which has an adaptive learning path and a different neighborhood structure that is generated randomly. All these functional structure make customers be heterogeneous. Customers attach importance to their habits which switching cost value increases with. This situation is handled with learning functions. There is no global network effect, firm's products are incompatible and each customer's network effect value is linearly increasing in the number of buyers in his or her neighborhoods. Installed based is not a consideration for customers (adopters), this information is only valuable for firms using it before price-setting. Each period, firms must decide new rates which differentiate between harvest and invest strategies. Firms try to maximize their profit for a multi-period model. There are fourteen initial conditions which shape output values; total period count, switching cost multiplier, network effect multiplier, autarky value, discount value, network structure, customer locations, customer count, firm count, investment rule, learning parameter, unlearning parameter, learning velocity, unlearning velocity. These conditions are input values for a simulation programming structure which can easily change to observe system reaction.

I have observed different market outcomes when incompatible technologies compete against each other and both network effects and switching costs are essential features of the market.In many instances, competition between technologies leads to a persistent monopoly outcome where one technology becomes de facto standard. In other instances, market sharing outcomes emerges. Some instances shows coordination failure cases and some of them have no equilibrium. Ambiguity and incomplete information about market conditions may change firm competition behaviour that result in various and unpredictable market outcome. The simulation has shown that market conditions in a network effect and switching cost which does not only depend on the set of pricing

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[6]Heterogeneity is contrasted with the case of a representative agent model in which all agents are assumed to be identical. Economic models often use uniformity (homogeneity). In the real world, every agent has a different behavior pattern and cognitive capabilities. The agents have adaptive expectations rather than rational expectations. Representative agent methods are not used in agent-based models. Agent based computational economics takes account of based upon cognitive, social and individual preferences.

[7]Agents in real world have neither infinite global information nor infinite computational power. Thus agent based modelling assumes local information and bounded rationality.

[8]Agents interact with other agents like neighbors, classmates, etc. Local information is intensive then global information in agent based modelling network structures is often used.

strategies chosen by competing vendors but also strongly depends on the topological structure of the customers' network. This expresses the inappropriateness of installed base models.

2   Model

In this section, I consider an unconventional version of the standard textbook model of switching cost and network effect together. There is a finite set of n consumers indexed by $n = 1, ..., N$, and products which can be supplied by two firms ($k = 2$). These products are ex ante undifferentiated and functionally identical but after the purchase of one of them by a customer, they become differentiated by switching costs and network effect. Agents have to make new decisions to maximise their aggregate utilities or profits each period by considering new situations. In simulation model, maximizing situations depend on some ambiguous circumstances. For example, firms can not be conscious of network structure in which their relevant or potential customer's location are included and the customers cannot easily determine consuming decisions since there is no announcement for future prices. This information deficiency can not always handled with expectation operators so that conventional analytical solutions are going to be failed.

This paper models interaction between agents by means of a graph where each node represents customers. In this manner the customer utility depends partly on the number of his/her neighborhood rather than the total number of customers. In the customer utility function, there is a synchronization part that represents neighborhood's consumption preferences known as local network effect.

Firms focus on their market base and future profits without knowing who their existing and potential customers are within local network structures Customers are greatly influenced by local network effect and switching cost as well as product's inherent qualities. Customers cannot easily change their suppliers by only considering prices [9] and qualities. This situation is known as customer lock-in which makes a customer dependent on a firm for products and services. In oligopoly market structure firms use the customer lock-in factor to negotiate with their customers to get better deals .

The figure 1 shown below, is a basic representation of the model designed. Customers interact with each other and this interaction shapes consumer preferences. Independent of network structure, firms can only use market share information.

Each period firms announce prices which are evaluated by customers to choose the most valuable product or service. Following customers' evaluation process, firms' market shares are determined spontaneously. The period after, firms use this market share information to generate their price strategy. If firms' price level is sufficiently low compared to its rival when switching costs exist the firm can take some percentage of market share (in some situations the firm may dominate market). At the instant time t, Firms' market share definition represented as;
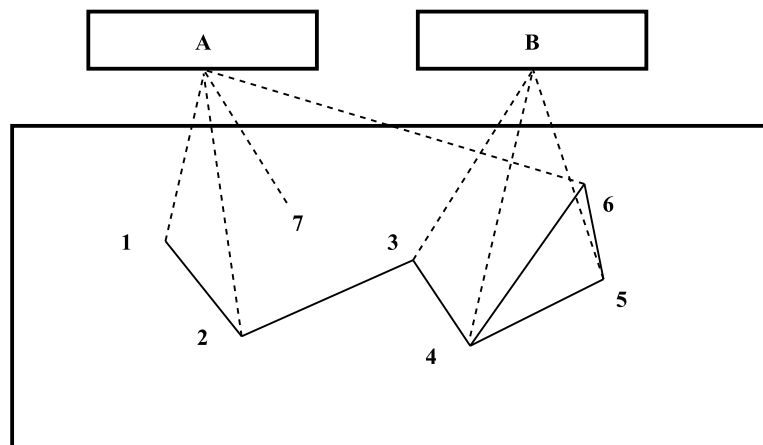

Figure 1: Representation of the model

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[9]Firms can announce just one price for all customers.

$$\sigma_i^0 \in [0,1] \qquad i \in (A,B) \qquad k = 2 \qquad \sum_{i=1}^{k} \sigma_i^0 = 1 \qquad \sigma_A^0 + \sigma_B^0 = 1.$$

Both location settings and local network structures could make customers be heterogeneous. The location vector holds the distance value from firms which are specified with vectors. Location vectors are generated randomly at the beginning of the simulation and assigned to customers. In real world example, the distance value introduces confidence, loyalty, advertisement effect, firm's prestige, ease and convenience of buying products and services, consuming routines, acquired information and habits by using product or service etc. The model encapsulate these characteristics by using distance value thereby it can get close to real world structure. I use distance value dynamically that is updated every period.

At the instant time t, Customer j has a location definition which is represented as $x_{j,t}$ (Figure 2).

