

Internet Economics and Financial Technology
Computer Science COMSM0019

Lecture 14: Economies in Games; Economics of Gaming

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University of
BRISTOL

Why are we talking about computer games?

Why are we talking about computer games?

Sep 2014

The image shows a newspaper clipping from the Financial Times. At the top left is the Microsoft Corp logo. To its right is a red button with the text '+ Add to myFT'. Below the logo is the main headline: "Microsoft buys Minecraft maker for \$2.5bn". A sub-headline reads: "Co-founder says deal is not about money but 'about my sanity'". Below the text is a large screenshot of the Minecraft game, showing a character and various blocky environments. A watermark for "State_of_decay_logo.jpg" is visible across the image. In the bottom left corner of the screenshot, the text "Mojang's Minecraft game" is written. At the very bottom of the clipping, there is some smaller text: "Richard Milne in Stockholm, Arash Massoudi in London and Richard Waters in San Francisco SEPTEMBER 15, 2014".

Markus "Notch" Persson said he
preserve his sanity

Why are we talking about computer games?

Aug 2015

The stage at Frankfurt's Commerzbank-Arena during the Gamescom trade fair.

FINANCIAL TIMES

HOME WORLD UK COMPANIES MARKETS OPINION WORK & CAREERS LIFE & ARTS

FT Magazine + Add to myFT

Let the egames begin

How computer gaming came out of the bedroom to become a \$100bn industry

Read next

Undercover Economist
Game-changers: the imp...
the puzzle

WANT ACCESS TO A RANGE OF FINANCIAL EXPERTISE?

Why are we talking about computer games?

July 2016

myFT

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FINANCIAL TIMES

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Supercell + Add to myFT

Tencent buys stake in 'Clash of Clans' maker Supercell for \$8.6bn

Chinese tech group acquires asset from SoftBank, as Japanese company seeks to cut debt



Supercell has focused on a small number of titles

Read next

Tencent beats expectations as smartphone games take off

WANT ACCESS TO A FULL RANGE OF FINANCIAL EXPERTISE?

DISCOVER MORE

Page 5

Why are we talking about computer games?

Oct 2018

fastFT Games industry + Add to myFT

Fortnite developer Epic Games raises \$1.25bn

Investment led by private equity group KKR

HAVE YOU PLAYED FORTNITE BEFORE?
IF SO, THEN WE CAN FIND YOUR ACCOUNT WITH ALL YOUR
PROGRESS AND PURCHASES.

© Bloomberg

Tim Bradshaw in San Francisco OCTOBER 26, 2018

Fortnite's developer Epic Games has received a huge new power-up in the form of a \$1.25bn investment led by private equity group KKR.

Why are we talking about computer games?

May 2019

Forbes

Billionaires Innovation Leadership Money Business Small Business Lifestyle Lists Advisor Fea

Exclusive: The Saga Of 'Star Citizen,' A Video Game That Raised \$300 Million But May Never Be Ready To Play

Matt Perez Forbes Staff Games
I write about video games and esports.

Nathan Vardi Forbes Staff Hedge Funds & Private Equity
Following the money trail

This story appears in the May 31, 2019 issue of Forbes Magazine. [Subscribe](#)

f t in

I t's October 2018 and 2,000 video game fanatics are jammed into Austin's Long Center for the Performing Arts to get a glimpse of *Star Citizen*, the sprawling online multiplayer game being made by legendary designer Chris Roberts. Most of the people here helped to pay for the game's development—on average, \$200 each, although some backers have given thousands. An epic sci-fi fantasy, *Star Citizen* was supposed to be finished in 2014. But after seven years of work, no one—least of all Roberts—has a clue as to when it will be done. But despite the disappointments and delays, this crowd is cheering for Roberts. They roar as the 50-year-old Englishman jumps onto the stage and a big screen lights up with the latest test version of *Star Citizen*.

<https://www.forbes.com/sites/mattperez/2019/05/01/exclusive-the-saga-of-star-citizen-a-video-game-that-raised-300-millionbut-may-never-be-ready-to-play/#68c63c635ac9>

Why are we talking about computer games?

Aug 2019

The screenshot shows a news article from the Financial Times website. The header features the FT logo and navigation links for Home, World, UK, Companies, Tech, Markets, Graphics, Opinion, Work & Careers, Life & Arts, and How to Spend It. The main headline is "Fame and 'Fortnite' – inside the global gaming phenomenon". Below the headline is a sub-headline: "It's captivated a generation of teens. Now it's making millionaires of its star players". The author is Anna Nicolaou, and the date is August 2, 2019. The article includes a "Listen to this article" feature powered by Curio.io, a progress bar for a 18:10 video, and a "Save" button. A sidebar on the left has social sharing icons for Twitter, Facebook, LinkedIn, and a "Share" link. The right side of the image shows a large photograph of two young boys at a gaming tournament, with a screen in the background displaying a Fortnite match.

Why are we talking about computer games?

Dec 2019

FINANCIAL TIMES

HOME WORLD UK COMPANIES TECH MARKETS GRAPHICS OPINION WORK & CAREERS LIFE & ARTS HOW TO SPEND IT

Latest on Twitch Interactive Inc

Fox invests \$100m in streaming start-up Caffeine

The challenge of monitoring online debate

Opinion Twitch Interactive Inc

Twitch shows how hard it is to foresee the jobs of the future

How can we best prepare workforces for the unforeseeable new roles created by tech?

JOHN THORNHILL + Add to myFT

A teenager watches someone else playing Fortnite on the twitch platform.

