

STAR ATLAS

State of the Economy

ATMTA, Inc.

Department of Economics

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Executive Summary

Over the past three months, volatility persisted in the broader cryptocurrency markets. The total market cap of crypto fell approximately -21.6%¹ (\$263 billion), and the metaverse gaming index declined by 29.92% (\$2.9 billion). The decline in private Star Atlas wealth over the period was -11.6% (\$10.26 million)².

On July 15th, 2022, ATMTA announced the repricing of ships denominated in ATLAS as part of the Galactic Marketplace upgrade. Until July 21st, 2022, sales of primary origination ships priced in ATLAS were brought forward in time totaling 131.28 million ATLAS. Players took this opportunity to expand into higher classes of ships.

On July 21st, 2022, Star Atlas introduced POLIS locking, and private POLIS locked reached 14.76 million on September 12th, which accounted for 30.2% of outstanding circulating supply.

Key Highlights:³

- Aggregate daily ATLAS wages grew by 4.4%.
- The average wage per ship declined by -9.5%.
- The aggregate employment rate per ship decreased by -0.44%.
- The size of the labor force grew by 14.3%.
- Ship prices fell by -8.5%.
- The market value of ships outstanding increased by 5.9%.

All of the growth in aggregate wages occurred during July due to the increased accumulation of higher-class ships. Their addition pushed up average ATLAS wages by 5.8%, accounting for most of the growth in total ATLAS emissions over the three months.

¹ Data collected from <https://www.tradingview.com/symbols/CRYPTOCAP-TOTAL/>

² We define private wealth as the sum of privately held R4 inventory, ships, POLIS, and ATLAS.

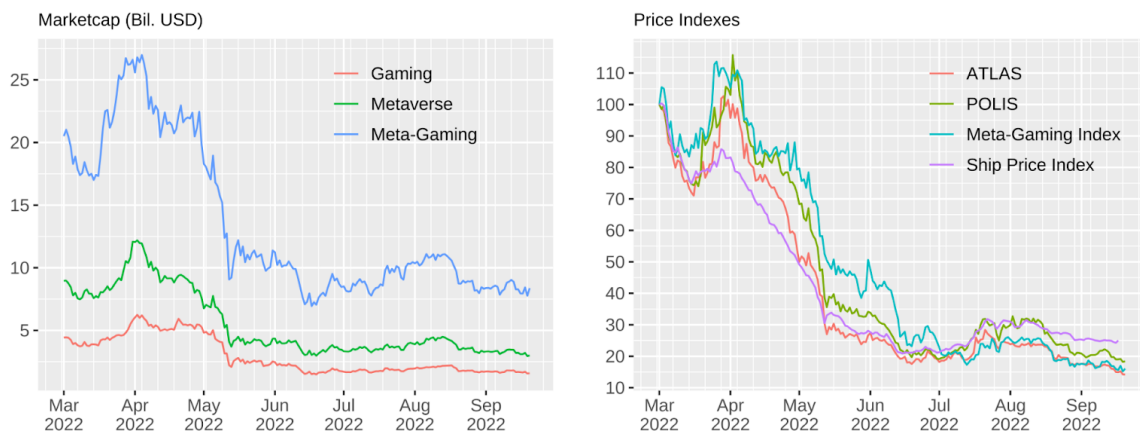
³ Data reported between the period of June 1, 2022 and August 31, 2022.

The Bear Market Strengthens

In the past three months, global financial markets have experienced a brief bear market rally from mid-July to mid-August. Since then, prices across all asset classes have turned down. Once again, the Star Atlas ecosystem was not immune to this volatility. The increasing correlations we've seen during this downturn are reminiscent of past instances of mass deleveraging within the system.

After briefly showing signs of life, ship prices have retraced. However, ships have outperformed the metaverse gaming token index, POLIS, and ATLAS, since March 1st (see figure on right). Ship outperformance is attributable to its lower volatility.⁴

Metaverse Asset Performance



Source: Coinmarketcap.com and ATMTA, Inc. Economics Department. Notes: Marketcap is in billions of USD. The meta-gaming index comprises 130 tokens, the gaming index consists of 270 tokens, and the metaverse index has 105. Price indexes are equal to 100 on March 1st, 2022. The ship aggregate price index tracks the average price of all ship NFTs outstanding using the most recent transaction prices of ships sold in the marketplace.

In addition to the challenging external environment, essential changes have occurred within the Star Atlas ecosystem. For example, the introduction of POLIS locking created an aspiring decentralized system of governance. In addition, residents can now meet the criterion for becoming citizens – as citizens generally have a vote in government policy. Another critical event included repricing ship originations priced in ATLAS back to USD parity. As we will show, the announcement of this change moved ship purchases forward in time, thus causing a temporary surge in ship acquisition by existing residents. Existing residents viewed this as the perfect opportunity to diversify their fleets into different ships of a larger class.

With this report comes several new datasets. The Ship Aggregate consists of underlying detail necessary to derive the market value of ships both in and out of the labor force. It includes prices, issuance, and the number of ships outstanding. This dataset aids in the construction of a blockchain flow of funds that allows us to categorize participants into various groups based on their asset holdings. The foundation of this work is the Star Atlas Census, which provides a point-in-time look at the Star Atlas Universe.

⁴ The source of this lower volatility is the utility that S.C.O.R.E. affords.