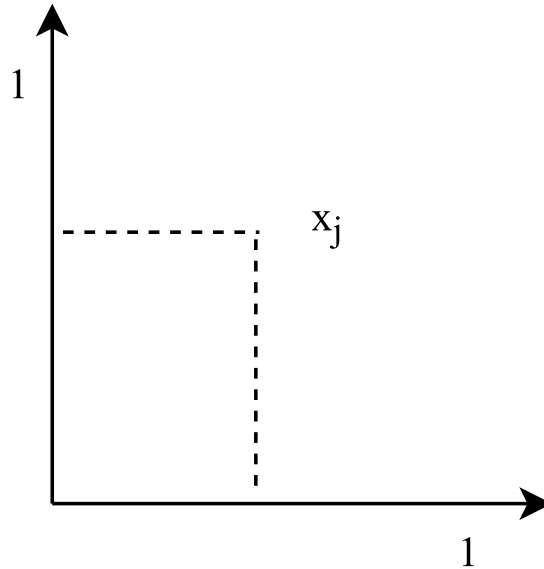$$j \in \{1,..,m\} \qquad x_{j,t} \subset \Re^k \qquad k = 2$$

Figure 2: Location of Customer j

Customer's location is one of the initial condition which is set randomly before simulation starts. This variable is updated by product usage at the end of the period so that it can be used with updated value at next period. Customers get extra information about product or service by using it. Product usage is the process in which usage increases loyalty through learning effect in the model. I assume that learning curve is concave and decreasing. Customers get more information about the product during initial periods rather than latter ones. On the contrary, customers lose experience when they do not use firm's product or services and I assume unlearning curve is convex and increasing. The structure described above is realistic for high tech industries. The learning-curve is important in strategic planning since it means that increasing a market share could also bring advantages in competition.

x period counts that customer use relevant products or services over and over (sequentially), LV customer learning velocity, ULV customer unlearning velocity, LP customer learning parameter and ULP represent customer's unlearning parameter. Respectively, customer learning and unlearning functions are shown below [10];

Customer Learning Function: $LP(x^{LV} - (x-1)^{LV})$

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[10]These parameters are set for initial conditions like; $LV : 1$, $ULP : 1$, $LV : 0.5$, $ULP : 1.1$. This values can be easily changed for different sectors and market conditions.

Customer Unlearning Function: $ULP(x^{ULV} - (x-1)^{ULV} - 1)$

There is a relationship between switching costs and location distance in the model. A total value of switching costs is defined as below;

$$\phi_i(1 - x_{j,t}\vec{e}) \qquad i \in (A, B, ..) \qquad e \in (i, j, ..) \qquad (e \text{ is the axis of a cartesian coordinate system})$$

ϕ_i is a multiplier of location distance that might be assigned different values for different firms [11]. ϕ_i symbolize firm's characteristics. For real world example, ϕ_i might be bureaucratic procedures, infrastructure level, marketing, selling and after selling procedures etc.

Customer's utility function contains local network effect. j customer index, i firm index and t represents current period.

Local Network Effect: $\beta_{j,i,(t-1)} \in [0,1]$

I denote customer's first degree neighborhood count by $s(x_j)$ and the count of first degree neighborhood that adopt same product or service by $s(x_{j,i,t})$. For my analysis it is convenient to define the ratio of $s(x_j)$ to $s(x_{j,i,t})$ by

$$\beta_{j,i,t} = \frac{s(x_{j,i,t})}{s(x_j)}$$

γ_i is a multiplier of local network effect that might be assigned different values for different firms. γ_i refers to advantage of being in a network such as its popularity, prestige and loyalty etc. These kind of properties can be easily changed for different sectors and market conditions like learning effect or switching cost.

Total local network effect: $\gamma\beta_{j,i,(t-1)}$

All consumers have valuation of the stand-alone value of the products, ϑ. If this variable is sufficiently high, the market is always covered such that all customers are motivated to buy product or service from one of the suppliers because of the positive utility value [12]. Size of the variable ϑ is important for the decision of consumption. If this variable is not sufficiently high, there might be a negative utility value due to high prices and switching cost values resulting in lack of consumption. ϑ is one of the initial conditions in the simulation that different ϑ values create varied aggregate market outputs.

ϑ, switching costs, local network effect and prices are the main parts of the customer utility function. This function can be written as below;

$p_{i,t}$ represents firm i's price at the period t,

Customer j utility function is;

$$U_{j,i} = \begin{cases} \vartheta + \gamma_i\beta_{j,i,(t-1)} - p_{i,t} & if & (i)_t = (i)_{t-1} & i \in \{A, B, ..\} \\ \vartheta + \gamma_i\beta_{j,i,(t-1)} - p_{i,t} - \phi_i(1 - x_{j,t}\vec{e}) & if & (i)_t \neq (i)_{t-1} & i \in \{A, B, ..\} \end{cases}$$

The firm's profit function is;

Firm i's Marginal cost function; c_i and m is the number of customer of relevant firm.

$$\pi_{i,t} = m(p_{i,t} - c_{i,t})$$

I suppose the firm's cost function is the same [13]; which is $c_i = c, \quad i \in \{A, B, ..\}$

I use Farrell and Klemperer's (2007)' s notation that shows firm's i current-period value function (i.e., total discounted future profits), $V_{i,t}$, as the sum of its current profits, $\pi_{i,t}$, and its discounted next-period value function $\delta(V_{i,(t+1)}(\sigma_{i,t}))$, in which σ is the discount factor and the next-period value function, $\delta(V_{i,(t+1)}(.)$, is a function of the size of its current-period customer base, $(\sigma_{i,t})$. In general, the firm's future profits depend on its customers' types and their full histories, expectations, how market share is distributed among competing

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[11] I assigned $\phi_i = \phi$ in the model.

[12] One of the assumption is customers can consume at most one product.

[13] A constant value is used as the value of c_i to calculate utilities as cardinal numbers

firms, how many consumers in the market make no purchase, etc. but in relevant literature market share is very often used.

$$V_{i,t} = \pi_{i,t} + \delta(V_{i,(t+1)}(\sigma_{i,t}))$$

As Equations illustrate, the firm must balance the incentive to charge high prices ("harvest strategy) to get greater current profits against the incentive for low prices ("invest strategy") that get higher market share and hence increase future profits.

The firm's (i) first-order condition for the optimal choice of a period-t price is

$$\frac{\partial V_{i,t}}{\partial p_{i,t}} = \frac{\partial \pi_{i,t}}{\partial p_{i,t}} + \delta \frac{\partial V_{i,(t+1)}}{\partial \sigma_{i,t}} \frac{\partial \sigma_{i,t}}{\partial p_{i,t}} = 0$$

The main results are;

$$\frac{\partial \pi_{i,t}}{\partial p_{i,t}} > 0$$

$$\frac{\partial \sigma_{i,t}}{\partial p_{i,t}} < 0$$

Firms have two main strategy, one of them is paying more attention to get current period profits (harvesting) and other is taking care of high market share (investing) in order to increase future profits. The tradeoff between harvesting and investing depends on interest rates, the state of the business cycle, expectations about customer profiles, rival strategy behaviours, market network structure, regulation rules, exchange-rates, market shares, firm profiles and other macroeconomic aggregates (such as GDP or total employment) etc. Some of these dependent cases like rival strategy behaviours, market network structure can be handled by this model. Harvesting and Investing strategies (H,I) does not indicate single point like p_i on price interval ($0 < p_i < \infty$). In the model these strategies specify an interval like ($\underline{p_i} < p_i < \overline{p_i}$) The intervals for investing and harvesting strategy are represented below;

Investing strategy (I); $[c - (\phi + \gamma), c + \gamma]$

Harvesting strategy (H); $[c, c + \phi + \gamma]$

These two strategy's price sets have common members. The intersection of Investing strategy and Harvesting strategy, is $[c, c + \gamma]$. This unusual situation arise from heterogeneous agents which have different level of switching cost and network effect. These two phenomenon affect customer's utility function in different directions. Looking from the viewpoint of simulation perspective, these interval is useless for price selection by firms, hence model needs one more extra variable to use point prediction. Firms should determine a point that refers value of price in relevant interval which makes the best profit. Variable α determines point gaps in interval which are tested by simulation program.