John Thornhill

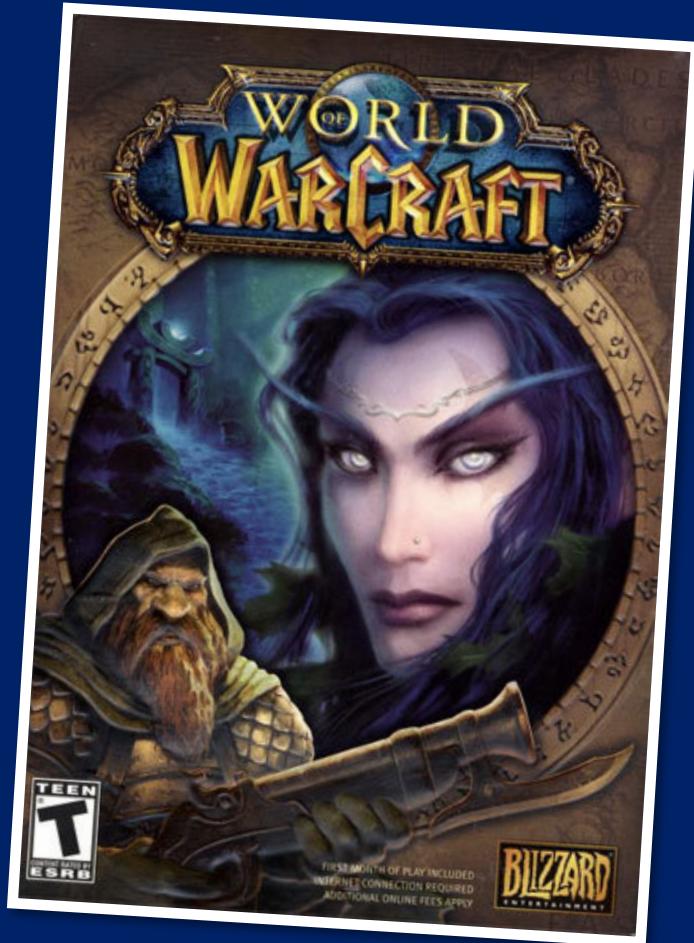
Meet Chris Pucke gaming host

Le Menu

- Economies in Online Games
- Gold Farming
- Game Development Economics

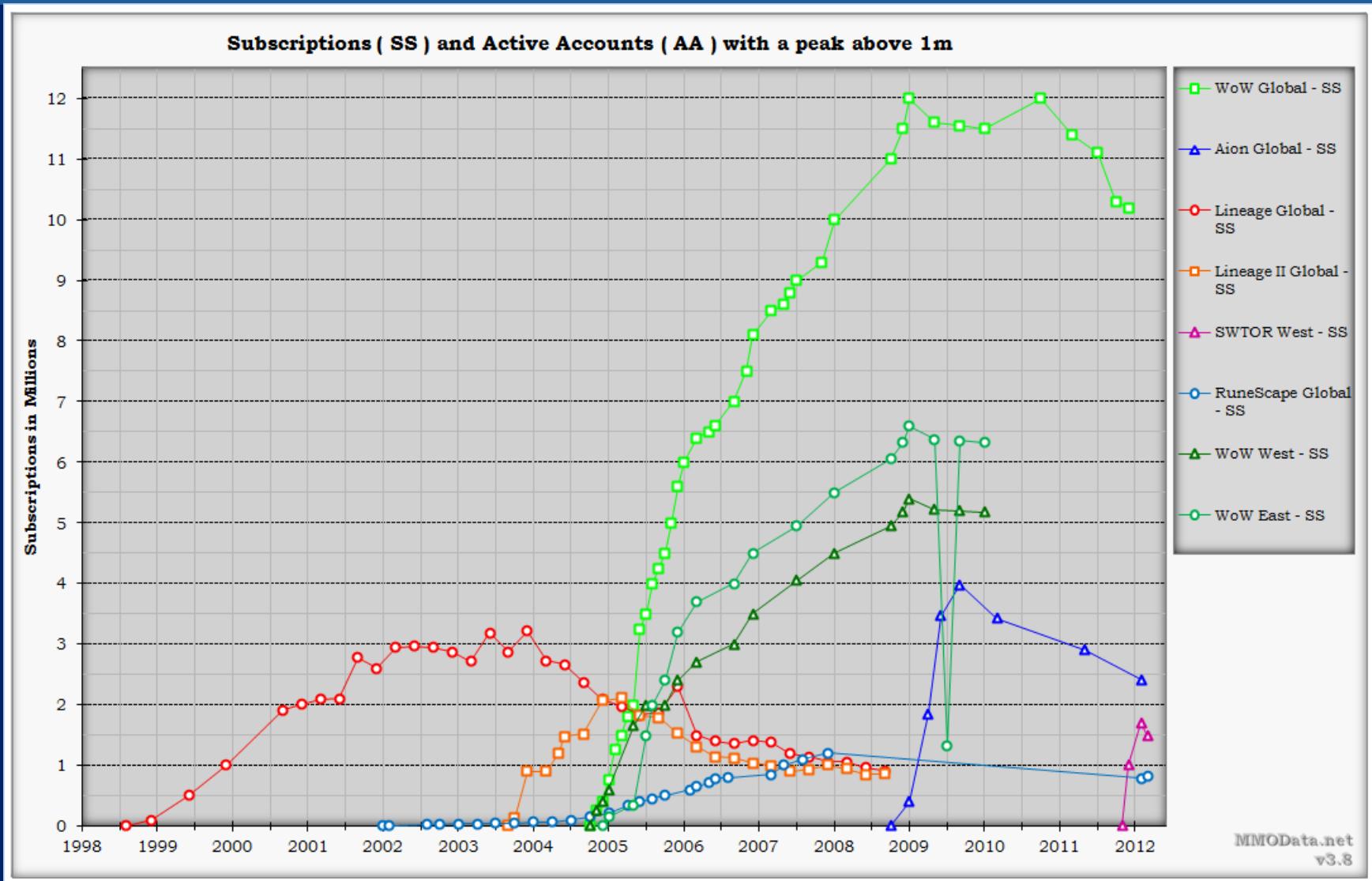
World of WarCraft

- Massively Multiplayer Online Role-Playing Game (MMORPG), launched in 2004
- Game in which a large number (>500) of players can interact with each other in a shared, persistent, online world
 - Any one player might experience and interact with a few hundred other players, but total number of simultaneous players can be MUCH higher (>1,000,000)
- Players' characters (avatars) are persistent and show some sort of advancement over time
- By 2012, WoW had >10M active subscribers



