The Game Economy: designing for, and playing with, the digital era

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Video of slides with audio linked here: http://www.microethology.net/the-game-economy/

I would like to say thank you to Milena for the introduction, and to the University and the organisers of the International Conference on Finance and Economic Policy for your kind invitation to address this exciting event. I am neither an economist nor a financial expert - rather, I am a scholar of art, media and design, but with a long-standing interest in the economic forces and contexts that drive them. As such I offer you my thoughts today with some trepidation. I very much hope that some of what I will be presenting will be of interest to you, and ask for your patience with my tentative handling of topics and concepts that are very much your fields of expertise. I present this talk in the spirit of interdisciplinary dialogue and look forward to your thoughts, responses, and suggestions.

My disciplinary home of the study of media culture and technology accounts for economic forces and systems in two broad strands, put very simply: on the one hand the cultures and aesthetics of consumption - questions of identity, ideology, and the everyday as driven by post War affluence, advertising and consumerism; and on the other the political economy of the media and cultural industries, notably Hollywood and other cinemas, TV production, the press - and more recently digital media, the Internet, social media and - of course - computer games. My work to some extent mediates these two strands: asking how do actual economic forces determine everyday life in a digital media environment ?

This talk is structured into four inter-connected themes: 1 the cultural economy of games; 2 an assertion that digital games are structurally economic in form; 3 a focus on recent mobile device based 'free-to-play' games; and finally I will take the game *Animal Crossing: new horizons* as a current example of the ways in which the study and playing of digital games might open up an imaginative engagement with both current prevailing conditions and relationships and with possible economic futures.

The cultural economy of games

I'm sure it will come as no surprise to you that the videogame industry has for some time been a significant economic force in the entertainment, media and technology industries. Newspaper articles love to point out its relative worth versus cinema box office or recorded music. I will argue however that the significance of the computer game for understanding current economic forces goes well beyond its dominance in the global cultural economy. The games industry, and games themselves, as both everyday playful experiences and virtual worlds, function as a seed-bed for novel and innovative forms of business models and monetisation, and - as I will argue later - as a unique medium for expressing and exploring economic and financial systems and relationships.

From the late 1980s, the dominant model of game consumption was the sale of stand-alone media software on discs or cartridges, and of the hardware in form of PCs and consoles. In this, the business model was very similar to the DVD and recorded music markets, the latter dating back from CDs to vinyl, right back to the gramophone at the end of the nineteenth century. However, digital games have subsequently revolutionised media monetisation, with a plethora of innovative and ingenious models of subscription, social media connectivity and microtransaction. I'll come back to these, but first let's look back to the origins of the commercial videogame in the arcades of the late 1970s and early 80s for a hint of the very different models of monetisation to come. Like the pinball machines they began to replace in the late 1970s, coin-op computer game machines established a very different relationship between their products, and the consumption of these products by gameplayers. Unlike the music or video disc, where the consumer pays a fixed sum up front for unlimited access to the music or film, the arcade player pays for *time*. The quarters or 10p pieces bought an indeterminate but definitely finite period of play. Moreover, the duration of this media experience is determined not by a pre-set time span, but by the interrelationship of the skill of the player and the aleatory contingencies of the game itself as an automated mechanical world. In pinball the player grappled with the dynamic physics of ricochet and gravity, in the videogame with the computer-driven animation of hostile ghosts, aliens and space ships. Put simply, the better the player - with a bit of luck from the machine - the longer the play. Even at the time, as this quote from the mid-1980s indicates, the topsy-turvy economics of play were noted, along with their allegorical reflection of the ongoing shift of Western economies from manual industrial labour to information and services.

I recount this digital cultural prehistory partly because it prefigures in fascinating ways the novel mechanics and systems of contemporary digital play. While the business models have changed, the salience of *time* as a determining factor in the economics of digital play has returned.