For strategy I; If $\alpha = 0.5$ ($\alpha \in [0, 1]$);

Firm i 's price; $p_{i,t} = c - (\phi + \gamma) + \frac{\phi + 2\gamma}{2}$

If a realistic analysis is tried to model Bertrand duopoly competition in markets with network effects and consumer switching costs, a question arises as to the firm's future price preferences and profits. Since the answer can not be given by analytical approach, I have developed a simulation generated by agent based computational techniques, and analyzed the results for different initial conditions and different price alternatives. Literature mostly argue that switching cost and network effect increase price levels. I have tried to develop a more flexible model to check if this statement is valid or not. Similar to flexible assumptions, model's fiction and the sequence of the process are very important too. There are three stages in each period;

1. Prices are simultaneously set by firms and announced to every agent in the market. Firm's main inputs when deciding price level are market shares and past profit levels. ($t \neq 0$)

2. Customers evaluate these prices and use as an input for their utility function. After that customers choose most valuable product or services.

3. After consumption, firms calculate their current market share and total profits together with discount value. These two inputs are used to decide price level for the next period (item 1)

One of the objective of the model is to analyze potential coordination failures. For this purpose, After all price announcements, model save equilibrium, nonequilibrium and multi equilibrium situations. Potential price set (potential announcements) for each firm determined by α. For example if $\alpha = 0.05$ then there are $1/\alpha + 1 = 21$ potential announcements for each firm and simulation program analyzes every price announcements in the market. That shows which pair of price or prices are the best choice. Additionally mixed strategy equilibrium is calculated for the price preferences. Systems output values are listed below;

Outputs

1. Maximum Value

2. Minimum Value

3. Average Value (Mix Strategy Equilibrium)

4. Positive Value Percentage

5. Maximum Total Value (Strategy couple)

6. Minimum Total Value (Strategy couple)

7. Nash Equilibrium Values

This result is just get for one element of initial conditions subset. System's initial conditions are presented below;

Initial Conditions

1. Network Structure

2. Customer Locations

3. Customer Count

4. Firm Count

5. Investment Rule

6. Total Period

7. Gamma γ

8. Phi ϕ

9. Discount Value δ

10. Default Utility Value (autarky value) ϑ

11. Learning Parameter

12. Learning Velocity

13. Unlearning Parameter

14. Unlearning Velocity

3   Simulation

The simulation model [14] described in the preceding section is designed as a multi-step architecture. In the first step of the process, a module named as "Orchestration", fetches all combinations of initial conditions stored in a relational database. There are two more input variables besides initial conditions. One of them is called "alpha" [15] defined according to how many equal parts the strategy interval is divided. Other variable is called "thread" and defined according to how many simulation processes is executed concurrently [16] . Text below, shows a pseudocode of the orchestration module.

```
    Declare a String variable called "alpha" and initialize it;
 Declare a String variable called "thread" and initialize it;
 Get all conditions from database which is declared before;
 For each condition,
     Call "Alpha Organizer Module" with alpha, thread and current condition
 variables;
     Call "Reporting Module";
```

Orchestration Module is executed for each element in the cartesian product of the sets of initial conditions. There are two main parts in this code block. In the first part, a module named as "Alpha Organizer", is called. This module controls "Core Simulation Module" which is executed $\alpha^{firmcount}$ times. Text below, shows a pseudocode of the Alpha Organizer Module

```
    For each alpha for firm 1,
     For each alpha for firm 2,
        For each alpha for firm 3,
            Call "Core Simulation Module" with alpha, thread and current
 condition;
```

For example, lets analyse potential price selections for firm count, k = 3 and alpha, $\alpha = 20$. Each firm has to choose its price level in a set of prices which has 21 distinct values. Startpoint of definition interval for invest and harvest strategies represent as $\bar{x}$ and interval lenght represents as y. The firms prices are;

$$p_a = \bar{x} + \frac{y}{\alpha}\alpha_a, \ p_b = \bar{x} + \frac{y}{\alpha}\alpha_b \text{ and } p_c = \bar{x} + \frac{y}{\alpha}\alpha_c$$

$\alpha_a, \alpha_b, \alpha_c \in [0, \alpha]$, One of the instance of this formulation is;

$$p_a = \bar{x} + y0.05, \ p_b = \bar{x} + y0.8 \text{ and } p_c = \bar{x} + y0.35$$

Total count of price combinations for these three firms is $(alpha + 1)^k = 21^3 = 9261$ and Core Simulation Module is called 9261 times for each combination of the initial conditions.

Core Simulation Module checks all of potential strategy combinations for the entire period so that all potential output values can be observed. These output values are written to a specific file parsed by Reporting Module later. Text below, shows a pseudocode of the Core Simulation Module.

---

[14] All parts/modules of the application are written in java programming languages (https://www.java.com)

[15] The interval of the investment strategy is $[c-(\phi+\gamma), c+\gamma]$ and the interval of the harvest strategy is $[c, c+\phi+\gamma]$. A firm which choses one of these strategies, should specify a price level to announce and that represents a point in relevant strategy interval. The model force agents (firms) to elect a price level which is a starting point of one of the fragment that defined by alpha value. This finite selection model is requisite for simulation. If the fragment count raises (higher alpha value), the model's expressing capability increases but the cost of model increase in the same time. There is a trade off between the cost and the expressing capability.