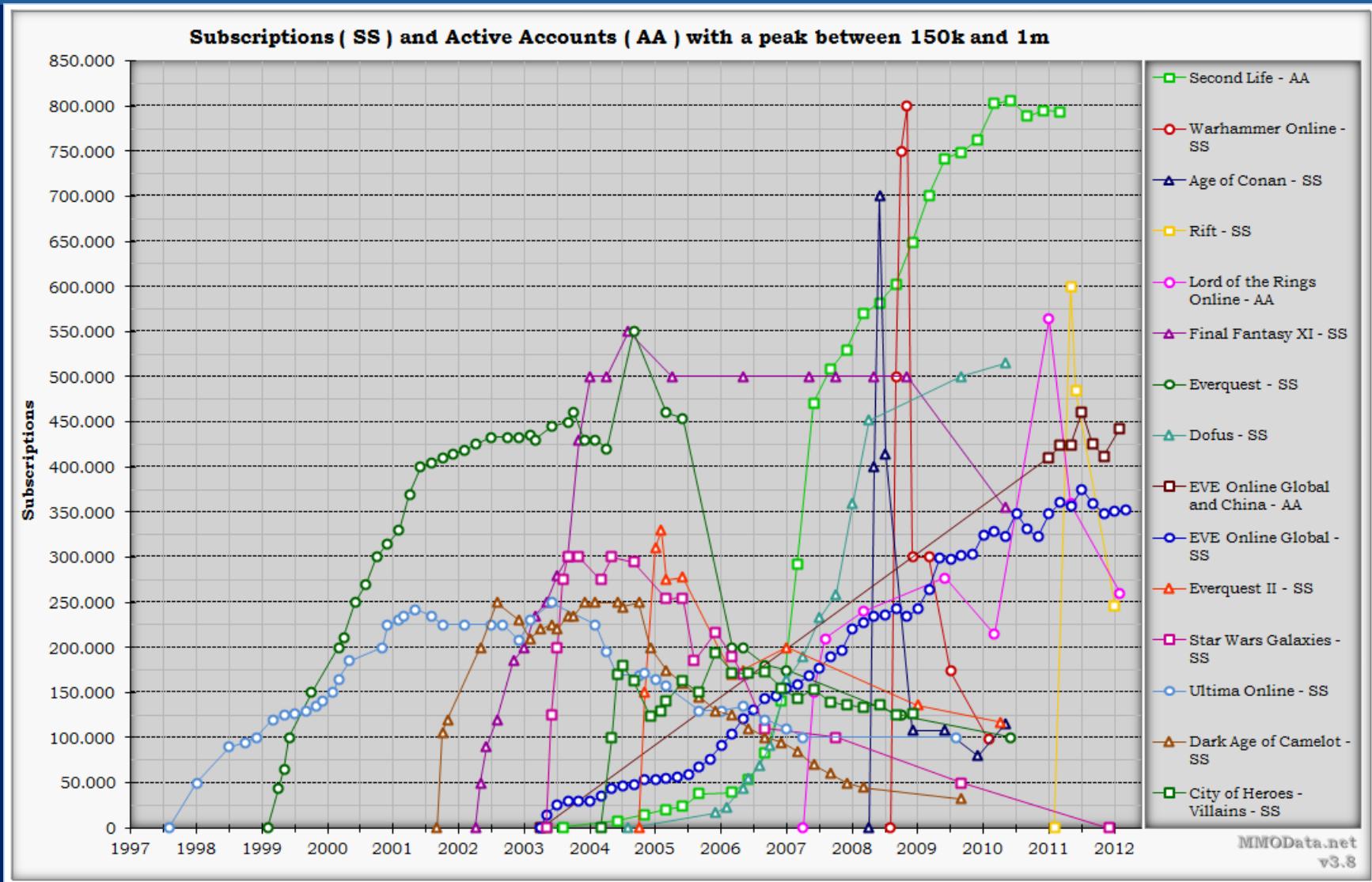
WoW/MMO stats

Graphs from mmodata.net



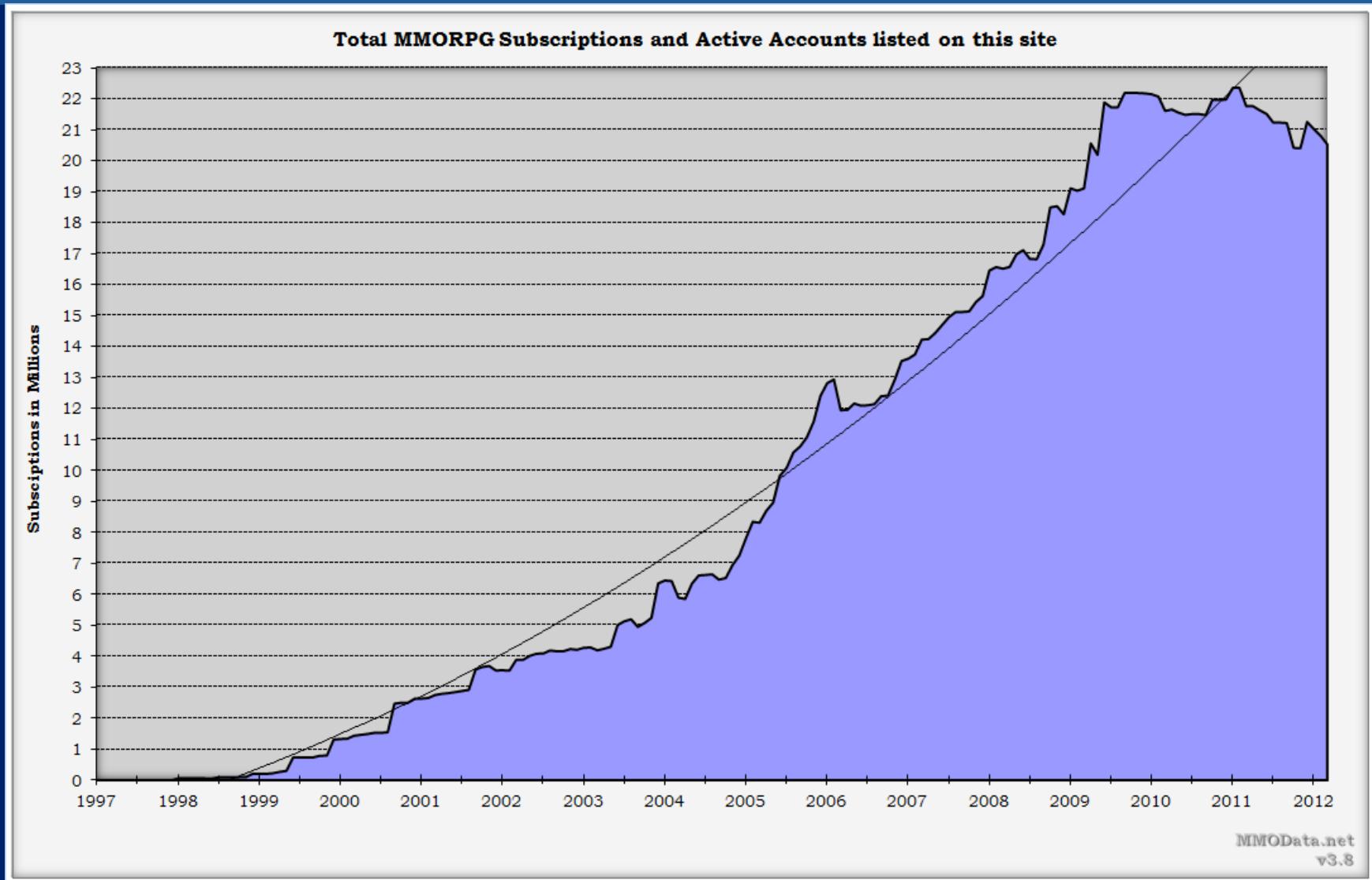
WoW/MMO stats

Graphs from mmodata.net



WoW/MMO stats

Graphs from mmodata.net



WoW!

Saturday, December 28, 2013

Version 4.1 thoughts and comments

Graphs from mmodata.net

Hey all

Well I have some good but mostly bad news for anyone who liked and followed MMOData.net.

v4.1 will be the final version of MMOData.net, and MMOData.net will close down on June 2014.

That's right I am closing shop.

The biggest reason is that it is getting increasingly difficult to get any useful numbers. Also many of the subscription based MMORPG's went free to play, and their companies tend to not give out useful active accounts numbers.

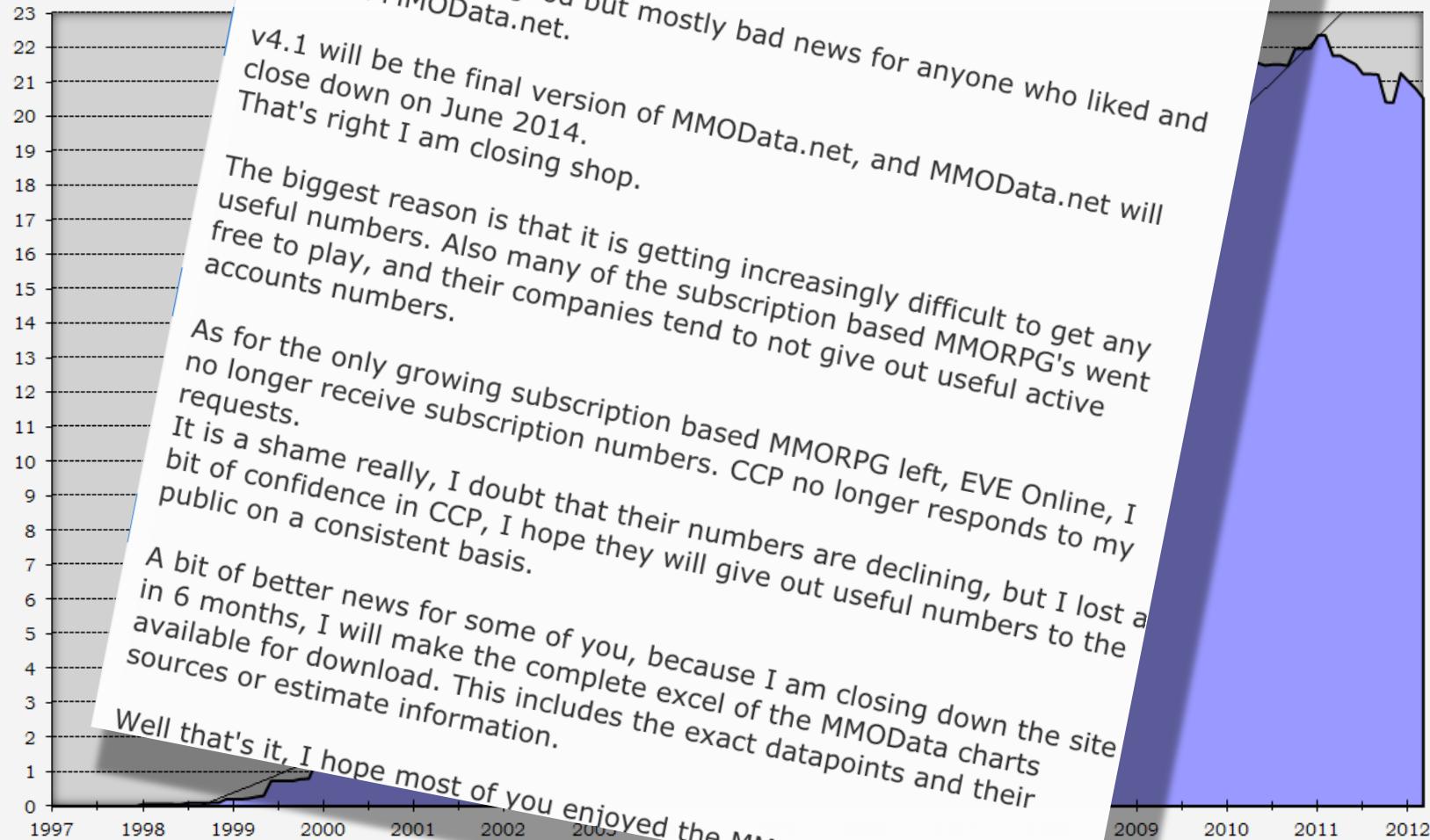
As for the only growing subscription based MMORPG left, EVE Online, I no longer receive subscription numbers. CCP no longer responds to my requests.