Defining the Star Atlas Universe

The Star Atlas Universe consists of five non-overlapping statistical groupings of wallets based on blockchain data. The number of wallet addresses is not the actual number of people involved. For example, Guilds may have only a few wallet addresses but represent more than one player (which will cause wallets to under-represent the actual population). Additionally, on average, people will have more than one wallet (which will cause wallets to over represent the number of participants). Table 1 provides the definitions for the five groups. The ordering of groups flows from the least attached to the most involved.

Table 1: Star Atlas Universe Statistical Definitions

| Concept | Statistical Definition |
|---------------------------------|--|
| Nonresident Currency | Wallet that only holds ATLAS, POLIS, or both |
| Nonresident Ship | Wallet that that holds a ship, but is not a S.C.O.R.E enlisted account address. May also hold ATLAS and POLIS |
| Nonresident Locked POLIS | Any wallet that has locked POLIS, but does not have ships enlisted in S.C.O.R.E. May also hold ships, ATLAS, and POLIS |
| Residents | Wallet that has a S.C.O.R.E account associated with enlisted ships |
| Citizens | Wallet that meets residency conditions and actively locks POLIS |

The Star Atlas Census

A total of 12,591 new people entered the Star Atlas Universe since the last census, in contrast, 4,802 left the Universe. An additional 1,635 people became residents, while 1,510 experienced a permanent separation from employment. Nonresident currency holders grew the most in number at 10,395. As mentioned in the introduction, POLIS locking necessitates refining our statistical definition of what it means to be a Star Atlas Citizen. In this report, a resident must be locking POLIS to earn the citizen distinction - holding POLIS is no longer sufficient for citizenship. A total of 3,156 people became citizens.⁵

The share of nonresident currency holders increased slightly from 57.5% to 58.5%. The more stringent conditions in our revised statistical classification of a citizen make the figures incomparable to last quarter. However, the combined share of residents and citizens declined to 27.9%, down from 29.3%. On net, we saw more growth in nonresidential currency holders than new faction residents or citizens.

⁵ Data from May 27th through September 5th.

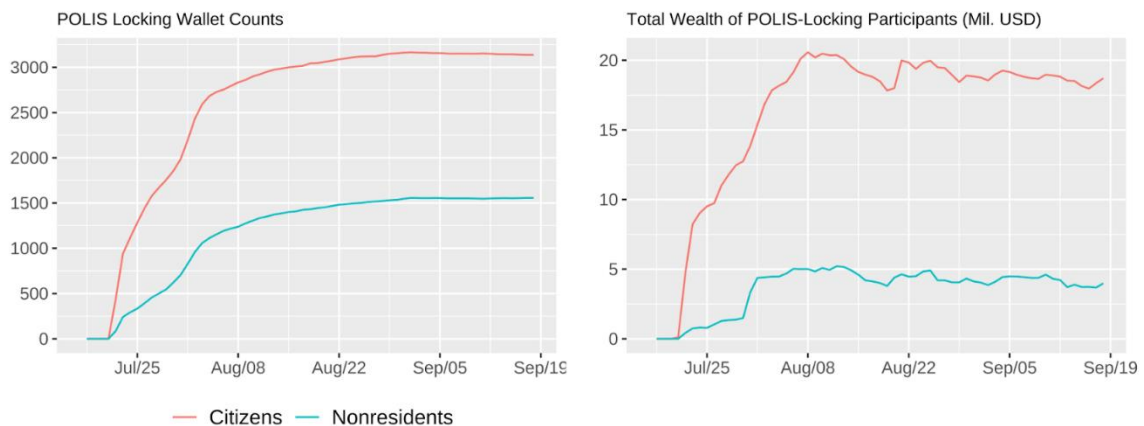
Table 2: Star Atlas Census (9-5-2022)

| Class | Employed | Ship Owner | Voter | Currency | Freq | Frac | Wealth | WShare |
|---------------------------------|----------|------------|-------|----------|-------|------|--------|--------|
| Nonresident Currency | 0 | 0 | 0 | 1 | 83474 | 58.5 | 22.94 | 26.91 |
| Nonresident Ship | 0 | 1 | 0 | 0 | 12348 | 8.7 | 2.46 | 2.89 |
| Nonresident Locked POLIS | 0 | 1 | 0 | 1 | 5466 | 3.8 | 0.91 | 1.06 |
| Residents | 0 | 0 | 1 | 1 | 1452 | 1.0 | 4.33 | 5.08 |
| Citizens | 0 | 1 | 1 | 1 | 104 | 0.1 | 0.16 | 0.18 |
| Residents | 1 | 1 | 0 | 0 | 4606 | 3.2 | 4.07 | 4.77 |
| Citizens | 1 | 1 | 0 | 1 | 32110 | 22.5 | 31.47 | 36.92 |
| Citizens | 1 | 1 | 1 | 1 | 3156 | 2.2 | 18.92 | 22.19 |

Although citizens represent just 2.2% of the population, they command significant influence at 22.2% of the total wealth. They also represent the majority of the participants in POLIS locking. Thus this relatively small group, which includes DACs (guilds), now controls the bulk of future political power.

The figure below shows the growth in wallets and the Star Atlas wealth of nonresidents and citizens engaged in POLIS locking. The total number of wallets with POLIS locked as of September 5th was 4,712, 67% of which are citizens. As a result, the total Star Atlas wealth of those locking POLIS was \$23.4 million, with citizens accounting for 81%.⁶

Star Atlas Citizenship and Voting Power



Source: ATMTA, Inc. Economics Department. Notes: Nonresidents include wallets that only hold POLIS or ATLAS, or have ships that are in-inventory. Total private citizen and nonresident wealth includes ships, ATLAS, POLIS held in the wallet, as well as any amount locked. The figure does not show the total amount of POLIS held in the locking facility - see appendix figure A.6 A for total private POLIS locked. The ATMTA team lock has been excluded from nonresident wealth.