[16] The cost expressed above can be diminished by multithreading in computer architecture. This is a one of the optimization property for programming languages.

```
    Initialize all conditions;
Calculate Strategy Matrix;
For each strategy couple (firm1 & firm2),
    For each period,
        Announce Prices.
            Calculate utilities and profits for all object.
                Calculate firm's customer base.
Create "report file".
```

When core simulation module starts, firms define their strategy set which has 2^{τ} elements (two strategies; harvest - invest and τ represents period count). As an illustration, a character sequence like "0101101011" represents strategies for 10 periods. The index of character in the representation, defines strategic decision in the period which has same index. "0" refers to strategy of investing and "1" refers to strategy of harvesting in relevant period. Pay-off matrix (Strategy Matrix) is created with $(2^n)^k$ cells. Firms announce their prices for each period, then customers prefer one firm considering switching costs, network effects and prices. These preferences affect firm's profits and customer bases which are an input for next period profits.
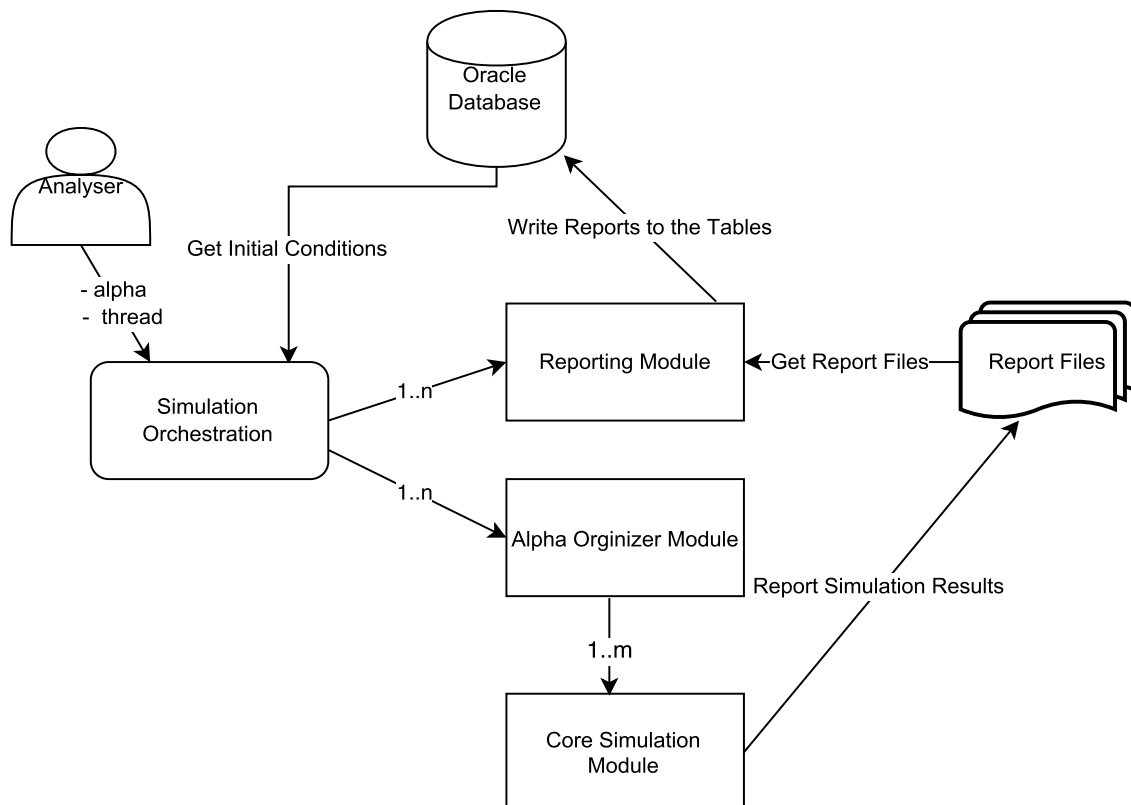
n means cartesian product of initial conditions and m means alpha to the power of firm count

Figure 3: General Architecture

In the second part of the pseudo code (orchestration module), a module named as "Reporting", is called. Output files which are created by core simulation module, are parsed by Reporting Module. Then reporting module inserts them to database tables. These entries are used for reporting and monitoring system outputs.

Core Simulation Module

Core simulation Module is the most important part of the simulation ecosystem. All agents interact with each other, and their utility functions include this interactions both directly and indirectly. Network effect and location values exist directly in customer's utility functions. Customer's choices define firm's customer base that affect the price decisions at the next period. Agents have lots of ambiguities (incomplete information) which may lead to inconsistent decisions. The model shows potential decisions in the system that customers and firms are affected by switching costs and network effect.

First of all, I try to set out heterogeneous agents types (customers and firms). Then general process will be illustrated.

Customers
Below is the customer properties with descriptions;
Customer Variables;

1. *firmDistance:* This variable holds distances between customers and firms.

2. *firmMap:* This Map holds firm specific values that customers know as public information.

3. *firmBasedUtulityValuesMap:* Customers evaluate switching costs, network effect, location, learning effect and prices etc. to form utility value for each firm. These utility values are held to compare which utility value is greater than others.

4. *friends:* In this simulation model rather than global network effect, local network effect is prefered by this way customer's neighbor's consumptions are important. This variable holds neighbors of current customer.

5. *friendDistribution:* This variable holds usage percentage about each product among customer's friends.

6. *totolFriendCount:* Customer's total friend count

7. *location:* This variable defines customer location.

8. *stepCount:* it holds current period index.

9. *currentFirm:* This variable holds current consumption preference.

10. *firmPeriodCount:* It holds how many period customer consume same product over an over (measure of loyalty) and how many period he/she doesn't consume it. This variable is used in learning function.

11. *id:* Customer Identity

When simulation starts, first, *firmMap* and *id* variables are initialized for each customer. *Location* variable is initialized by initial condition then *firmDistance* is filled by using location value. Each period *step()* function is called. This function manages all customer operations such as calculating utility function. Pseudocode is presented below;

```
   step{
If stepCount = 1 then initialize friends and totolFriendCount by using
initial conditions.
initialize friendDistribution variable.
For each firm;
    calculate switching costs.
    calculate network effect.
    calculate utility value by using switching costs, network effect,
announced price, consume value.
Chose best utility value.
Consume product and fill currentFirm variable.
Update location information by using learning effect.
}
```

Firms
Below is the firm properties with descriptions;
Firm Variables;

1. *id:* Firm Identity.

2. *location:* "Location" variable use for firm location. This location information is constant during simulation.

3. *marjinalCost:* Marginal cost of firm.

4. *currentPrice:* Announced price at current period.

5. *currentStrategySet:* Assigned strategy set at current period.

6. *stepCount:* it holds current period index.

7. *base:* Firm's current period market share.

Firms have two main functions, named as *announcePrice* and *setFitnessValueAfterStep* respectively. *announcePrice* method is called at the beginning of the period and *setFitnessValueAfterStep* method is called at the end of the period. *announcePrice* method determines period prices by using *currentStrategySet* and *alpha* values. After customers make their decisions by these announced prices, *setFitnessValueAfterStep* method is called. This method is used to calculate total output values for current strategy set.

Mechanism of Core Simulation Module

An instance of the combination of the initial conditions and alpha value are the input values of the core simulation module. This module executes *optimizeAlpha* method to calculate output values and report them for all instances of strategy set.

```
    optimizeAlpha{
Create Strategy Matrix;
For each cell in Strategy Matrix;
    Create Firms and keep account of them to firmMap;
    Create Customers with location, network structure and utility function.
For each Period;
        Firms Announce Prices (announcePrice function in firm class)
        Customers calculate utility value by using switching costs, network
effect, announced price, consume value and chose best utility value (step
function in customer class)
        Firms calculate their profits and market shares and write it to
relevant cell on strategy matrix (setFitnessValueAfterStep function in firm
class)
Call Report Function
}
```

4   Results

The model described above, agents make choices at the same period in mutual awareness of each other. They are characterized by different information sets and they have no meaningful pattern for choosing absolute strategy in non-repeating game such that expectation operator becomes useless. Discriminating between complete information case and incomplete information case is representing differences between formal analyses and complex analyses in the simulation model. Output levels could show differences between information degrees.