It is a shame really, I doubt that their numbers are declining, but I lost a bit of confidence in CCP, I hope they will give out useful numbers to the public on a consistent basis.

A bit of better news for some of you, because I am closing down the site in 6 months, I will make the complete excel of the MMOData charts available for download. This includes the exact datapoints and their sources or estimate information.

Well that's it, I hope most of you enjoyed the MMOData charts, and

Subscriptions in Millions



MMOData.net
v3.8

“Virtual” Game Economics

- WoW has a very vibrant internal economy
- In-game trade *between players* in many different items (usually through auctions):
 - Raw materials for crafting
 - Crafted products
 - Rare items
- Different shards/servers have identical starting conditions but different economies
- Each is a complex system driven by the players and the environment

“Virtual” Game Economics

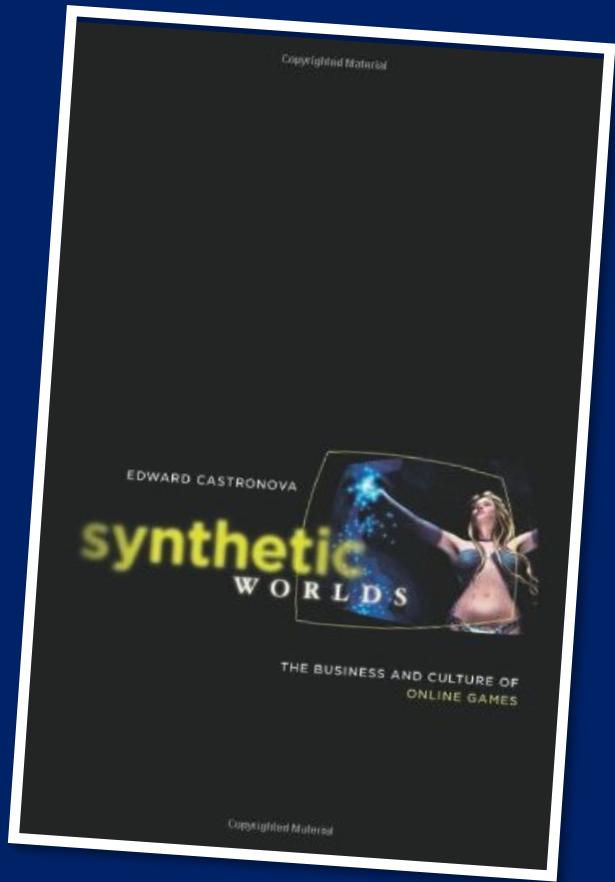


“Virtual” Game Economics

- In-game virtual economies have many of the same issues as real economies
- For a persistent world to maintain a stable economy, a balance must be struck between currency **sources** and **sinks**
- If imbalances exist, this can lead to “MUDflation” (*MUD=Multi-User-Dungeon*)
- Designing/managing vibrant & stable MMORPG economies is difficult
- Players create their own “meta currencies” – e.g. Dragon Kill Points (DKP)
- Virtual crime is also a problem in some games
- Crucially, the membrane between real and virtual worlds is permeable

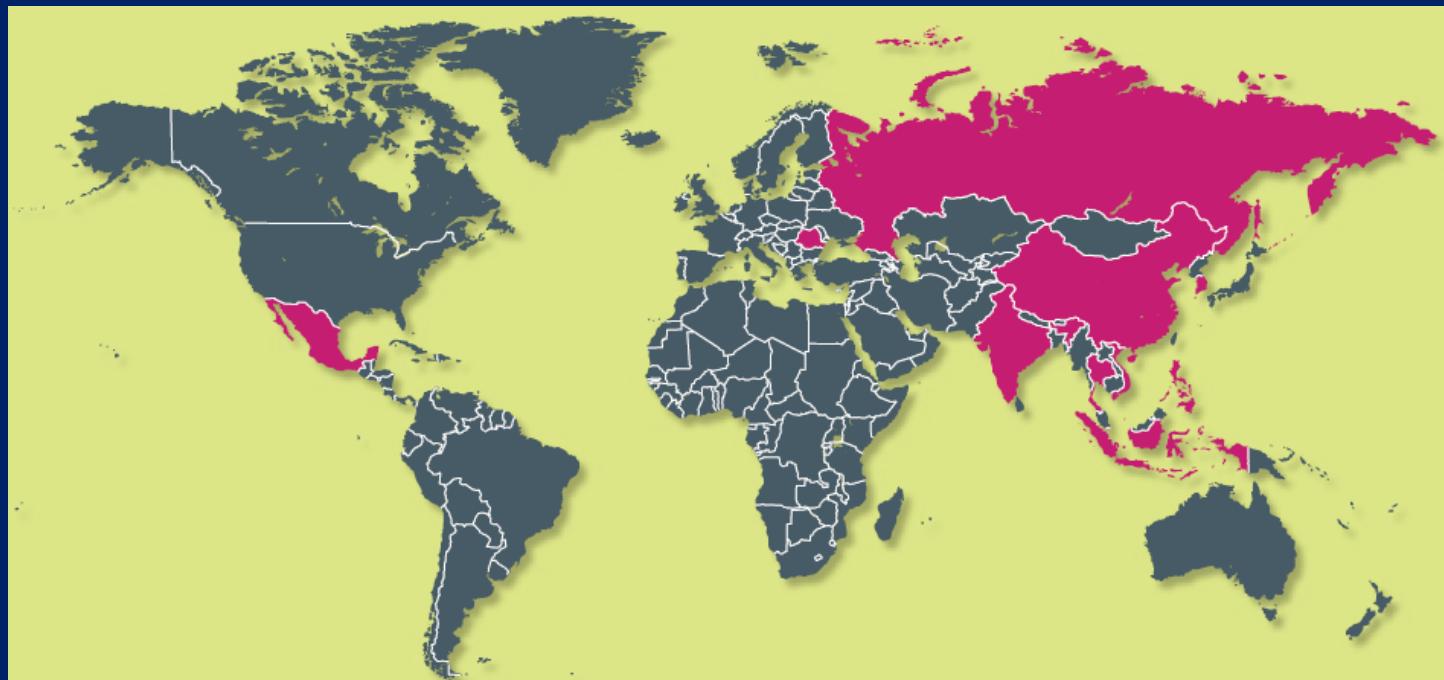
“Real” Game Economics

- Some players don't want to play fair...
- Castranova's 2001 analysis of *Everquest* (EQ)
- Exchange rate between EQ Gold and US\$
- EQ's GDP per capita higher than many real-world countries (e.g. Bulgaria)
- In such countries, it makes sense to ‘work’ in a virtual world...