Parallels between the metaverse and country political identity force us to consider the environment at home for the S.A. resident with conditions abroad. One crucial dimension is the impact the level of political democracy can have on a nation’s collective well-being. The Economist Intelligence Unit created the Democracy Index in 2006 to measure the state of democracy globally.⁷

Even in its infancy, Star Atlas receives a score of 7.13, placing it in the “flawed democracy” category. According to the Economist Intelligence Unit 2021 report, 39.3% of the world’s population lives in

⁶ ATMTA team lock is excluded.

⁷ See Economist Intelligence Unit, *Democracy Index 2021*, accessed from www.eiu.com. The democracy index does not measure economic freedom or social equality.

flawed democracies, and only 6.4% live in full democracies. To grasp the significance of this number, we have created a player-weighted democracy index. The index weights a country’s democracy index by the fraction of players in S.C.O.R.E from that country. We use the top 40 countries of the S.C.O.R.E. player base in constructing the index. The player-weighted democracy index value is 7.14. Citizens and residents within the S.A. Universe mainly reside in flawed democracies.



Source: Economist Intelligence Unit and ATMTA, Inc. Economics Department.
 Notes: The player-weighted index weighs each country-level democracy index component by the fraction of players from that country. A player’s country of origin is their self-reported nation. Missing values are supplemented with available web-traffic data.

The Democracy Index is the average of five sub-index category scores (from 1 to 10). Between 2008 and 2021, the categories that have declined the most globally include civil liberties (-1.00), and electoral process and pluralism (-0.47). The EIU report points to the decline in freedom of speech and the increase in government overreach during the COVID-19 lockdowns as two primary drivers of the decline in civil liberties. The restrictions on speech and personal freedoms sparked mass protests, increasing political participation scores. As a result, political participation is the only category to have improved globally since 2008 (0.78).

The two most significant differences in political democracy between Star Atlas and the player nations mirror global trends. The underlying details suggest that Star Atlas residents are willing to sacrifice political participation (-1.64) for increased civil liberties (1.56).

Dynamic S.A. Census

The S.A. Census provides the statistical definitions for grouping people within the ecosystem. For example, we can query the blockchain for the wallet addresses that hold ATLAS, POLIS, Ships, and resources. One blockchain snapshot produces a stock figure—for example, the number of ATLAS holders today. A flow is derived when we view two snapshots side-by-side.

Two flows critical to the health of the Star Atlas ecosystem are the flow of people arriving and exiting. Someone that owned no Star Atlas assets yesterday and today holds a Star Atlas asset has entered the S.A. Universe. Conversely, someone who held at least one S.A. asset yesterday and no assets today has exited the S.A. Universe.

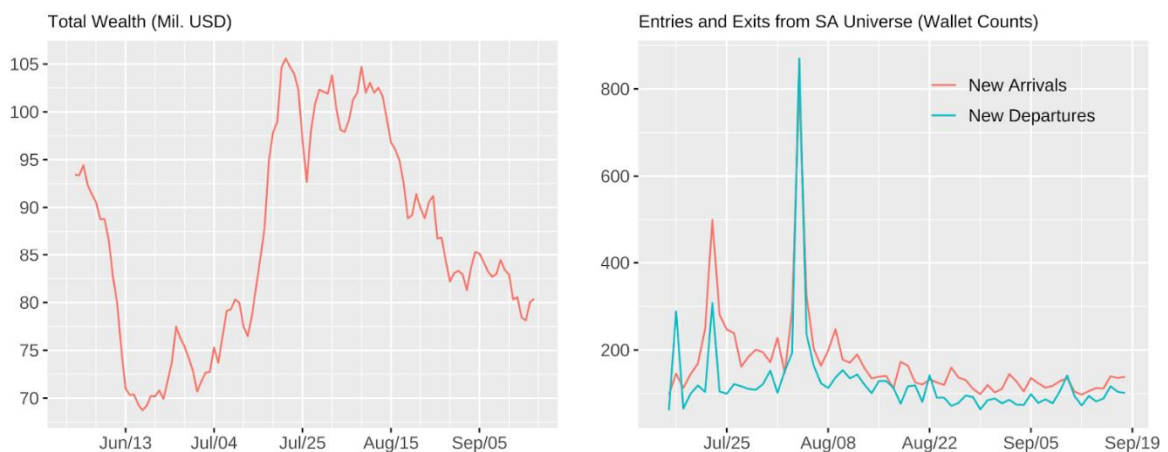
The chart on the right below shows the arrivals and departures from S.A. Universe. The first significant spike is associated with people moving into ATLAS and POLIS for the first time; the second spike was on August 3rd in direct response to the Slope mobile wallet hack on August 2nd.

According to one unofficial source, 173 wallets holding ATLAS and 53 wallets holding POLIS were affected by the hack.⁸ Net inflows have been positive over this brief time.