In the complete information perspective, I suppose that each agent knows other agents' all information and properties and perfect cognitive abilities so that they can easily maximize their utilities and profits. This assumption is consistent with formal literature. In addition I relax lots of assumptions like interaction with

agents. As for the incomplete information perspective, cognitive abilities come into prominence that makes model more difficult to solve.

Simulation Results in Complete Information

All the subgame equilibrium values' sign [17] is calculated positive ($\phi >= 0$) at the end of the simulation process ,which is similar with literature. The percentage of 0 ($\phi = 0$) values from all equilibrium values is 29% . 0 profit level is not significant for firms so they do not enter into the market under this condition. If there is no subgame equilibrium for relevant alpha couple, mixed strategy equilibrium is calculated. All of these equilibrium values (both nash and mixed strategy equilibriums) which are calculated from subgames, generate main payoff matrix that gives the possible outcome of a twofirm. The row of the strategy (possible alpha values for firm 1) is chosen by firm 1 and the column of the strategy (possible alpha values for firm 2) is chosen by firm 2. Strategic dominance occurs when one alpha strategy is better than another alpha strategy for one firm, no matter how that player's opponents may play. The table above (Table 1) symbolize this situation.

Table 1: Matrix presentation of alpha values

Strategies	Firm 2 Alpha 1	Firm 2 Alpha 2
Firm 1 Alpha 1	5,5	2,8
Firm 2 Alpha 2	3,3	1,2

For example, the simulation results for report $id = 3158$ [18] , has 121 ($11 * 11$) different alpha couple alternative which are placed to payoff matrix. Each cell represents subgame which is calculated by core simulation module. The cell values are sub game nash equilibrium(s) or mixed strategy equilibrium. Unique subgame nash equilibrium count is 97 (Table 2).

Table 2: Subgames which have unique equilibriums for alpha couples (Report $id = 3158$), form a part of main payoff matrix.

ReportAlpha	Reportid	Strategy1	Strategy2	Value1	Value2
1;1;	3158	00100	00100	301.5	238.5
1;0;	3158	00100	11111	0	0
1;0.9;	3158	01111	00101	685.89	18.9
1;0.8;	3158	00110	01111	1.8	610.2
1;0.7;	3158	00100	01111	0	513
1;0.6;	3158	00100	01111	0	414
1;0.5;	3158	11111	00101	350.1	101.7
1;0.4;	3158	11111	00111	344.88	18.9

---

[17] These are sub game equilibrium values which are results for each alpha couple.

[18] Initial conditions for report $id = 3158$ represented below;

"REPORTID" "KEY" "VALUE"
3158 "CONNECTION_PROBABILTY" "0.3"
3158 "DELTA" "1"
3158 "GAMMA" "0.9"
3158 "INVEST_RULE_COUNT" "3"
3158 "LEARNING_PARAMETER" "1.1"
3158 "LEARNING_VELOCITY" "0.5"
3158 "LOCATIONS" "0.7767832587644451;0.27590643373027923;...."
3158 "NETWORK" "1-3;1-6;1-7;1-8;1-9;1-10;...."
3158 "NUM_CUST" "100"
3158 "NUM_FIRMS" "2"
3158 "PHI" "0.9"
3158 "PRODUCTVALUE" "100"
3158 "TOTAL_PERIOD" "5"
3158 "UNLEARNING_PARAMETER" "0.9"
3158 "UNLEARNING_VELOCITY" "1.2"

1;0.3;	3158	01111	11111	6.3	266.22
1;0.2;	3158	11111	01110	179.28	1.8
1;0.1;	3158	00100	11111	0	90
0;1;	3158	11111	00100	0	0
0;0;	3158	11111	11111	0	0
0;0.9;	3158	11111	01100	0	1.26
0;0.8;	3158	11111	00100	0	6.12
0;0.7;	3158	11111	00110	0	6.84
0;0.6;	3158	11111	01111	0	19.08
0;0.5;	3158	11111	00111	0	127.35
0;0.4;	3158	11111	01111	0	216
0;0.3;	3158	01111	11111	117	0
0;0.2;	3158	11111	01111	0	18
0;0.1;	3158	11111	11111	0	3.42
0.9;1;	3158	00100	01111	31.5	669.06
0.9;0;	3158	01001	11111	0.63	0
0.9;0.9;	3158	01001	01001	251.37	261.63
0.9;0.8;	3158	00110	01111	30.15	564.12
0.9;0.7;	3158	00100	01111	1.26	511.65
0.9;0.6;	3158	01111	00100	414	0
0.9;0.5;	3158	00100	01111	0	315
0.9;0.4;	3158	00100	11111	99.81	252.72
0.9;0.3;	3158	00100	11111	30.87	243.54
0.9;0.2;	3158	01001	11111	6.93	176.04
0.9;0.1;	3158	11111	01010	89.1	3.15
0.8;1;	3158	01111	00100	608.4	3.6
0.8;0;	3158	00100	11111	2.88	0
0.8;0.9;	3158	01111	00101	501.12	65.07
0.8;0.6;	3158	00111	01111	2.16	411.3
0.8;0.5;	3158	00100	01111	0	315
0.8;0.4;	3158	01111	00100	216	0
0.8;0.3;	3158	00100	01111	0	117
0.8;0.2;	3158	00111	11111	38.88	141.12
0.8;0.1;	3158	11111	00111	85.86	8.28
0.7;1;	3158	01111	00100	513	0
0.7;0;	3158	00110	11111	7.38	0
0.7;0.9;	3158	01111	00111	507.6	5.04
0.7;0.5;	3158	01111	01001	315.9	0.18
0.7;0.4;	3158	01111	00100	216	0
0.7;0.3;	3158	00100	01111	0	117
0.7;0.2;	3158	00100	01111	0	18
0.7;0.1;	3158	11111	00100	64.62	13.86
0.6;1;	3158	00100	01111	0	414
0.6;0;	3158	10010	11111	0	0
0.6;0.9;	3158	01111	00100	414	0
0.6;0.8;	3158	00100	01111	1.44	412.2
0.6;0.4;	3158	00101	01111	0	216
0.6;0.3;	3158	01111	00100	117	0
0.6;0.1;	3158	11111	00111	0.72	288.72
0.5;1;	3158	11111	00111	332.1	120.6
0.5;0;	3158	01011	11111	106.2	0
0.5;0.9;	3158	01111	00100	315	0