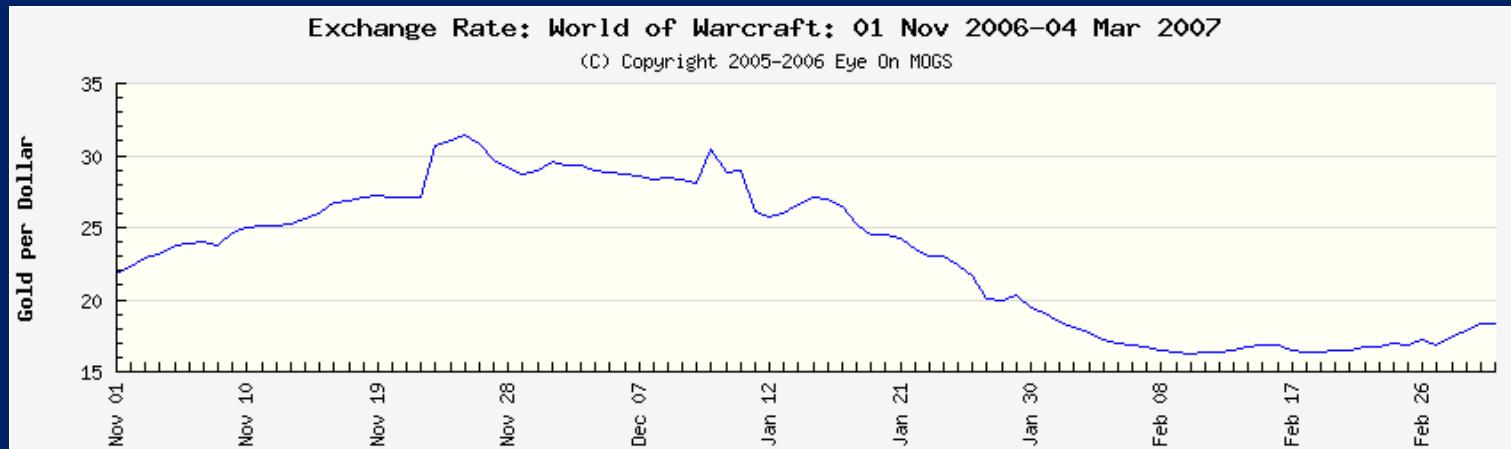
Gold Farming Overview

- This led to ‘Gold Farming’
- At peak, over 500,000 people worked in this industry world-wide



Gold Farming Overview

- There are sites that track exchange rates



- The distinction between real and virtual becomes more blurred
- Such activity is against the game's EULA (End-User License Agreement)
- Like many industries, Gold Farming is becoming increasingly automated

Gold Farming Economics

- Gold Farming shows classic sequence of development
 - Subsistence – Barter – Monetisation
 - Wage Labour – Globalisation/Offshoring – Automation
- What Gold Farmers do...
 - Selling in-game currency
 - Selling in-game items
 - Power-levelling
- Does it matter?

2014: Gold Farming in Numbers

50 million: Number of global MMO game players

(20 million subscription players)

100,000 to 1 million: Estimated number of gold farmers

\$150 – Average monthly salary of a gold farmer in China

\$4.00 – Usual piecework rate for every 1,000 WoW gold gathered

60,000 to 100,000 – Number of gold-farming firms worldwide

\$200m to \$3bn – Estimated total real-money trading worldwide (gold-farming and other unauthorized online game goods and services)

\$400: Cost of power-levelling (getting to level 75 in Final Fantasy XI)

\$13.50: Exchange rate for 5 million gold pieces for the game RuneScape

\$1.3m: Highest reported amount made by a gold farmer over a 2-year period

4m to 12m: Estimated number of consumers of gold-farming services

2014: Gold

Undercover Economist FT Magazine

+ Add to myFT

Game on for the virtual sweatshop

A new 'World of Warcraft' expansion could put thousands of poor players out of business

50 million: Number of people

(20 million subscribers)

100,000 to 1 million: Number of farms

\$150 – Average monthly income

\$4.00 – Usual price of a virtual item

60,000 to 100,000: Number of farms

\$200m to \$3bn: Total value of the gold

farming and trading industry

\$400: Cost of purchasing a virtual item

\$13.50: Exchange rate between gold and US dollars

\$1.3m: Highest recorded weekly earnings from gold farming

4m to 12m: Estimated number of people

Tim Harford JANUARY 7 2011

I'm a board game fan myself, but I know that millions of people spent their Christmas exploring the underwater realm of Vashj'ir, thanks to the online computer game, *World of Warcraft*, which launched a new version, Cataclysm, in December.

Loyal readers will know why economists find such games interesting: they are virtual worlds in which millions of people spend many hours interacting, creating experiences and goods that other players value, and even spending real money on virtual items. (Crazy? No more crazy than paying to watch a movie.)

Facebook applications such as FarmVille have many more users. But it is the great online role-playing games – and none is bigger than *World of Warcraft*, with 12 million users paying a monthly subscription – which hold an enduring fascination for the way that they blur the line between virtual life and real life.

One notable feature is “gold farming”, in which time-rich, cash-poor players carry out boring in-game tasks – “grinding” – and then sell the results to time-poor, cash-rich players. Julian Dibbell, author of *Play Money*, spent a year trying to live only off his earnings in virtual worlds – which eventually reached \$3,000-\$4,000 a month.

2014: Co

50 million: N

(20 million su

100,000 to 1

\$150 – Average

\$4.00 – Usual

60,000 to 100,

\$200m to \$3br

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\$1.3m: Highest

4m to 12m: Esti

INFORMATION TECHNOLOGY

Undercover Econ

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REAL MONEY from VIRTUAL WORLDS

Online fantasy games enable developing world entrepreneurs to make a living by trading stashes of make-believe gold for hard cash **By Richard Heeks**

KEY CONCEPTS

- A new type of service industry has emerged to meet the needs of the millions who play online fantasy games such as World of Warcraft.
- Players called gold farmers amass game "currency" to sell it to other players for a fee.
- This controversial practice violates the rules of play but has become a means for tens of thousands of developing world players to earn a wage comparable to that of factory workers.

—The Editors

It sounds like a digital alchemist's question. How do you turn virtual gold into the real item? Hundreds of thousands of "gold farmers" in developing countries have found a lucrative answer. They have become entrepreneurs who make their living by profiting from online games. By assuming fantasy roles in these games, they kill monsters, mine ore or engage in other activities that earn "virtual gold" that they then sell to other players, often in rich nations, for real-world currency. Although it flouts the rules of the game, buyers and sellers of this make-believe currency use the gold to determine the fate of a character in these fantasy games.

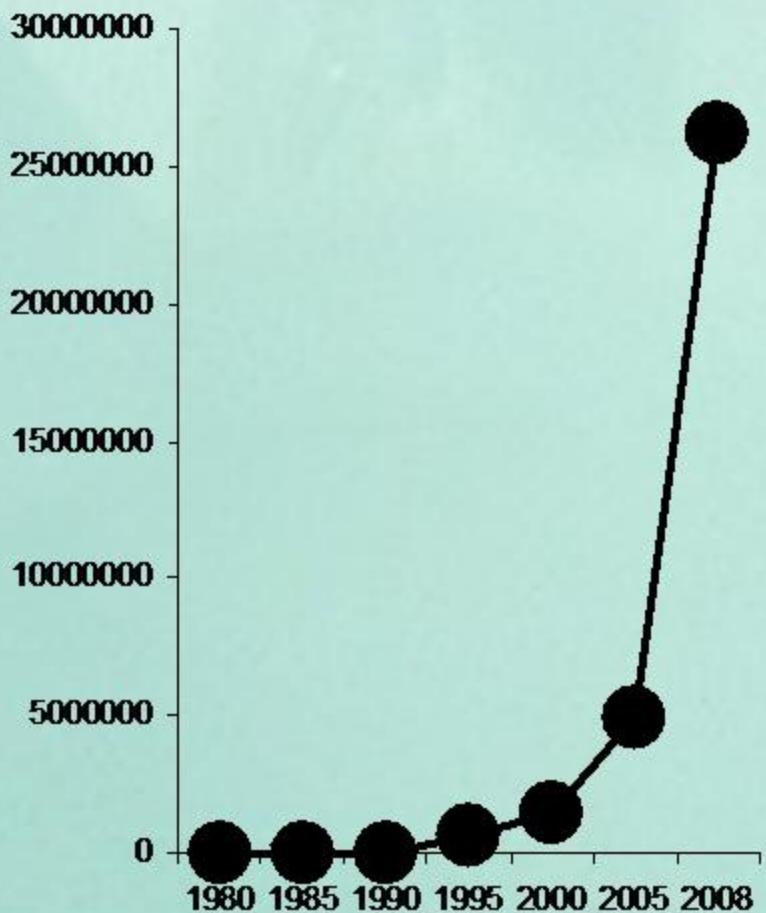
A gold farmer in China who plays games and sells virtual currency can earn the same wage and, sometimes, more than might be paid for assembling toys in a factory for 12 hours a day. As a result, this activity has emerged in the past 10 years as an ingenious, though controversial, way for poorer nations to earn money from information and communications technologies and a way for impoverished workers to build digital skills

that might be later transferred to other information technology jobs unrelated to game playing.