Aggregate wealth is another important metric for gauging the health of the community. Aggregate wealth is the sum of the USD market value of ships enlisted and held in player wallets, private POLIS and ATLAS holdings, and R4 (Faction Fleet resources) held in player wallets. This measure captures the aggregate personal wealth of the Star Atlas Universe (see the figure on the left).⁹

As mentioned, the middle of August began a downward slide in all risk assets. The decline in wealth during this period was around \$20 million. The market value of ships accounts for \$11 million of that decline, privately held ATLAS contributed \$6 million, and POLIS market value slid by \$3 million. As a result, the wealth-to-population ratio fell from USD 750 to USD 600. For a more detailed look at wealth and its various components, see figure A.5 in the appendix.

Aggregate Wealth and Arrivals and Departures from The Star Atlas Universe



Source: ATMTA, Inc. Economics Department. Notes: Aggregate wealth is the sum of privately held R4 inventory, ships, POLIS, and ATLAS - in millions of USD. Because of missing data, the private circulating supply of ATLAS and POLIS is interpolated from May 27th through July 16th.

⁸ See anduril.data Flipside query, "Star Atlas Tokens - 8/2 Hack".

<https://app.flipsidecrypto.com/velocity/queries/b5b2e001-c1b5-4c96-ba24-71545feed0e5>

⁹ We remove a list of 18 wallets that includes DEX addresses and known Star Atlas wallets from POLIS and ATLAS private supply. This results in our figures being significantly lower than that found on Galaxy. See <https://galaxy.staratlas.com/tokens/atlas> for ATLAS and <https://galaxy.staratlas.com/tokens/polis> for POLIS in circulation.

Main Economic Summary

Revisiting Employment and Unemployment

The last report relied upon food refill actions to define employment and unemployment. For that report, these actions defined the size and composition of the labor force. However, a critical drawback of that approach was that it resulted in an inflated measure of unemployment – and, therefore, the labor force. For example, that approach did not allow us to capture when a ship was withdrawn from S.C.O.R.E. and held in a player’s wallet. As a result, we would mislabel that ship as unemployed.¹⁰

In our new approach, we query the blockchain for all holders of ships. We then match a list of S.C.O.R.E. enlisted account addresses to the address list returned by our ship NFT query. This procedure results in a list of players with fleets enlisted. It is this count which defines the size of the labor force. Ships held directly in a wallet not tied to an enlisted account address are “in-inventory” and out of the labor force or OLF. For employment and earnings, the calculation remains as follows:

A player deposits food (we assume that the total food capacity of the ship is met). Each ship burns food at a rate that determines how long it will remain employed. The ship remains employed for this amount of time. If the fleet runs out of food before the following refill action, it enters unemployment. It remains unemployed until the following refill action.

We no longer calculate the exact number of seconds of employment for a ship and allocate those seconds to the nearest hour. Our new approach is to round the maximum employment hours to the day. For example, a Fimbul BYOS Tankship can go 194.66 hours without needing a food refill. Following our new approach, it will receive eight days of continuous employment before the next refill date. A Fimbul ECOS Treearrow can go 186.83 hours and gets the same eight days of steady employment.

Since the employment aggregation is to the day, we no longer define the labor force states in terms of ship seconds. Instead, now we use the number of employed or unemployed ships. This approximation will result in less volatility in the employment rate and a slight decrease in accuracy. But the trend remains the same.

Wages and Employment

At the surface level, the aggregate labor market summary points to a continuation of the first Quarterly trends. Aggregate daily ATLAS wages grew at a more mature rate of 4.4% from June 1st

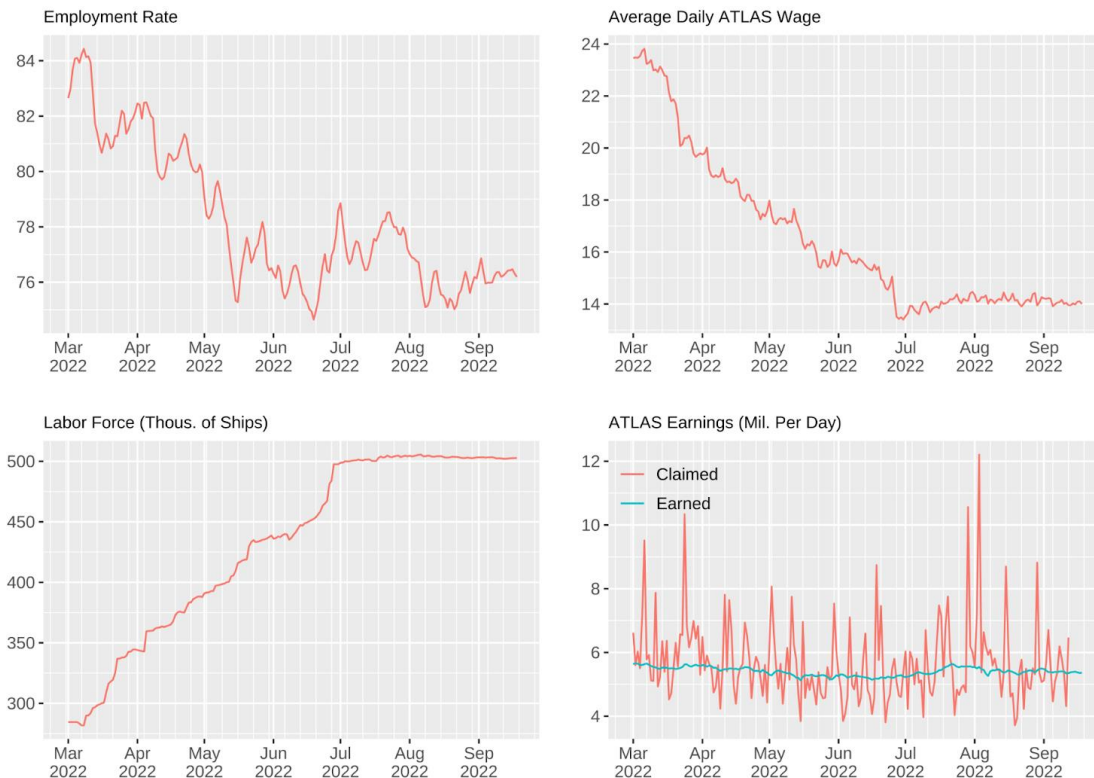
¹⁰ Another issue was the time it took to run the calculations.

