

Draft GN: The Recording of Non-Fungible Tokens (NFTs) in Macroeconomic Statistics

BOPCOM/AEG

October 19, 2022



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The views expressed in this presentation are those of the presenter and do not necessarily represent the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce.

- This guidance note is the latest of several efforts to address the treatment of crypto assets in macroeconomic statistics
- The IMF and OECD began exploring this issue in 2018, focusing on fungible types of crypto assets
- The guidance note “F.18 The Recording of Crypto Assets in Macroeconomic Statistics” includes updated discussions on the recording of **fungible** types of crypto assets
- That note recommended that the classification of **non-fungible tokens** (NFTs) be addressed in a separate guidance note

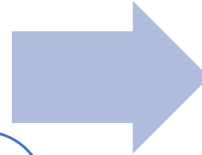
What are NFTs?

- Non-fungible tokens (NFTs) are **digital records** hosted on a blockchain that are associated with a digital or physical asset, goods, or services
- An NFT is **distinct from the associated asset** and should not necessarily be recorded in the same way
- NFTs are similar to fungible crypto assets like bitcoin and ether in that they rely on distributed ledger technology
- But they differ in that they reflect **rights** related to a **unique** (or semi-unique) **digital or physical asset**
- NFTs must be purchased with another crypto asset
 - E.g., ether if the NFT is hosted on the Ethereum blockchain

Anatomy of an NFT

On-chain information

- NFT issuer (original creator)
- Current NFT owner
- Transaction and ownership history
- Token identifier (unique and permanent)
- Smart contract address to execute agreement between issuer and purchaser
- Link to off-chain information



Off-chain information



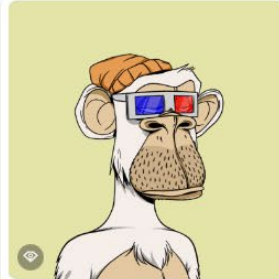





- Associated asset (e.g., image, video, audio file) or service (e.g., video game features, club membership, event ticket)
- Licensing agreement (in the case of an asset)

Trading NFTs: Example NFT marketplace

NFTs Collections Users

Filters Clear all Search by NFTs Price: high to low

- Status
- Price
- Marketplace
- Collection & Traits
 - Bored Ap... 961.9K ETH Floor: 75.9 ETH Volume
 - Search by traits
- Clothes 43
- Hat 36
- Mouth 33
- Eyes 23
- Fur 19
- Background 8
- Earring 6

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|---|---|--|--|------------|--|-------|-------------|---------------------|------------|---|-------|-------------|-----------------|------------|--|-------|-------------|------------|------------|
|  <p>Bored Ape Yacht Club BoredApeYachtClub #9426</p> <table border="1"><tr><td>Price</td><td>Highest bid</td></tr><tr><td>100,000,000,000,...</td><td>3.278 wETH</td></tr></table> | Price | Highest bid | 100,000,000,000,... | 3.278 wETH |  <p>Bored Ape Yacht Club BoredApeYachtClub #5673</p> <table border="1"><tr><td>Price</td><td>Highest bid</td></tr><tr><td>99,999,999,999,9...</td><td>3.278 wETH</td></tr></table> | Price | Highest bid | 99,999,999,999,9... | 3.278 wETH |  <p>Bored Ape Yacht Club BoredApeYachtClub #5664</p> <table border="1"><tr><td>Price</td><td>Highest bid</td></tr><tr><td>999,999,999 ETH</td><td>3.278 wETH</td></tr></table> | Price | Highest bid | 999,999,999 ETH | 3.278 wETH |  <p>Bored Ape Yacht Club BoredApeYachtClub #1015</p> <table border="1"><tr><td>Price</td><td>Highest bid</td></tr><tr><td>50,000 ETH</td><td>3.278 wETH</td></tr></table> | Price | Highest bid | 50,000 ETH | 3.278 wETH |
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- NFTs can be categorized **according to the rights** conferred upon the NFT owner:
 1. **Personal use and display rights** to the associated digital or physical asset
 2. **Some commercial rights**, or other rights beyond personal use but short of full ownership, to the associated digital or physical asset
 3. **Full ownership** of an associated digital or physical asset