0.5;0.8;	3158	01111	01110	315.45	0.36
0.5;0.7;	3158	01001	01111	0.27	316.35
0.5;0.2;	3158	01111	00100	18	0
0.5;0.1;	3158	11111	01111	0.9	311.85
0.4;1;	3158	11111	00101	338.4	27
0.4;0;	3158	01111	11111	216	0
0.4;0.9;	3158	01111	00100	216	0
0.4;0.8;	3158	01111	00100	216	0
0.4;0.7;	3158	01111	01100	216.72	0.09
0.4;0.6;	3158	00110	01111	0	216
0.4;0.5;	3158	10101	00101	0	45
0.3;1;	3158	11111	00110	264.6	9
0.3;0;	3158	01111	11111	117	0
0.3;0.9;	3158	11111	00101	228.96	47.88
0.3;0.8;	3158	01111	00100	117	0
0.3;0.7;	3158	01111	00100	117	0
0.3;0.6;	3158	01111	00100	117	0
0.3;0.5;	3158	10101	00101	0	45
0.3;0.4;	3158	11011	01011	0	72
0.3;0.1;	3158	11111	01111	0	117
0.2;1;	3158	11111	00100	178.92	2.7
0.2;0;	3158	01111	11111	18	0
0.2;0.9;	3158	11111	01111	172.44	13.23
0.2;0.8;	3158	11111	00101	138.24	41.76
0.2;0.7;	3158	00100	01111	0	18
0.2;0.5;	3158	01111	00100	18	0
0.2;0.1;	3158	11111	01111	0	18
0.1;1;	3158	11111	00110	89.82	0.9
0.1;0;	3158	11111	11111	1.44	0
0.1;0.9;	3158	11111	01010	88.92	3.78
0.1;0.8;	3158	11111	00100	80.46	19.08
0.1;0.7;	3158	00100	11111	42.48	51.84
0.1;0.6;	3158	11111	00111	0.36	288.36
0.1;0.5;	3158	01111	11111	315	0
0.1;0.3;	3158	01111	11111	117	0
0.1;0.2;	3158	11111	01111	0	18
0.1;0.1;	3158	11111	11111	42.3	47.7

Multi subgame nash equilibrium count is 11 (Table 3).

Table 3: Subgames which have multi equilibriums for alpha couples (Report $id = 3158$), form a part of main payoff matrix.

ReportAlpha	Reportid	Strategy1	Strategy2	Value1	Value2
0.8;0.8;	3158	01010	01010	194.04	201.96
0.8;0.8;	3158	01001	01001	190.08	205.92
0.8;0.8;	3158	00100	00100	144	144
0.7;0.7;	3158	01001	01001	125.55	153.45
0.7;0.7;	3158	00100	00100	72.9	89.1
0.6;0.6;	3158	01001	01001	59.94	102.06
0.6;0.6;	3158	00101	00101	77.76	84.24
0.5;0.5;	3158	10101	10101	91.8	88.2

0.5;0.5;	3158	01101	01101	86.4	93.6
0.5;0.5;	3158	00101	00101	17.55	27.45
0.4;0.4;	3158	11011	11011	95.04	120.96
0.4;0.4;	3158	01101	01101	33.84	38.16
0.4;0.4;	3158	01011	01011	33.12	38.88
0.4;0.2;	3158	11011	01011	0	72
0.4;0.2;	3158	00111	10111	72	0
0.4;0.1;	3158	11111	01111	0	216
0.4;0.1;	3158	11101	01101	0	72
0.4;0.1;	3158	01011	11011	72	0
0.4;0.1;	3158	10111	00111	0	72
0.3;0.3;	3158	11111	11111	140.4	129.6
0.3;0.3;	3158	10111	10111	49.14	67.86
0.2;0.4;	3158	01101	11101	72	0
0.2;0.4;	3158	11011	01011	0	72
0.2;0.2;	3158	11111	11111	97.2	82.8
0.2;0.2;	3158	01111	01111	9.9	8.1
0.1;0.4;	3158	11111	01111	0	216
0.1;0.4;	3158	11101	01101	0	72
0.1;0.4;	3158	11011	01011	0	72
0.1;0.4;	3158	10111	00111	0	72

Mixed subgame equilibrium count is 13 (Table 4) .

Table 4: Subgames which have just mixed equilibriums for alpha couples (Report $id = 3158$), form a part of main payoff matrix.

ReportAlpha	Reportid	AvgValue1	AvgValue2
0.8;0.7;	3158	76.9	261.94
0.7;0.8;	3158	248.33	88.37
0.7;0.6;	3158	55.22	149.18
0.6;0.7;	3158	136.93	64.21
0.6;0.5;	3158	25.07	48.45
0.6;0.2;	3158	11.73	-171.94
0.5;0.6;	3158	43.97	28.67
0.5;0.4;	3158	-12.79	-37.17
0.5;0.3;	3158	-15.27	-95.49
0.4;0.3;	3158	-58.35	-114.25
0.3;0.2;	3158	-108.62	-187.3
0.2;0.6;	3158	-172.06	11.91
0.2;0.3;	3158	-187.63	-109.73

All of these alpha couples form a part of main payoff matrix then nash equilibrium(s) are solved. For Report $id = 3158$, I have found unique nash equilibrium which is (Alpha=0.3, Alpha=0.3). The output values for this alpha couple is respectively 140.4 and 129.6

Another analysis can be done via total system output at the end of the simulation. A potential total output interval is represented below for nash equilibrium point (Table 5). The market's output level is between -495 and 270 .

Total count of the combinations of the initial conditions is 1296 and 152 of them has one or more nash equilibrium. One of them whose id is 3133, has multi equilibrium (Table 6)[19] so that there is a coordination

---

[19] Initial conditions for report $id = 3133$ represented below;
REPORTID KEY VALUE

Table 5: Maximum and minimum values for report $id = 3158$

ReportAlpha	Reportid	MaxSum	MinSum
0.3;0.3;	3158	270	-495

failure potential (The output level of the alpha values which is $0.3; 0.3;$ is higher than $0.5; 0.5;$ level).

Table 6: Nash Equilibriums for report $id = 3133$

ReportAlpha	Reportid	Value1	Value2
0.3;0.3;	3133	133.95	151.05
0.5;0.5;	3133	91.65	103.35

Total count of the combinations of the initial conditions which have no unique or multi nash equilibrium is 1144 and I have calculated mixed equilibrium that resulted in positive values.

Simulation Results in Incomplete Information

If agents have no sufficient information about their environment, location and other agents' preferences, game come to a conclusion on another output level which may be different from equilibrium point which agents have complete information about all of the system properties (Figure 4,5,6,7,8).