In just a few years gold farming has become a vast enterprise. A best estimate suggests that Asia, and particularly China, where most of the gold farmers reside, employs more than 400,000 players who spend their days amassing gold. Total annual trade in virtual gold probably amounts to at least \$1 billion. Perhaps as many as 10 million players worldwide buy gold from farmers or services that help them advance in the game.

Once almost invisible to nongamers, gold farming now draws considerable attention from economists and sociologists as a nexus where rich and poor, real and virtual intersect. In recent years economists, sociologists and popular media have developed a fascination for the dynamics of games that represent tiny worlds in fast forward—the fates of players and groups rise and fall in a matter of days and weeks rather than the decades or centuries that represent a human lifespan or an entire society. I became interested in gold farming after encountering virtual gold merchants while

Economics of Game Production

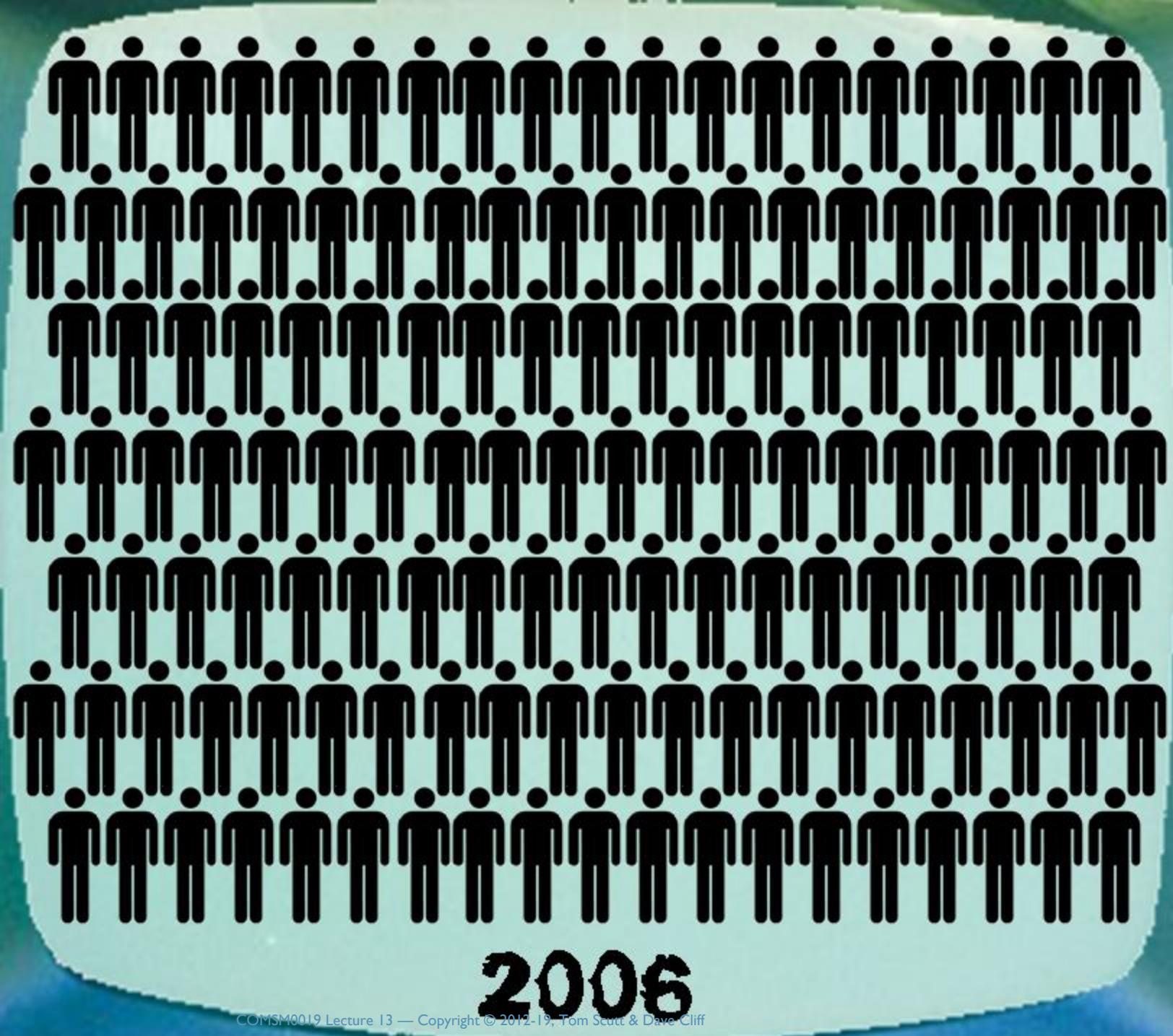


Those first few numbers are 8k, 64k, that sort of thing.

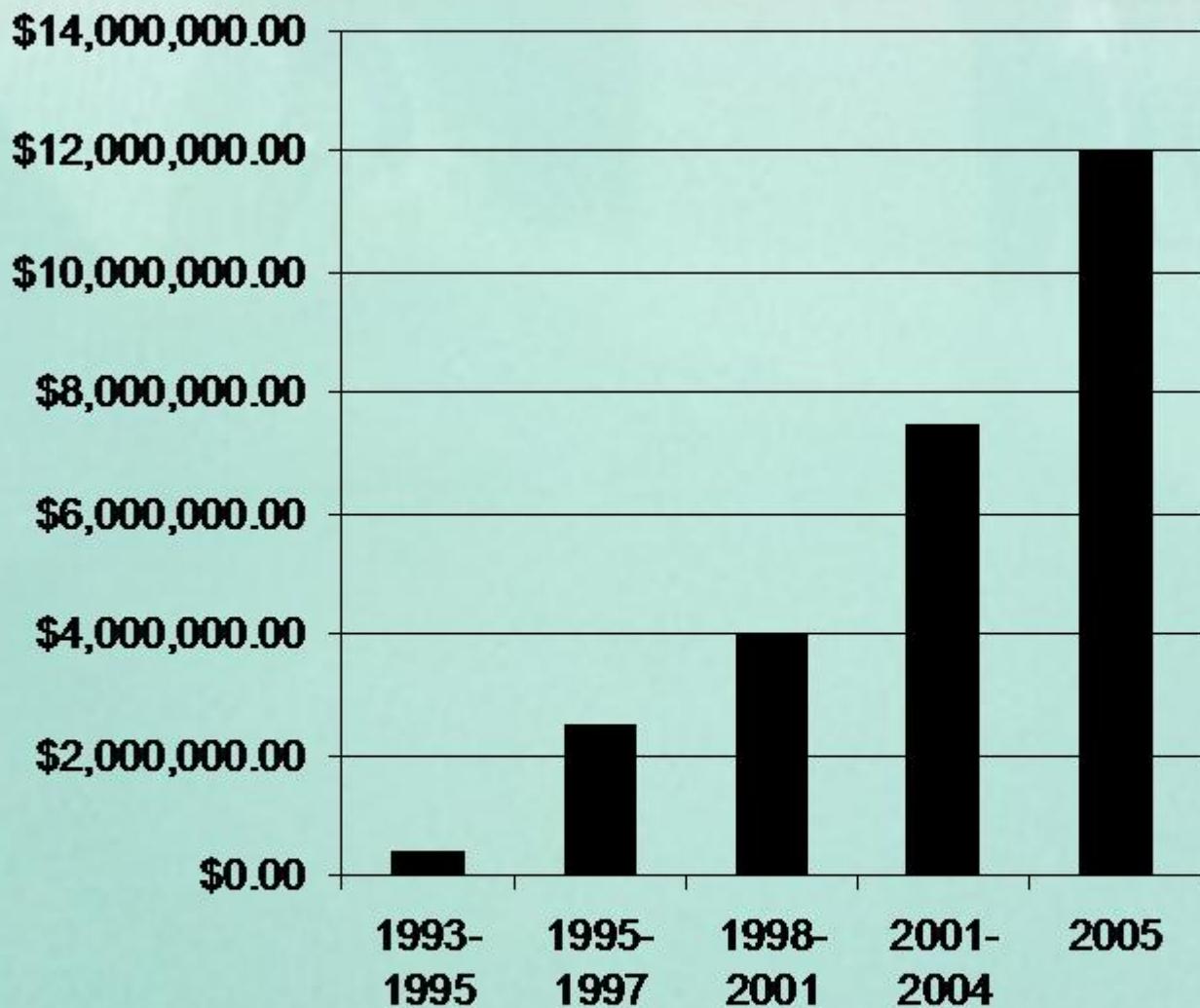
SIZE OF GAMES OVER TIME



1982 GAME TEAM



2006



GAME BUDGETS OVER TIME

What about more recent numbers?