The first domestic computer games were generally distributed on audio cassette, and were as subject to the everyday practices of sharing and piracy that bedevilled commercial music distribution on that format. Today, with the advent of massively multiplayer online games (MMOs), and games for mobile phones and tablets, along with the new generations of games consoles and the perennial PC gaming platform, we see an explosion of diverse models of monetisation and return. The disc sale model persists, though more often now as downloads than physical storage media, but has been supplemented - and for some committed players - largely supplanted by the Steam platform for PC play, by subscription payments for MMOs, and by various modes of microtransaction in low cost or free-to-play mobile games. The past twenty years has also seen the emergence of new relationships between producers and consumers, with players creating their own in-game items and clothing, to challenge the governance of these online worlds and - in some notable cases - modifying or modding a commercial game to the extent that a new game and community is created.

For this talk I will explore three overlapping dimensions in this established but unstable and shifting ludic economy. First, digital games as media products and experiences that are uniquely economic in theme, form, and mechanics. Second, the shaping of games as media objects and play as media experience by the business models and monetisation strategies of their producers - and the platforms through which they are accessed. That it, how aesthetics, gameplay, story and - importantly, the temporality of the game-media experience - are determined by the demands of establishing, sustaining, and extracting income from an audience in an extremely crowded and competitive digital media landscape. And lastly, drawing on my own research into children and games, the ways in which all games might be studied as virtual economies, systems of value and exchange driven by the demands of play not market pressures or material need. What I call the economic imaginary of digital games.

I'm sure most of you are familiar with the 'freemium' or 'free-to-play' model of mobile digital game access. It was popularised by browser games such as *Bejewelled* in 2001 and social media platform games such as *FarmVille* on Facebook in 2009. It came to dominance with the marketing of the iPhone and other smartphones, and was well-established enough in young consumers' experience by 2014 to be parodied by South Park. I'd note that, though satirical, this episode actually does a good job of explaining this business model, game mechanic and impact on player behaviour.

In these images Nintendo explains its rationale for micropayments in its Arcade app for the handheld 3DS console from 2014 to 2017. A cartoon rabbit, the putative owner of the arcade, explains to his young clientele that their actual money is needed to keep his arcade in business. The game - such as it is - is a simulation of mechanical claw games, here to offer the chance at grabbing a virtual badge with which to decorate one's 3DS home screen. Of course it can be read as an allegory of the new platform consumer capitalism for new generations of consumers, explaining both the functionality and the ethos, morality even, of the relationships of expenditure, obligation and reward into which these children are being inducted.

A game more characteristic - or paradigmatic - of the free-to-play model is *Candy Crush Saga*, released in 2012 and still going strong today. The developers, King, didn't invent this genre of tile matching game nor the business model that led to its continued dominance in the mobile or casual game marketplace. But they certainly exploited both to produce a hugely successful game and business strategy. The game mechanic itself is simple, taken from earlier tile-matching or match-three games notably *Bejeweled* - a board or field of vivid, colourful virtual objects that the player must try to clear by matching 3 or more in a line.. Unlike the material restrictions of the game disc or cartridge, or the inevitable loss to the accelerating speed and difficulty of the classic arcade game, *Candy Crush* is effectively infinite. Keen players progress through its series of puzzle-like screens or levels but all the while the developers are adding new screens ahead of them - new puzzles and items with new affordances in the game. The game then is more a *service* provided by the company than a stand-alone media product.

To account for the appeal - compulsion even - of this game would be the topic of another talk. My interest today is: how does a game like this make money, given it is free to download and play and that the large majority of *Candy Crush* players have never paid a penny to King? And what are the implications or applications of this

model to broader formations of accumulation and exchange in the digital cultural economy at large? Players aren't required to spend any money to play and progress, but the outlay of small amounts of money can provide a virtual item or tool - presented as rewards and prizes - to crack a particularly frustrating and recalcitrant level, or to add novelty and interest. More than 95% of players will spend little or nothing, even with years of play (Luton 2013: 9), but with the scale of downloads and repetitive, compulsive play only a small proportion of players are needed to make a viable return on the initial investment in the design and promotion of the game, and its ongoing maintenance and updating. Importantly these microtransactions are structural to the game design and mechanic itself. The player doesn't have to spend actual money but the game makes it very much worth their while to do so.