through August 31st.¹¹ Average wages declined by 9.5%, the employment rate per ship decreased by .44%, and the size of the labor force grew by 14.3%.¹²

Table 3: ATLAS Earnings Growth Decomposition

| Date | $Wages_t$ | w_t | $empl^{rate}_t$ | LF_t |
|------------|-----------|--------|-----------------|---------|
| 2022-06-01 | 5.26 M | 15.68 | 76.9% | 436 |
| 2022-08-31 | 5.50 M | 14.26 | 76.6% | 503 |
| log change | 4.41% | -9.48% | -.44% | +14.33% |

Employment Rate, Average Wages, and Aggregate ATLAS Earnings



Source: ATMTA, Inc. Economics Department. Notes: Five-day moving average of the employment rate. The average daily ATLAS wage per employed ship. The labor force is the total number of ship NFTs associated with S.C.O.R.E. staking accounts. S.C.O.R.E. food refill actions measure employment and gross ATLAS earnings. ATLAS claimed is equal to the amount of ATLAS distributed through reward harvests and fleet withdrawals.

Digging a little bit deeper into the table on net ATLAS earnings by class reveals some substantial differences.

¹¹ From June 1st through August 31st, players claimed a total of 505.53 million ATLAS. The average daily ATLAS claimed was 5.49 million.

¹² As mentioned in the first Quarterly report, aggregate measures of the labor force will be heavily skewed by the presence of XXS ships. An alternative approach is to weigh ships by their market values. For example, when weighted on a per dollar basis, average ATLAS wages only declined by .9% over the period.

Net ATLAS Earnings by Class

One key change since June 1st has been the broad level of growth in the labor force and a general improvement in conditions. The labor pool grew the most for XXS ships at 17.4%; followed by Capital ships, 12.8%; and Large ships which grew by 7.3%. XXS net wages grew 15.9%, but this time around they were not the only ones to see positive growth. Net wages grew a healthy 15.3% for Capital ships, and a respectable 9.3% for Large ships.¹³ Average net wages per ship increased for Capital and Large class ships.¹⁴

These results point to some major events that have taken place within the ecosystem, in particular they point to a change in player behavior in response to the ship repricing.

Table 4: After-tax ATLAS Earnings By Class

| Class | Source | Percent Change | June 1, 2022 | Aug 31, 2022 |
|------------------|-----------------|----------------|--------------|--------------|
| Commander | Net Wages | 3.7 | 0.6750 | 0.7006 |
| | Avg Net Wage | 0.0 | 3183.9506 | 3184.6232 |
| | Employment Rate | 3.3 | 0.9099 | 0.9402 |
| | Labor Force | 0.4 | 233.0000 | 234.0000 |
| Capital | Net Wages | 15.3 | 0.7917 | 0.9224 |
| | Avg Net Wage | 0.4 | 1074.2825 | 1078.8102 |
| | Employment Rate | 2.0 | 0.8848 | 0.9029 |
| | Labor Force | 12.8 | 833.0000 | 947.0000 |
| Large | Net Wages | 9.3 | 0.7553 | 0.8289 |
| | Avg Net Wage | 2.1 | 325.4064 | 332.4733 |
| | Employment Rate | -0.2 | 0.8802 | 0.8784 |
| | Labor Force | 7.3 | 2637.0000 | 2838.0000 |
| Medium | Net Wages | -3.5 | 0.8093 | 0.7817 |
| | Avg Net Wage | -0.4 | 93.7923 | 93.4132 |
| | Employment Rate | -5.2 | 0.8357 | 0.7936 |
| | Labor Force | 2.1 | 10325.0000 | 10544.0000 |
| Small | Net Wages | -1.4 | 0.9719 | 0.9581 |
| | Avg Net Wage | -0.5 | 31.4258 | 31.2760 |
| | Employment Rate | -4.2 | 0.8759 | 0.8397 |
| | Labor Force | 3.3 | 35310.0000 | 36481.0000 |
| XS | Net Wages | -7.1 | 0.2037 | 0.1899 |
| | Avg Net Wage | -1.7 | 6.8667 | 6.7497 |
| | Employment Rate | -7.3 | 0.6324 | 0.5881 |
| | Labor Force | 1.9 | 46921.0000 | 47832.0000 |
| XXS | Net Wages | 15.9 | 0.1641 | 0.1923 |
| | Avg Net Wage | -2.1 | 0.6242 | 0.6112 |
| | Employment Rate | 0.6 | 0.7736 | 0.7781 |
| | Labor Force | 17.4 | 339811.0000 | 404371.0000 |

¹³ See appendix figure A.2.2 for net ATLAS wages by class.