Steve Theodore on games budgets

- Theodore's blog: blog.theodox.com

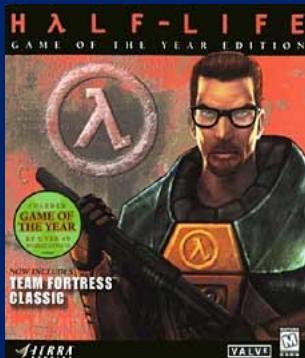
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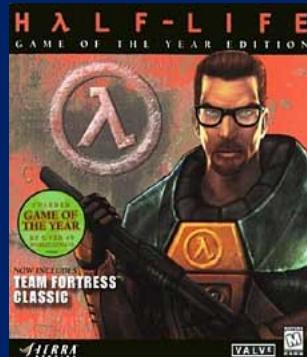
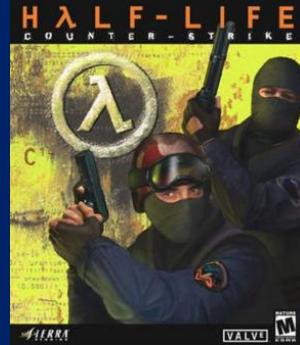
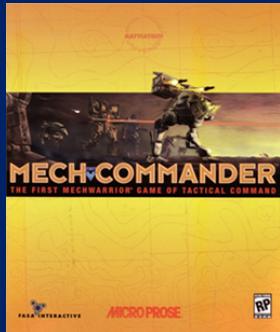
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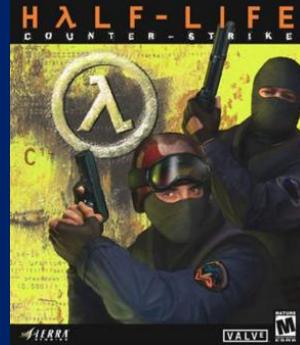
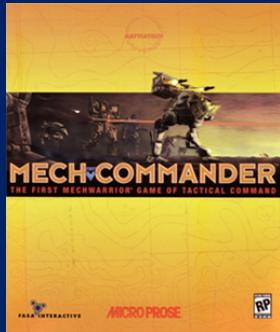
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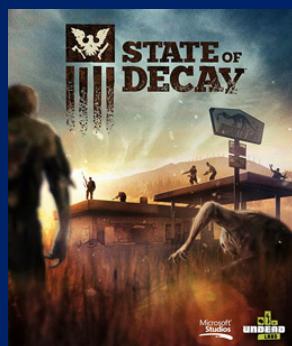
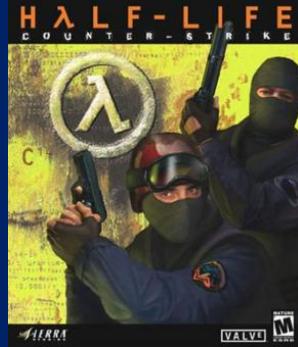
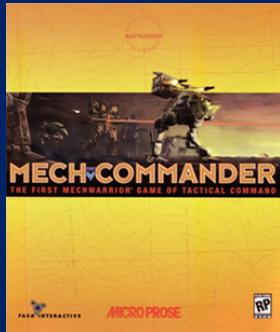
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2014

Steve Theodore on games budgets

- Theodore writing in Forbes, Oct 31 2016

<https://www.forbes.com/sites/quora/2016/10/31/why-have-video-game-budgets-skyrocketed-in-recent-years/>

- Video game budget increases driven by 2 trends traceable to past 10-15 years
- Real budgets are closely guarded secrets, especially on big projects
- Top-budget (AAA) game budgets now many hundreds of millions of dollars
- *Average* game budget has fallen because avg game is a small title by 10-15 people
 - Usually on a shoe-string budget
 - A tiny fraction become noteworthy/profitable successes, the rest fail
- Big shift: loss of mid-sized studios with 50-75 people, \$25M budget projects
 - Either absorbed by a gorilla company or fragmented into mobile/casual/f2p
 - Shift has two causes: growth of **content cost** and of **marketing costs**

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Content Costs: total labor costs, number of content creators, is much higher per workpackage – number of person-days to create/animate a character has gone from c.10 to c.100; creative jobs have fragmented by expertise

- Games devs tired of being small cogs in big studios left to make indie games
- But for big studios, rising content costs are **useful**:

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- *“Not everybody can raise \$400M in development costs and \$300M in marketing; not everybody can actually manage to coordinate the efforts of a 700-person team on three continents. If you’re lucky enough (and rich enough) to be in that kind of business you have many many fewer competitors and a correspondingly rosier economic future.”*

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- “*The problem, ... is that its very hard to take creative risks when you’re borrowing a quarter of a billion dollars to fund your project (and remember: if the developer spends \$250 million, they have to earn more like \$350 million before they see any profit at all!). Thus, the well known and easy to complain about sequelitis, lack of innovation and overall me-too-ism in the AAA space.*”

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- *“Hollywood has had to do the same thing, in a world where everybody with an HD camera and some acting school friends can tell a moving story or comment on society, telling moving stories and commenting on society is a low-margin business.”*