Microtransactions themselves are often embedded in the game world or mechanic, offering virtual enhancements that have no material impact on the game - such as the *Nintendo Arcade* badges mentioned earlier, or new character designs - or 'skins' in PC-based online multiplayer free-to-play games such as *League of Legends*. In other forms of microtransaction the virtual item is an instrumental device by which a player can overcome a particular challenge, or gain a competitive or temporal advantage. *Angry Birds* players, for instance, faced with a particularly tricky set of pig-defences have the opportunity to buy an eagle for a small sum, a powerful bird / device that will immediately swoop across the screen and destroy the intractable puzzle, allowing the player to progress to the next.

In *Candy Crush* King have pioneered a particularly elaborate and effective microtransactional regime, a system that mobilises and monetises social media connectivity and data mining, and drives a game mechanic that regulates and manipulates player time and attention on a minute-by-minute rhythm. This is partly effected by the implementation of a dual currency, a device that mediates in-game virtual expenditure with the investment of actual money by the player.

This dual currency economy or mechanic is characteristic of many current popular free-to-play mobile games, and I'll return to it a little later. For now, let's address the significance of the regulation of time and attention in these games. A crucial innovation in *Candy Crush* is the determining role of time in structuring and retaining its players: a core aspect of its game mechanic is a temporal ludic economy. Like the early arcade games, *Candy Crush* both incrementally ramps up the difficulty level and challenge of the game, and gives the player a finite number of lives. However, rather than necessitating expenditure to access the game again once these

lives are used up, free-to-play games offer payment as an alternative to simply waiting. That is, the player is locked out of the game for a set period of time, sometimes thirty seconds, more often 20 to 30 minutes. The frustrated player, who has probably used up their lives in a particularly challenging level will be sorely tempted to buy an immediate chance to try again.

Games are economies

I began this talk with a brief sketch of digital games as media commodities with a range of economically-driven platforms. Free-to-play games such as *Candy Crush* embed innovative, if fiendish, economic mechanics into the very structure and temporality of gameplay to realise their business strategy. In another way, however, all games are economies, regardless of their monetisation mechanics. As digital systems, computer games are of course fundamentally mathematical. Most single player games have as a core dynamic the accumulation and expenditure of various resources. These might be figured as money, for example the gem-like rupees of the *Legend of Zelda* games or bank transactions in *The Witcher*, as money-like tokens - the coins and rings of *Mario* and *Sonic the Hedgehog*, or less obviously in the ammunition and health-giving medipacks of first-person shooters from *Doom* onwards to action adventure games like *Tomb Raider*. These tokens, objects and resources might have an explicitly economic role the game's fictional world - we can buy virtual armour and potions for rupees for instance, or objects like ammo and medicine might circulate in diegetic systems that aren't figured as transactional as such, but are economic in effect.

In this sense even a completely free game would be considered an economic system. I have, more or less playfully, appropriated the terminology of endogenous and exogenous economies to denote - respectively - the virtual and ludic systems of accumulation, exchange and expenditure that underpin games *as* games - and the cultural-economic drivers of the production and consumption of games as media commodities. As we've seen, in both arcade games and free-to-play apps the exogenous demands of the business model closely drive the form and experience of the endogenous game world, whereas in console and PC games the relationship - whilst significant - is less tightly connected.

The *SimCity* series of games is a good illustration of this notion of games as

endogenous economic systems. Until the most recent iterations, they were designed in spreadsheets. The number and arrangement of parks, fire stations, sewage outlets and so on are numerical variables. The sense of a living and growing environment is driven by algorithmic relationships between these abstract variables. Figured as tax rates, expenditure on public works or police, and so on, these algorithms are in effect a ludic economy underlying the diegetic economy, shaping satisfying gameplay rather than accurately simulating actual urban growth. As Stone Lebrand, the lead designer on 2013 iteration put it: the games are 'prototyped in Excel [...] no graphics — it was just a bunch of numbers — but you could type a code that represented a particular type of building and the formulae built into the spreadsheet would then decide how much power it had and how many people would work there.'