In this case, agents try to comment signals from both their environment and other agents. These signals are evaluated by agents experiments. There is also a feedback mechanism which is forced to evolve agents experiments in each step of the game such that interactions plays a major role. The interpretation activity overcome the deficiencies on information set. In formal techniques, agents have either sufficient information or a capability to express an opinion about information patterns. Besides agents have enough cognitive capabilities to make correct decision in rational choices that maximize his/her utility or profit. In general homogeneity is often used. Few study focus on heterogeneity nevertheless they used this concept just for quantitative measurements like a budget not for cognitive values. In this study, generalization process is tried to be much little than formal methodologies like heterogeneity or interaction cases so that the explanatory power of real world issues become more powerful than contemporary ones. The explanatory power can be increased by engineering processes or model add-ons, however cognitive capabilities and levels is a different case to discuss. To model system with evolutionary viewpoint, cognitive issues in other words artificial intelligence must be analyzed. Learning is the key concept for evolutionary cases. Genetic algorithms and machine learning are most useful toolkits for modelling artificial intelligence. Complexity economics is the main discipline that internalize artificial intelligence. This study's basic purpose is to model switching cost and network effect by using these toolkits.

3133 "CONNECTION_PROBABILTY" "0.3"
3133 "DELTA" "1"
3133 "GAMMA" "1.0"
3133 "INVEST_RULE_COUNT" "3"
3133 "LEARNING_PARAMETER" "1.1"
3133 "LEARNING_VELOCITY" "0.5"
3133 "LOCATIONS" "0.7767832587644451;0.27590643373027923;...."
3133 "NETWORK" "1-3;1-6;1-7;1-8;1-9;1-10;1-17;1-18;...."
3133 "NUM_CUST" "100"
3133 "NUM_FIRMS" "2"
3133 "PHI" "0.9"
3133 "PRODUCTVALUE" "100"
3133 "TOTAL_PERIOD" "5"
3133 "UNLEARNING_PARAMETER" "1.0"
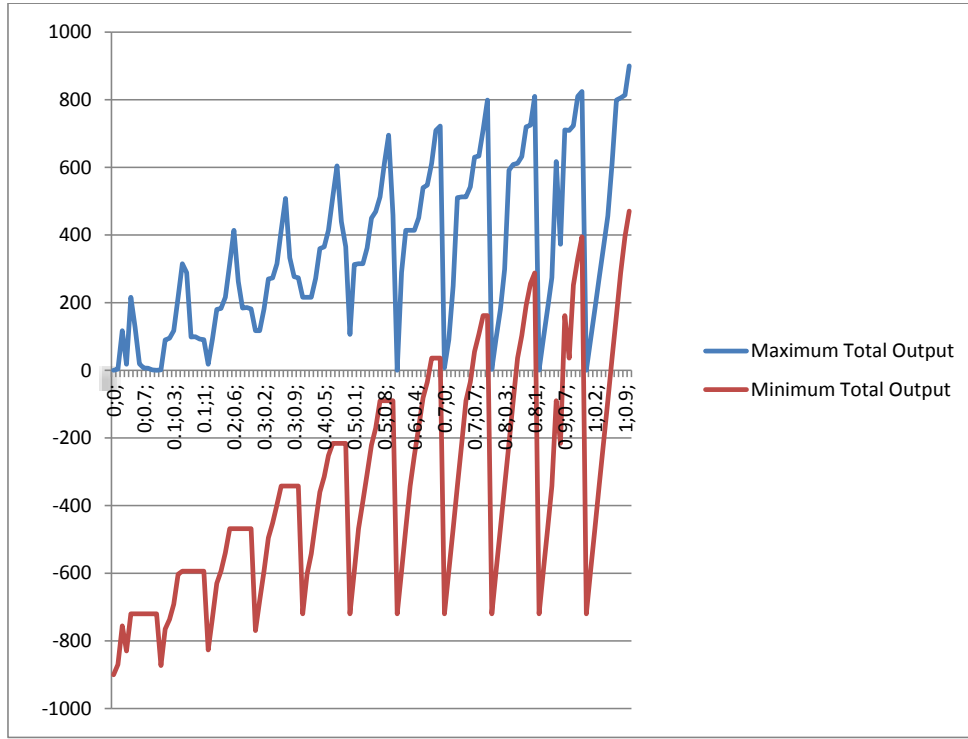3133 "UNLEARNING_VELOCITY" "1.2"
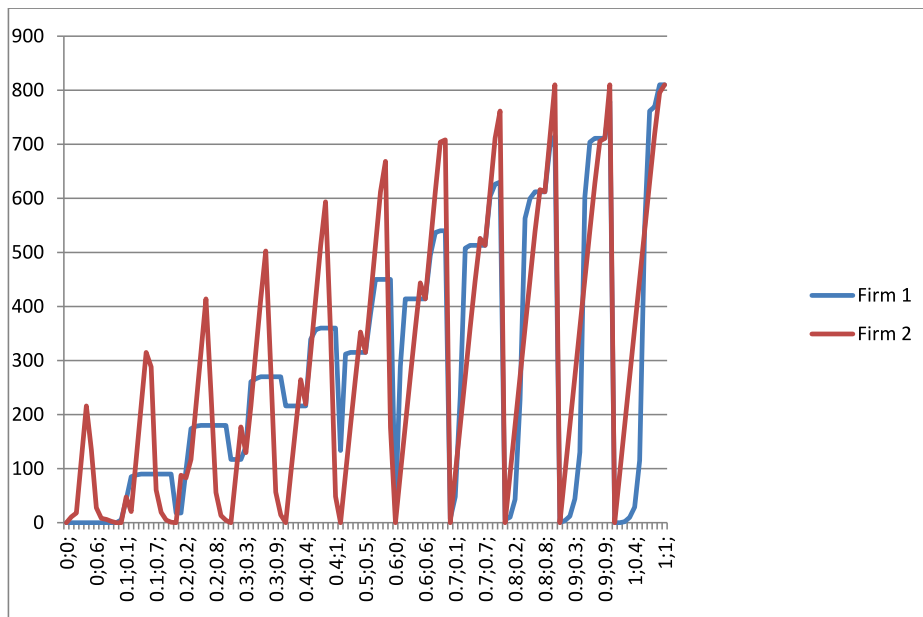
Figure 4: Total profit levels
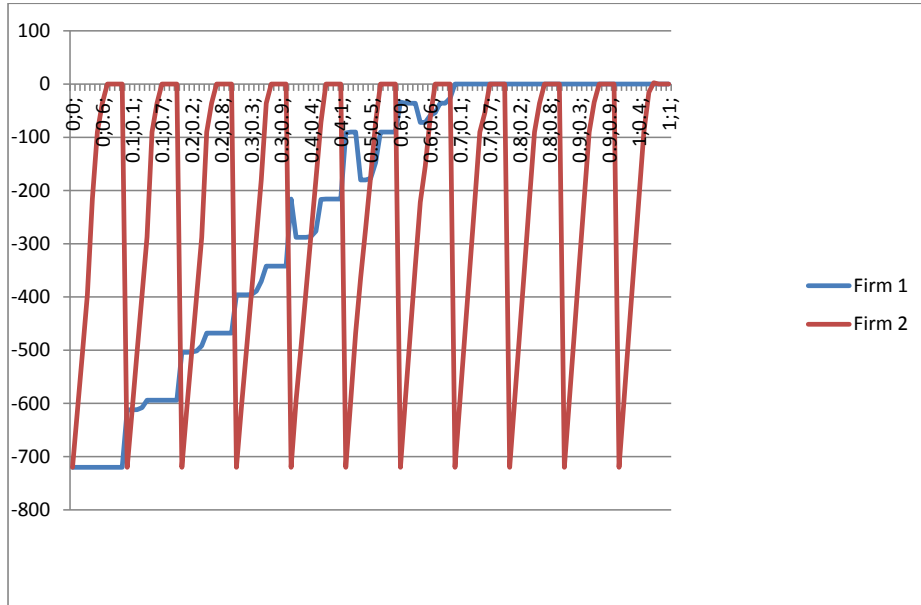