¹⁴ Table definitions: Net wages are the daily aggregate ATLAS earnings less the ATLAS cost of R4 burned in millions of ATLAS. The average net wage is the daily average wage of ships in that class net of R4 in ATLAS. The employment rate is the number of ships actively earning ATLAS divided by the labor force. The labor force is the number of ships deposited in S.C.O.R.E. The percentage change is from June 1st through August 31st, 2022.

Labor Force and Business Fixed Investment Update

Several significant events explain what happened to the labor force since the last report. At that time, falling ATLAS/USD provided the rebalancing mechanism necessary to keep the labor force growing. In early June, a further downward leg in crypto prices helped to accelerate the purchase of XXS, Small, Medium, and Large ships. From June 1st through June 19th, the ship aggregate fell 23.5%, and net ATLAS income rose by 10.6 ATLAS, from 39.3 to 49.9 net ATLAS per year.¹⁵

From June 19th through July 14th, ships appreciated 12%, and with it came a decline in value as the net ATLAS income fell by 8.5 ATLAS to 41.4 net ATLAS per year.

On July 15th, ATMTA announced the rebasing of primary market ships priced in ATLAS back to USD parity. Over the following six days, residents spent 131.28 million ATLAS on primary origination ships (see figure C below). The period accounted for 45% of all ATLAS spent on primary originations from June 1st through August 31st. The announcement had essentially brought forward in-time future ship purchases. In addition, residents went up in class and diversified into ships not already present in their fleets. The most significant contributions to the surge in investment by market value came from the additions of Large ships, then Capital ships, Small ships, and Medium ships (see figures E and F).

On July 22nd, the ship repricing came into effect, which was enough to effectively halt the sale of ships in ATLAS. Part of this decline is attributable to consumers that typically rely on a healthy supply of low-priced ships in which to deploy ATLAS earnings. The number of wallets claiming ATLAS and making purchases on the same day (through partial fleet deposits) fell by 50% (see figure D).¹⁶ From July 14th through July 22nd, ship prices rose 26.43%, and the net ATLAS income fell an additional 7.9 ATLAS to 33.5 net ATLAS.

It remains unclear if the introduction of the POLIS locking facility on July 21st further attenuated the shock to ship deposits.¹⁷

Partial fleet enlistments have decreased from about 900 ships per day to around 465 per day. However, the daily market value of ships brought in remained practically unchanged as the average price per ship more than doubled from \$22 to \$52.¹⁸ Partial depositors rely on a steady supply of low-priced ships for continuous purchases. Partial deposits account for 66% of marketplace transactions but only 32.4% of the dollar volume of sales.¹⁹ Since March 1st, the average USD value of all marketplace ship sales has been \$84.4, but only \$47.6 for partial depositors. Even though partial

¹⁵ The annualized net ATLAS income is defined as the daily net ATLAS earned (x 365) divided by the market value of employed ships. It is an indicator of value. The annual take-home ATLAS earnings per \$1 of employed ships at current market prices. See appendix figure A.4.4 H for net ATLAS income for employed ships. Alternatively, see figure A.4.1 D for net ATLAS income of ships sold in the Galactic Marketplace.

¹⁶ From a daily average of 98 from June 1st through July 21st to 50 from July 22nd through September 4th.

¹⁷ The number of wallets claiming ATLAS and locking POLIS on the same day has averaged 632 per day (through September 4th).

¹⁸ From June 1st through September 4th, using a 7-day rolling mean.

¹⁹ From March 1st through September 11th, 2022. See appendix figures A.4.5 A and A.4.5 C.

depositors seek out less expensive ships, they are not explicitly bargain hunting. For example, the average price-to-book value for all sales has been 41%, whereas partial depositors have averaged only a slightly lower 38.9%.²⁰

From June 1st through July 22nd, partial depositors averaged 133 per day and \$23,024 in daily ship purchases. After the repricing on July 22nd, partial depositors have averaged 73 per day, and daily purchases dropped by 45% to \$12,553.²¹ The decline is not unique to partial depositors. For example, daily average ship sales for the whole market fell 56.2% over the same period.²² The sharp decline in purchases suggests that the market values of ships have reduced players' ability to continue to expand their fleets through ATLAS denominated purchasing.

Net initial deposits are initial fleet deposits less fleet withdrawals (see figure A). This figure captures the underlying trends in the player base. We take the net figure rather than look at initial deposits and fleet withdrawals separately because the two figures are highly correlated.²³ Net initial deposits have been negative since the inception of S.C.O.R.E. with two significant exceptions: the first was when the game launched, and the second coincided with the purchase of 18,731 Fimbul Airbikes on June 26th and 12,793 Airbikes on June 27th.

Net initial deposits by market value reveal a different trend (figure B). On May 18th, the 7-day rolling average turned positive for the first time since inception and mostly remained positive through July 26th. Over this period, higher quality ships enlisted. From June 1st through September 4th, the average dollar price of a partially deposited ship was \$32.5; for an initial deposit, it was \$85; for a withdrawn ship, \$65.9.

The constant negative value of net initial deposits points to the persistent decline in the average number of players.²⁴ The daily average number of ships experiencing an R4 refill action increased from 271,358 to 314,005.²⁵ As a result, the number of ships-per-player grew 40.7%, from 27 to 38.

²⁰ See appendix figure A.4.5 E.

²¹ Through September 11th, 2022. See appendix figure A.4.5 F.