Keen players of SimCity will reverse-engineer this spreadsheet process, mapping out calculations of accumulation and exchange of variables for optimum play in their own spreadsheets. But all players must to some extent, implicitly grasp with the economic dynamics of their games.

A key aspect of virtual and network economies is that they are effectively unencumbered by material scarcity: media artefacts from texts, images, music files, and now feature films and TV series can be copied and distributed infinitely at next to zero cost[i]. Media companies have worked hard to develop and impose technical and legal fixes to this unprofitable plenitude, for example the successful prosecution of the music sharing site Napster in 2000, and subsequent digital rights management systems. But the underlying principle of unlimited virtual resources, infinite reproduction and instantaneous distribution pertains. Again this is epitomised in videogames. Virtual objects and environments and characters can be repeatedly reproduced and distributed within a game at no cost in the conventional sense. "Games are a medium characterised by plenitude" as Charles Bernstein put it, nearly 30 years ago. To function as an enjoyable game however, and not some unchallenging cornucopia of unlimited items and vistas, videogame design must impose restrictions on these virtual worlds' production of, and access to, such resources. As Bernstein put it, they must 'create an artificial economy of scarcity'.

Animal Crossing for example tempts the player with the promise of a life of plenty. Natural resources such as fruit and fish are abundant, and rocks yield bags of money if struck with a spade or axe. However to facilitate the challenge and hence duration of the game this cornucopia is constrained. Only one rock a day offers bells,

and only a limited quantity.

Alternatively, many console and PC games feature 'cheats', the capacity to remove ludic constraints on resources. Cheats are buried in the game code by the programmers to facilitate game testing. A famous one is the 'motherlode' cheat for *The Sims* typing the magic word in allows the player to access infinite quantities of the game's virtual currency Simoleons.

Within game studies and game culture, these 'restrictions' and limitations are more usually understood as 'rules', aspects of the game that limit or direct the movement, abilities, temporality and progression of the player and avatar. But from the perspective I am developing here, they are often fundamentally *economic* in operation and effects. So, resources such as health, ammunition, in-game currency and so on could just as easily, or more easily, be programmed as infinite in their availability. *Resident Evil* with unlimited supplies of ammo would be a very different (and much less challenging) play experience, effectively a different game - or not even a game at all. A plentiful supply of colour bombs in *Candy Crush* would remove the core challenge and pleasure of the game. Digital game design is in large part a balancing of the possibility of infinite digital artefact production with restrictions that shape and structure challenge, competition and sociality. On one important level then, an endogenous game economy is austere for purely ludic reasons: to scaffold cooperative or competitive play, to provide intellectual or motor challenges, and to slow down progress through the game.

Economies of free-to-play games

As I suggested earlier in relation to *Candy Crush*, in the newer free-to-play mobile games the internal or endogenous game economy serves the dual purpose of establishing engaging gameplay and driving the player towards microtransactional activity. The endogenous virtual economy is much more closely determined by the exogenous economic context of actual commercial production and monetisation.

As an example, I'll compare the well-established *SimCity* series of games for PC and console to the recent free-to-play mobile version *SimCity BuildIt*. Both games offer a representation of urban development and economic growth, driven by an underlying virtual economy of algorithmic values and relationships, and nonlinear systems. The mobile game however is simpler and more directed in play, with less of

the sandbox openness and flexibility for which the earlier games are famous. It does not demand significant budgetary decisions, taxes are set automatically and are a direct function of the 'happiness' rating of the citizens, or Sims. The gameplay focuses on manufacturing, building, and - as the game progresses - trade. This trade is both endogenous, within the software world itself, and exogenous, through social media and online connectivity with other players.