Figure 5: Firm's maximum profits
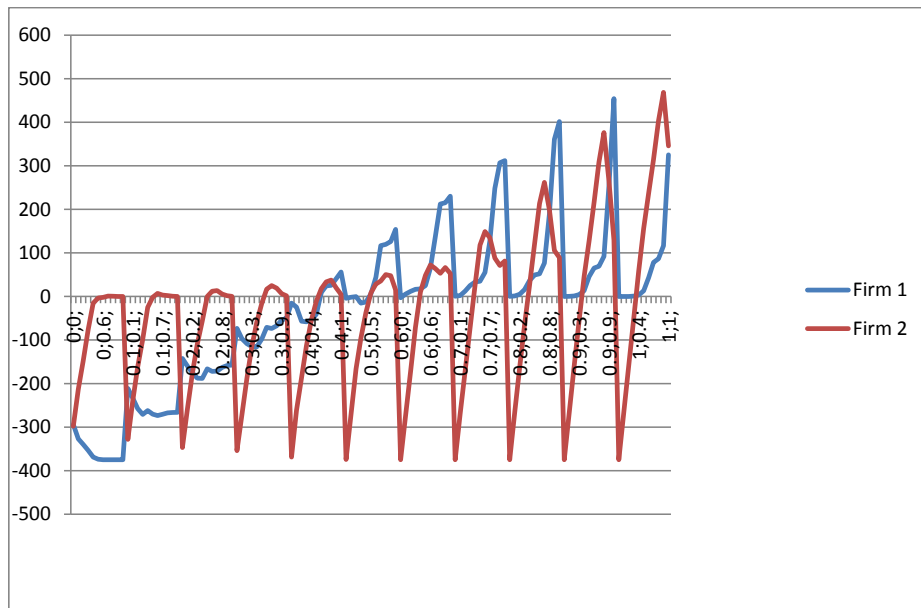
Figure 6: Firm's minimum profits
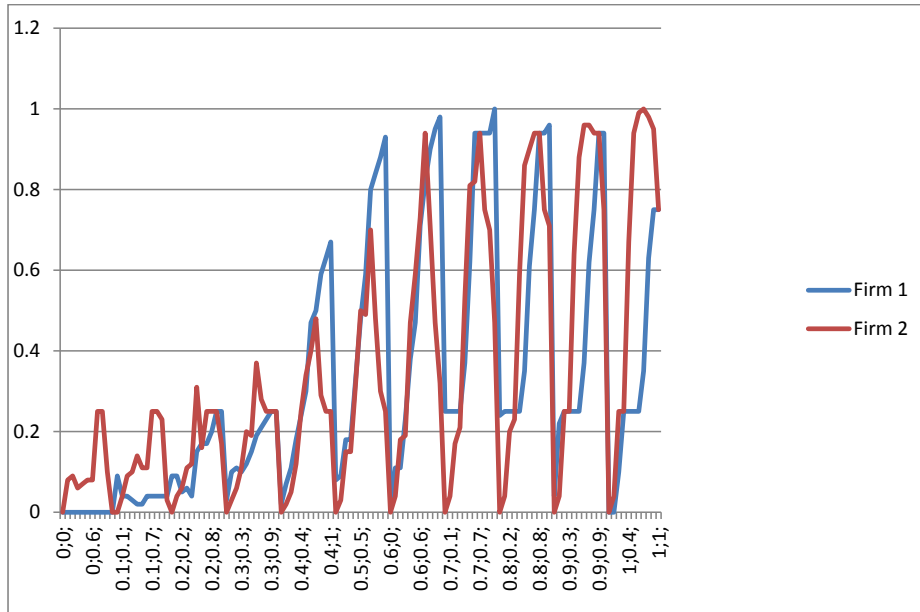

Figure 7: Firm's average profits

Figure 8: Firm's positive profit value percentages

5   Conclusion

A model of complex systems should contain multi agent structure in which agents interact with each other. Interactions play main role which determine global dynamics and behaviours of systems. Agent based computational methodology presents computational frameworks that permit the study of complex system behaviors. it is very difficult to formally analyze complex systems. The agent based computational model has more explanatory power than conventional analytic solutions because agent based approach makes assumptions less rigid and more realistic. Launbenbacher (2009) pointed out that results obtained through simulations do not formally validate the observed behavior. Thus, there is a need for a mathematical framework which one can use to represent multi agent systems and formally establish their properties and interactions' structure.

This paper presented an agent-based simulation of a complex system by both mathematical framework and computational simulation structure that consists of a collection of agents (firms and customers). This complex system represents market situations in the presence of both switching costs and network effect. The state of an agent at a given point in time is determined through a collection of rules that describe the agent's interaction with other agents. The collection of rules have been presented with formal equations in the model section and the simulation framework have been explained with pseudo codes in the simulations section.

This study aimed to test, critique and comment mainstream theories of the switching costs and network effects, and empirical understanding for how particular observed regularities and irregularities have evolved by using of the methodology of agent-based computational economics (ACE). When the full implications of bounded rationality and complete information assumptions are accepted, a process-based approach is preferred rather than adaptation and evaluation approaches. The process-based approach is sufficiently enough for testing experimentation of mainstream aspect. If unpredictable situations are considered like uncertainties (incomplete information), path dependencies and relationship characteristics between firms and customers, optimal outcomes are not guaranteed. In this case, agent's cognitive capabilities are the main focus point for adapting different situations by agents. This adaptation process measures agent's profit or utility level so that learning algorithms, genetic algorithms and artificial intelligence plays critical role. Even though the integration of both the collective (network effect) and individual (switching cost) dimension in the same framework is a real challenge for cognitive perspective, this study will evolve to this direction to analyze dynamic features of markets viewed as cognitive and complex social interactive systems.

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