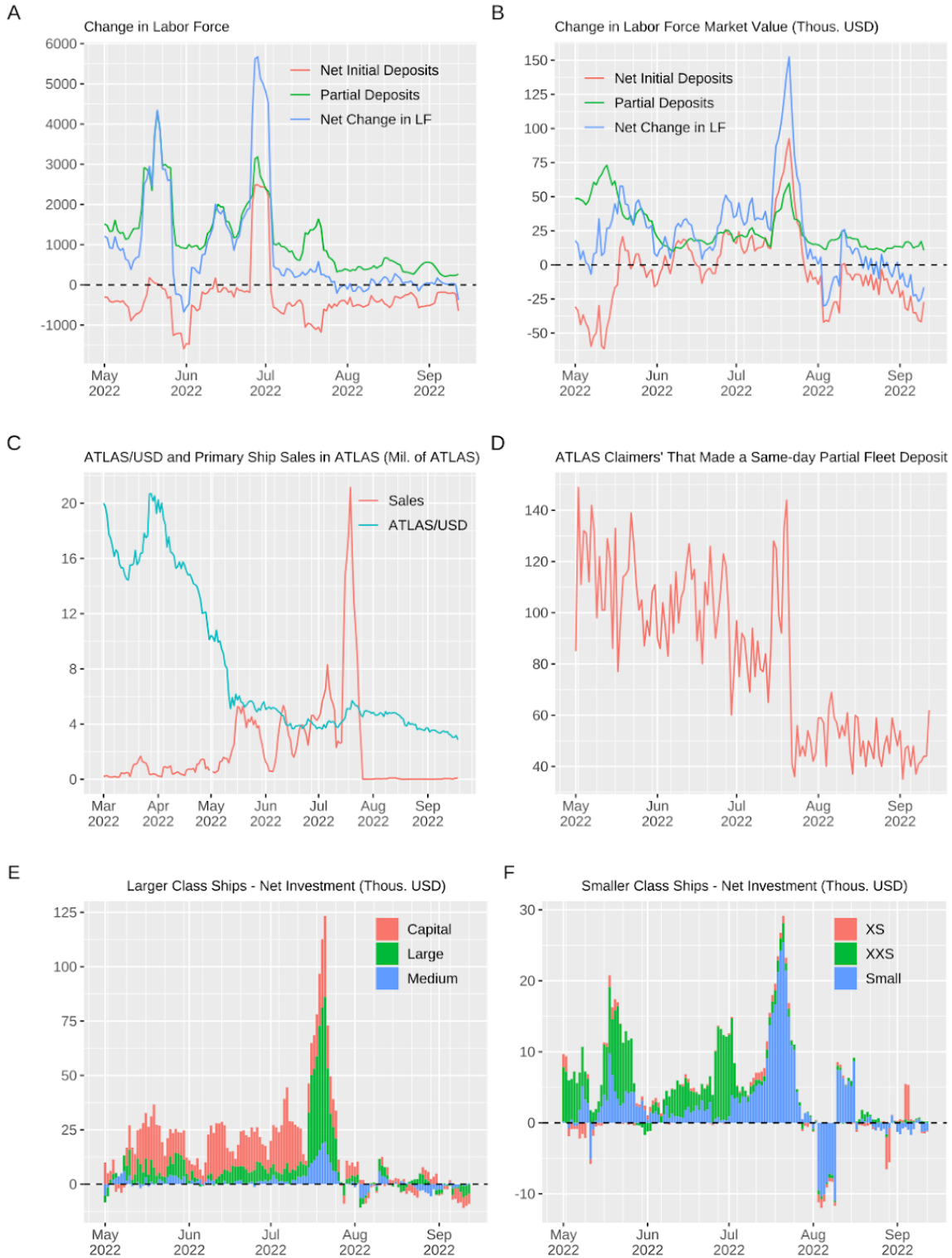
²² The USD volume of ship purchases averaged \$97,551 before July 23rd, and \$42,646 since then.

²³ 98% from January 1st through September 4th

²⁴ Daily active players fell from 10,223 on June 1st to 8,375 as of August 31st. This number should not be confused with the number of players enlisted in S.C.O.R.E., which has increased slightly over the period.

²⁵ From June 1st through August 31st.

Sources of Labor Force Change



Source: ATMTA, Inc. Economics Department. Notes: For figure A, net initial deposits are initial deposits fewer ship withdrawals. The net change in the labor force adds partial deposits to net initial deposits. In figure B, the market value of the net change in the labor force is in thousands of USD. Figures A and B are both expressed as seven-day moving averages. Figure C shows the five-day moving average of the sales volume of primary origination ships priced in ATLAS; ATLAS/USD is indexed to 20 on March 1st, 2022. Figure D shows the number of unique wallets that claimed ATLAS and made a partial fleet deposit on the same day. Figures E and F show the seven-day rolling average of the net labor force change by class in thousands of USD.

DAO Revenue and Net ATLAS Emissions

For the period, Capital ships continued to have the lowest effective tax rate at 12.9%, followed by Commander ships at 13.8%, while XXS small ships continued to have the highest tax rate at 23.7%. Directly impacting DAO revenue is the share of R4 burned over the period by class. XXS ships saw their share increase the most at 1 percentage point, to 6.4%, followed by Capital ships, whose share increased .6 points to 14.3%. The share of R4 burned by Commander ships fell the most at .9 points to 12%, and Small ships fell by .5 points to 24.8%. Medium through Commander class ships represented 75.1% of total employment by market value while accounting for 63.5% of the R4 consumed over the period and 70% of net ATLAS earnings. Small ships accounted for 18.1% of total employment by market value and 21.5% of net ATLAS earnings.