Like *Candy Crush* the early stages of the game promise a satisfying if unchallenging plenitude. The game provides an endless and free supply of raw materials - initially steel, timber, plastic, sunflower seeds, but quickly imposes restrictions on progression by limiting the number of factories the player can build to process these limitless raw materials, and storage space to keep processed materials before they can be used in further manufacture. For instance, building construction requires planks, hammers and nails, all of which are produced relatively slowly. In the early stages steel is easily accumulated -produced literally in a minute. It can then be used to make nails, but these are particularly slow to produce, and are produced in small numbers, thereby limiting most further production.

As with the original PC games, keen SimCity BuildIt players analyse the game's economic algorithms to establish optimum productivity and offer their findings to others online.

So, again like *Candy Crush,* time is of the essence and the imposed patience is indicative of fundamental changes to the gameplay from the console games driven by the interface between virtual economy and monetisation model. *SimCity BuildIt* is much more linear, with its challenges solved by watching advertisement or making in-app purchases of virtual currency. Rather than limiting 'lives' like *Candy Crush*, *SimCity BuildIt* imposes bottlenecks on production. The player isn't locked out of the game, but finds they must exercise a great deal of patience - or of course succumb to the game's insistent appeals to actual purchase or other modes of microtransaction. Though, as the citizens periodically remind the player, 'simoleans are the lifeblood of a well-run city', these thoughts don't capture the layered nature of the economic base. Initial promises of plenitude are soon reneged on: the soft currency of simoleons is produced in abundance, primarily through taxation and virtual trade, but any serious intervention in the supply pipeline requires the game's other, hard, currency - Sim Cash. Like the Gold Bars in *Candy Crush* Sim Cash must be purchased by the player with actual money. When I was playing the game a couple of years ago, Sim Cash cost just under 2p per unit when purchasing the smallest

amount, and half that when purchasing the larger amounts. More than just imposed scarcity though, these micro-monetary policy systems establish a number of rewards for acquisition from both hard and soft currency, not just overcoming challenges but unlocking new abilities, pursuing collections of virtual items and often facilitating trade within the game and with other players through social networks.

The first notable form of microtransaction was advertising, and it persists in current games, often cleverly integrated into the gameworld's environment. Click on a billboard in the city for instance and the player can watch a short animated ad for the product - often another game or app. The reward for this 30 seconds or so of attention might be a loot box like choice in which a valuable virtual product or bundle of Sim Cash are hidden in one of three crates in a digital version of follow-the-lady or shell games[ii].

SimCity BuildIt feels to me more a game of attention, time and rhythm than one of zoning and development - more like a personal productivity app than a game. Others may get a great deal of pleasure from it - it is a popular game. Rather than judge the ideology or ethics of a game from an analysis of its images, gameplay or business model, and would always argue that we need to pay attention to actual players and actual modes of play in everyday life. When timed out, many casual game players will simply put the game down for the time being - or in the case of a number of my Masters students - switch to a different free-to-play game of a similar type until they are locked out of that one by which time *Candy Crush* will open up to them again. Such players may use these temporal constraints as a virtue - time-limiting their gameplay in spare moments of the day. Others make it a point of honour not to pay and this can become a kind of game in itself, a metagame of nonpayment and patient resistance.

To adequately address the ways in which players engage playfully, creatively and imaginatively with these different kinds of game economies would require a whole series of talks. It is important to open up this question though. I will do so by positing the concept of economic imaginaries - and through reference firstly, again, to *SimCity*, and then to the recent game *Animal Crossing: new horizons*.