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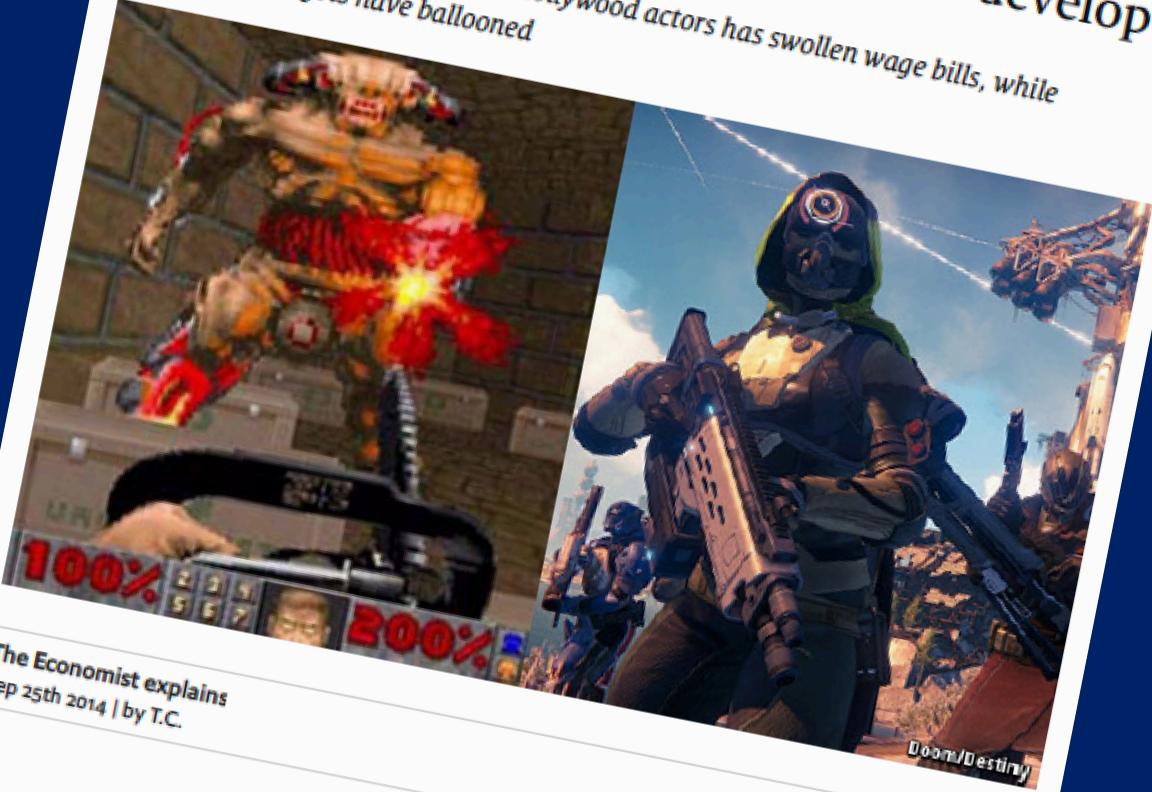
- “*Hollywood has had to do the same thing, in a world where everybody with an HD camera and some acting school friends can tell a moving story or comment on society, telling moving stories and commenting on society is a low-margin business.*”
- “*Life was pretty cushy back when making games was technologically hard. Now that any kid with gumption can download Unreal or Unity and start with an engine that, frankly, beats the pants off the best engines of the early 2000s, now that there are dozens of schools cranking out artists and animators, developers are in the same kind of squeeze that music and movie producers face: there's always somebody smart and hungry and willing to work for peanuts. Either you have to go ultra-lean and be really, really efficient or you have to go large and simply out-spend most possible rivals. If you're just there in the middle, things are pretty rough.*”

The Economist, Sep 2014

The Economist explains

Why video games are so expensive to develop

Hiring more graphic artists and Hollywood actors has swollen wage bills, while marketing budgets have ballooned



Doom/Destiny

The Economist explains
Sep 25th 2014 | by T.C.

WHEN Activision, a big games publisher, released its annual financial results last month, it was not just covered in the gaming media. It was eye-watering.

Mid-range games studios closed since 2006

- Source: <https://kotaku.com/5876693/every-game-studio-thats-closed-down-since-2006>

3D Realms - 2009	Factor 5 - 2009	Kush Games - 2008	Sandblast Games (THQ) - 2008
7 Studios (Activision) - 2011	FASA (Microsoft) - 2007	Locomotive Games (THQ) - 2010	SEGA San Francisco - 2010
Backbone Vancouver	Fizz Factor - 2009	Luxoflux - 2010	Shaba Games (Activision) - 2009
BigBig (Sony) - 2012	Flagship Studios - 2008	Mass Media (THQ) - 2008	SOE Denver - 2011
Bizarre Creations (Activision) - 2011	Flight Plan - 2010	Monte Cristo - 2010	SOE Seattle - 2011
Black Rock (Disney) - 2011	Frozen North Productions	Monumental Games - 2012	SOE Tuscon - 2011
Blue Fang Games - 2011	FuzzyEyes - 2009	Midway Austin - 2009	Stormfront Studios - 2008
Blue Tongue (THQ) - 2011	Gamelab - 2009	Midway Newcastle - 2009	Straylight Studios - 2009
BottleRocket - 2009	Game Republic - 2011	MTV Games - 2011	Team Bondi - 2011
Brash Entertainment - 2008	GRIN - 2009	Multiverse - 2012	The Code Monkeys - 2011
Budcat (Activision) - 2010	Helixe (THQ) - 2008	NetDevil - 2011	Titan Studios - 2009
Castaway Entertainment - 2008	Hudson Entertainment - 2011	Ninja Studio - 2009	THQ Studio Australia - 2009
Cheyenne Mountain - 2010	Humannature Studio (Nexon) - 2009	Outerlight - 2010	THQ Digital Warrington - 2009
Cing - 2010	Ignition London - 2010	PAM Development (Take-Two) - 2008	Transmission Games - 2009
Clover Studios (Capcom) - 2006	Ignition Florida - 2010	Pandemic Australia (EA) - 2009	Universomo (THQ) - 2009
Codemasters Guildford - 2011	Incognito Entertainment (Sony) - 2009	Pandemic LA (EA) - 2009	Venom Games (Take Two) - 2008
Cohort Studios - 2011	Indie Built (Take-Two) - 2006	Paradigm Entertainment - 2008	Vicarious Visions California - 2007
Concrete Games - 2008	Iron Lore - 2008	Pi Studios - 2011	Visceral Australia (EA) - 2011
Deep Silver Vienna - 2010	Juice Games (THQ) - 2011	Pivotal Games (Take-Two) - 2008	Wolfpack Studios - 2006
DICE Canada - 2006	Kaos Studios (THQ) - 2011	Propaganda Games (Disney) - 2011	Yuke's Company Of America - 2010
EA Chicago - 2007	Killaware - 2011	Pseudo Interactive - 2008	Zoe Mode London - 2009
EA Bright Light - 2011/2012	Killspace Entertainment - 2011	Rainbow Studios (THQ) - 2011	
EA Japan - 2007	KMM Brisbane - 2011	Realtime Worlds - 2010	
Eidos Manchester - 2009	Krome Studios (skeleton crew?) - 2010	Rebellion Derby - 2010	
Eidos Hungary - 2010	Kuju Manila - 2009	Red Octane - 2010	
Ensemble Studios (Microsoft) - 2008	Kuju Chemistry - 2009	Rockstar Vienna - 2006	

UK games economy: lots of micro-businesses

Apr 2016

Digital Media + Add to myFT

British game developers take on world from their bedrooms

Nine out of ten UK game makers are small or micro businesses

Nicholas Megaw APRIL 8, 2016

□ 9 □



UK developers pitch their games

FT BUSINESS

▶

Tony Gowland's new company is a little smaller than his last one.

After being a lead designer for Rockstar North, whose *Grand Theft Auto V*

<https://www.ft.com/content/24140ac0-fcd2-11e5-b5f5-070dca6d0a0d>

WoW still going strong

- August 2018
- Blizzard release WoW “Battle for Azeroth”, sells 3.4M units on day of release; c.\$180M
- WoW staff let slip that subscriptions > 10M

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HOME > GAMING > BATTLE FOR AZEROTH SMASHES LAUNCH RECORDS AS PLAYERS RETURN TO THE WORLD OF WARCRAFT

Battle for Azeroth Smashes Launch Records as Players Return to the World of Warcraft

By Joel Hruska on August 24, 2018 at 10:28 am | [26 Comments](#)

28 SHARES



Another blockbuster

- Fri October 26th 2018
- Rockstar Games release “Red Dead Redemption II”
- 17 million units in first 2 weeks
- \$725M sales on opening weekend
- Total sales 23 million by Dec 31st; revenue returned to Rockstar estimated at ~\$1Bn
- Dean Takahashi, Feb'19 estimates:
 - Content costs ~\$240M
 - Market costs ~\$300M
 - Profit ~\$460M (for first quarter)



Summary

- Many interesting, complex economic phenomena in virtual worlds which are well worth studying, but the industry is secretive and few academics involved
- Online games in particular provide a rich vein of complex economic behaviour
- MMORPG gaming is (still) HUGE
 - Oct2015: Blizzard reported 5.5M subscriptions to WoW (2019:>10M)
 - *League of Legends*, launched Nov 2011, #1 MMO by 2016
 - Monthly Unique User Logins=80M 79.5M viewer-hours on Twitch
 - Peak Concurrent Users=27M
 - NB most published academic research focused on older MMORPGS
- Economics of “AAA” game development converging to oligopoly?
 - Massive development costs are major barrier to entry
 - Barrier works in favour of incumbent major development studios