S.C.O.R.E is the primary source of ATLAS emissions into the ecosystem. From June 1st through August 31st, Residents and Citizens claimed 505.54 million ATLAS (+5.495 million per day) in gross employment earnings. In addition, 89.05 million ATLAS (-.968 million per day) flowed back into the DAO from the ATLAS sale of resources.²⁶ Another 293.6 million ATLAS (-3.191 million per day) was absorbed through the sale of primary origination ships denominated in ATLAS. After accounting for the ATLAS sinks, net ATLAS emissions totaled 122.89 million (or +1.34 million per day); as a result, over 75% of the ATLAS emitted through S.C.O.R.E. never left the ecosystem.²⁷

Table 5: Fiscal Contributions By Ship Class (6-01-2022 through 8-31-2022)

| | Effective Tax-Rate | Share of Total | | | | |
|------------------|--------------------|--------------------|------------|----------|-----------|-------------------|
| | | Employed Mkt Value | Employment | Earnings | R4 Burned | Net ATLAS Rewards |
| Commander | 13.81 | 18.64 | 0.06 | 14.68 | 12.05 | 15.21 |
| Capital | 12.92 | 21.93 | 0.22 | 18.67 | 14.30 | 19.55 |
| Large | 17.14 | 16.24 | 0.64 | 17.85 | 18.36 | 17.74 |
| Medium | 17.86 | 18.30 | 2.25 | 17.82 | 18.84 | 17.61 |
| Small | 18.97 | 18.13 | 8.19 | 22.00 | 24.77 | 21.44 |
| XS | 20.14 | 3.91 | 7.58 | 4.47 | 5.34 | 4.30 |
| XXS | 23.67 | 2.86 | 81.06 | 4.52 | 6.35 | 4.15 |

Concluding Thoughts

The bear market that began in 2021 continues to impact the price of assets and actions taken by metaverse gaming participants. Moreover, July substantially changed the ecosystem, including introducing the POLIS locking and repricing of ships to USD parity. This period highlighted the importance of S.C.O.R.E. for the ship markets in general. Ship purchases accounted for 70.5% of the

²⁶ As of September 16th, 2022, the DAO has collected 267,965,666 ATLAS in revenue.

²⁷ .34% of total lifetime ATLAS (122.89 net ATLAS emissions divided by 36 billion total lifetime ATLAS) and 3.71% of privately held ATLAS as of August 31st.

net ATLAS emitted (net of R4 purchased). In addition, players mostly rely on S.C.O.R.E. to expand their fleets' size and grow the labor force.

The introduction of POLIS locking brought about a revision in our statistical definition of what it means to be a citizen. Moreover, it caused us to look further into the foundations of what it means to be a resident or citizen of a nation. In particular, we focused on political democracy and found that the decentralized nature of Star Atlas offers a substantial gain in civil liberties for residents in their home countries.

In June, two large purchases of Fimbul Airbikes caused labor force growth to increase by 13.4% and pushed down average wages per ship by 14.7%. The purchases account for the bulk of the decline in average wages over the period.

In July, ship repricing moved the sales of origination ships priced in ATLAS forward in time. As a result, sales surged after the announcement and died with the repricing. Residents went up in class and diversified into ships not already present in their fleets. The most significant contributions to the surge in investment by market value came from the additions of Large ships, then Capital ships, Small ships, and Medium ships. In addition, growth in the labor force broadened across all ship classes, a welcome change from the previous report. Their addition pushed up average ATLAS wages by 5.8%, accounting for most of the growth in total ATLAS emissions over the three months.

The persistent effects of ship repricing can thoroughly explain the results for August. The USD volume of ship purchases averaged \$97,551 before July 23rd and \$42,646 since then. Part of the stagnation in labor force growth was due to the number of partial depositors falling in half. For the remaining partial depositors, the number of ships their ATLAS earnings could purchase became constrained by the rise in ship prices.²⁸

Table 6: ATLAS Earnings Growth Per Month

| | June | July | August | Total |
|-------------------|--------|-------|--------|-------|
| ATLAS Wage Growth | -0.53 | 5.74 | -0.80 | 4.41 |
| Avg Wage Per Ship | -14.69 | 5.78 | -0.56 | -9.48 |
| Employment Rate | 0.73 | -1.21 | 0.04 | -0.44 |
| Labor Force | 13.43 | 1.17 | -0.27 | 14.33 |

The decline in the number of partial depositors alongside the continued negative trend in net initial deposits suggests that we are entering a period of stagnation in the growth of the labor force. As unemployment and in-inventory ships are generally of lower value than employed ships, we might also expect average wages per ship to be biased upward in the coming months. Without any significant change to market conditions, ATLAS emissions will likely hold constant.

²⁸ For example, the Fimbul Airbike bottomed at \$1.87 on June 18th and finished at \$3.32 on August 31st, a 43.7% increase.

Data Appendix

A.1 Wallets Removed from Private POLIS and ATLAS holders

In addition to 14 ATMTA corporate wallets, we also remove the following four addresses.

1. Bz6zbmbZn2ERVsLq4gUCgqLJCTdWYS1iN59EdSbNoPZv
2. 6ZRCB7AAqGre6c72PRz3MHLC73VMYvJ8bi9KHf1HFpNk
3. u6PJ8DtQuPFnfmwHbGFULQ4u4EgjDiyYKjVEsynXq2w
4. 8gEGZbUfVE1poBq71VHKX9LU7ca4x8wTUyZgcbyQe51s