SimCity has long been valued as a toy or tool for exploring and thinking about dynamic and nonlinear systems, such as urban development and complex economic relationships. In this image, the games' designers illustrate two possible broad

trajectories for urban and economic priorities that players might imaginatively engage with. Even without this level of focus and intention to play *SimCity* by necessity demands a level of system thinking in order to play at all, regardless of whether the player explicitly reflects on their understanding of economic drives as they play. Even young children playing *SimCity* must learn and apply a mode of economic thinking - even as they deploy cheats and generate fantastical events - that is quite different to imaginative engagement with other media forms such as books, cinema and TV. *SimCity* would appear to simulate a model of growth and expansion that rules out either environmental concerns or radical alternatives to capitalist growth. *SimCity BuildIt* on the other hand seems to bury deep into everyday life and behaviour, instilling a neoliberal regime of personal time management and productivity, everyday surveillance and monetised sociality along with its themes of growth and trade. Each imposes the dynamics of scarcity, investment and return of classical economic theory, but for reasons that are as much for the structuring of play as they are ideological. And if, as I suggested earlier, virtually all digital games have some economic mechanics underpinning their dynamic virtual worlds and fictions, then most, if not all, gameplay entails this lived and applied economic imaginary.

The question of to what extent this imaginative engagement with virtual economies might map onto a grasp of actual world economic relationships and forces is a compelling one, and one that I will touch on now. At the risk of oversimplification, there are two dominant positions on this question. The first one would be the assertion that digital games are trivial and inconsequential, that gameplay is a distraction from actual learning and engagement with the world. The second takes games seriously, but regards them as ideological devices, their economic models reflecting dominant models of neoliberalism and consumer capitalism. This latter position is evident in media and games studies, particularly among scholars working with a political economy approach. [Sim yuppie example here?]

My interests suggest an alternative line of argument, one that tacks between the two, but never fully embracing either. All games are separate from the everyday practical worlds of work, education, etc. They have their own boundaries of time and space, their own modes of behaviour and social interaction that are rule-bound and driven by playful ends. Young children's play in particular is generally characterised by a dreamlike or phantasmagorical translation of everyday and media events, characters and activities. Digital games too mess with the physics of mundane reality,

sanction ordinarily prohibited behaviour, open up fantasy worlds, and invert social and power relationships. On the other hand though, they are still the products of the industrial and cultural environments and forces and - as I have indicated throughout this talk - are clearly shaped by them.

I refer to this alternative view as a playful economic imaginary. It arises from play *with* the economic systems of value, exchange, production and consumption within virtual games - imaginative play that may not appear to engage at all with wider industrial and economic forces , but which cannot be separated from these forces, forces that produce both digital games and the modes of consumption through which we encounter and play them.

Animal Crossing and economic imaginary

The release of *Animal Crossing: New Horizons* in the UK on March 20th 2020 has proved a remarkable moment of serendipity for both Nintendo and old fans and new players of the *Animal Crossing* games. Released a few days before the UK went into its first full covid19 lockdown, the game promised a charming and undemanding gameplay experience for these worrying new circumstances. Characterised by unique temporal rhythms and demands, this gentle game offers an hour or two a day of relaxed exploration, conversation (with non-player characters, but with the possibility to meet friends online), gathering and collection of natural resources and artefacts, and virtual making or crafting. As such it is ideal for nerves frazzled by viral threats and the transformation of domestic everyday life. The gameworld is synchronised in real time with the actual world, with festivals, birthdays and seasonal changes. For instance back in April my own Animal Crossing island woke up to an explosion of colour as the trees bloomed with cherry blossom. As I walked in the park later in the day, I was struck by the appearance of actual cherry blossom in the trees.

I've been fascinated for over a decade by the *Animal Crossing* universe as a model or simulated economic system, and have outlined my theories of the game's world as a gift economy in my book *Gameworlds*. The game is a virtual economy and society through which natural resources, commodities and emotions flow. The player gathers natural resources for exchange for currency ("bells"): fruit, shells, insects, and fossils are shaken from trees, beach-combed, caught in a net, or dug out of the ground.

Though at first glance the game seems to have financial capitalist underpinnings - for

all his cuteness the character of Tom Nook is the financier of island development, offering loans and mortgages. However, I argue that this is a misreading. Crucially, there are no interest rates in the Animal Crossing world, and no time pressure to repay loans. To be completely accurate there is a very small interest rate that only affects gameplay with small returns on savings after maybe a year or so. Indeed Nintendo had to reduce the interest rate as some players were manipulating the game's clock to move forward in time to accrue large sums of bells. Put simply, I have argued that for all its trappings of mercantile or consumer capitalism , *Animal Crossing* would be better understood as a system of symbolic exchange. The constant buying and selling, gathering and swapping of clothing, food, furniture, gathered and captured insects, fossils and shellfish, is driven not by any capitalist drive to accumulate scarce resources or exploit labour. Rather it is closer to the gift cultures identified by early anthropologists such as Marcel Mauss, in which exchange within and between tribes sustains and accentuates social communications and relationships.

Animals ask the player for a favour (to supply an apple or particular type of fish) and then reward the player with an object (an item of clothing, furniture or ornament), or they often respond to a visit or kind word from the player with a gift. Both pleasantries and objects flow between characters, cementing relationships and community. The animals offer inconsequential items and quirky epigrams, gifts given and received in mutually satisfying reciprocity. The bells accumulated by the player from these transactions are either fed back into the community through public works (park benches, bridges) or are spent on personal adornment or on enlarging and decorating the player's house, in an odd mix of municipal socialism and potlatch performativity.

The novel conditions and new everyday cultures of the Spring lockdown lent themselves to playful comparisons to *Animal Crossing*, from ramped up online communication with work and family to foraging for resources, and moments of temporally and spatially constrained outdoor exercise. These photos were all taken in the Spring within 200m of my house in south Bristol. We can see the performative decoration of house windows, sharing appreciation of key workers and the National Health Service, the redistribution of goods through leaving toys, books and kitchenware out in the street for passers-by to collect, new mini-games on social media or chalked on park paths, socially distanced street get-togethers, care for elderly or self-isolating neighbours, new hyper-local social media groups for support and sociality: overall a new spontaneous street-level gift culture of symbolic and

social exchange.

Animal Crossing has prompted comparisons with, and insights on, the post 2008 crash and current pandemic ramifications for global economic, political and social realities. Partly playful - and partly serious. I discussed this with the journalist Samuel Horti, for his article in the *New Statesman* magazine. Horti offered his own perceptive observations on the resonances and contrasts between the 0% interest finance of Tom Nook's home loans and the ability to bash money from rocks and shake valuable fruit from the trees in *Animal Crossing,* with the prevailing *actual* world economics of near-zero interest rates, frozen mortgages and job losses on the one hand and resistance to austerity, massive investment in furlough schemes, calls for shorter working weeks and universal basic incomes on the other. By playing with virtual economic systems we might open up new ideas about scarcity and plenitude, social and cultural resources and exchange. If money can be produced in abundance and resources mobilised on a national and global scale unprecedented in peacetime, to serve the needs of society as a whole, then *Animal Crossing* might one day be seen as not only the game that helped us through the day-to-day anxieties of the pandemic , but also as the economic imaginary that fed into a glimpse of a different future.

To conclude...

From the perspective of economists or entrepreneurs approaching networked marketplaces these game mechanics offer a rich set of ideas and techniques for digital business models in their own right. For me, as a researcher of digital culture as both aesthetics and lived experience, they open up fascinating questions about the ethics and politics of networked and virtual cultural economy at the level of the everyday, and - as we've seen - on the one hand new modes of shaping everyday media attention and temporality, and on the other, a new, vernacular economic thinking and imagination.

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[i] I'm leaving aside the material and ecological costs of the digital economy, from the energy expended cooling vast server farms to the planned obsolescence and upgrade culture of smart device production to ecological costs of rare earth mineral extraction - these costs are not as yet factored in to the digital economy.

[ii] The role of social media platforms is integral to the free-to-play economy. I haven't got time now to go into detail on this, but would note that David Nieborg regards social media connectivity as one of three key aspects of the commodity form of free-to-play games. As a business strategy this

commodity form is a neo-Taylorist virtuous cycle of attention, advertising, data mining and social media connectivity, a multi-sided strategy and 'symbiotic technological and economic relationship between [producers] and their host platforms' (Nieborg 2015: 2).