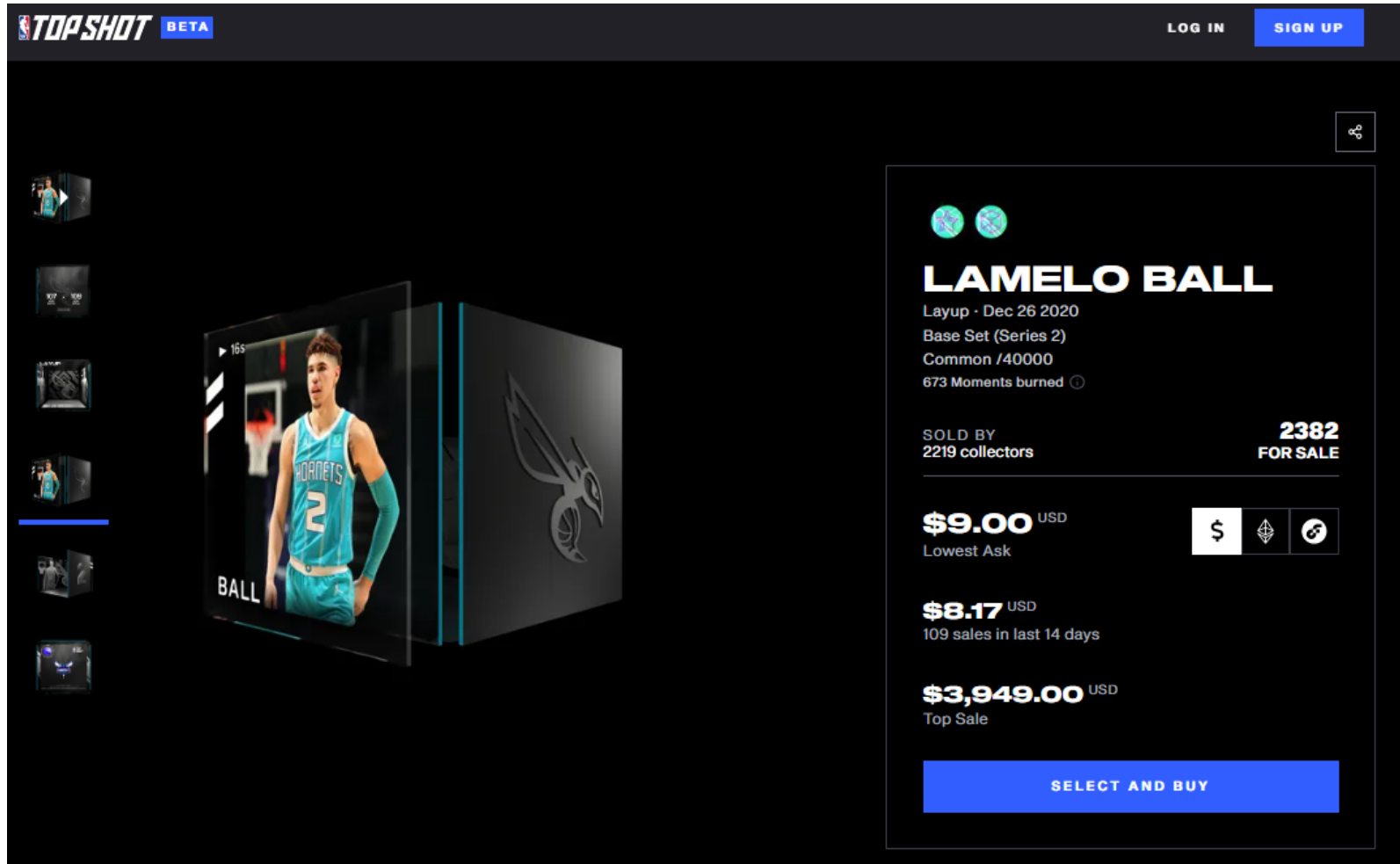
Type 1: NFTs with limited personal use rights

- In many cases, an NFT confers only limited personal use and display rights to the associated asset (often a digital asset)
- NFT owners can often display the digital asset on social media platforms that verify users' ownership
- NFT issuers usually retain IP and commercial rights

Example: National Basketball Association (NBA) “Moments”

- These NFTs are associated with video clips of NBA games
- The NBA retains most of the rights associated with the associated content
- The owner of the NFT has the right to use, copy, and display the content on a personal basis, as well as sell the NFT to others
- The NFT associated with the video clip of LeBron James' dunk in tribute to Kobe Bryant sold for \$400,000

Screenshot of example NBA NFT listing



The screenshot shows the TopShot website interface. At the top left is the 'TOPSHOT BETA' logo. At the top right are 'LOG IN' and 'SIGN UP' buttons. The main content area features a large 3D rendering of a Lamelo Ball NFT card, which is a dark grey cube with a teal basketball player (Lamelo Ball) on the front and the Hornets logo on the side. To the left of the main card is a vertical sidebar with several smaller thumbnail images of other NFT cards. On the right side of the main card, there is a detailed listing for 'LAMELO BALL'. The listing includes two teal circular icons at the top, the name 'LAMELO BALL' in large white letters, and the following details: 'Layup · Dec 26 2020', 'Base Set (Series 2)', 'Common /40000', and '673 Moments burned'. Below this, it says 'SOLD BY 2219 collectors' and '2382 FOR SALE'. The current price is '\$9.00 USD' with 'Lowest Ask' below it. There are three currency icons: a dollar sign, a diamond, and a coin. Below that, the price '\$8.17 USD' is shown with '109 sales in last 14 days' below it. The highest price is '\$3,949.00 USD' with 'Top Sale' below it. At the bottom of the listing is a blue button that says 'SELECT AND BUY'.

Type 2: NFT with some commercial rights

- NFTs can grant rights to an associated asset beyond personal use, such as commercial rights
- NFT issuer retains IP rights

Example: CryptoPunks

- CryptoPunks are one the of the first and most famous digital assets that have been used in NFT collections
- The NFTs reference a punk in a composite image of 10,000 punks that is posted online
- One of the most expensive punks was sold for 8,000 ether (\$23.7 million) in February 2022
- Currently, the license agreement issued by the CryptoPunks' owner, Yuga Labs, grants the NFT owner some commercial rights while retaining IP rights

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Bored Ape Hoodie I
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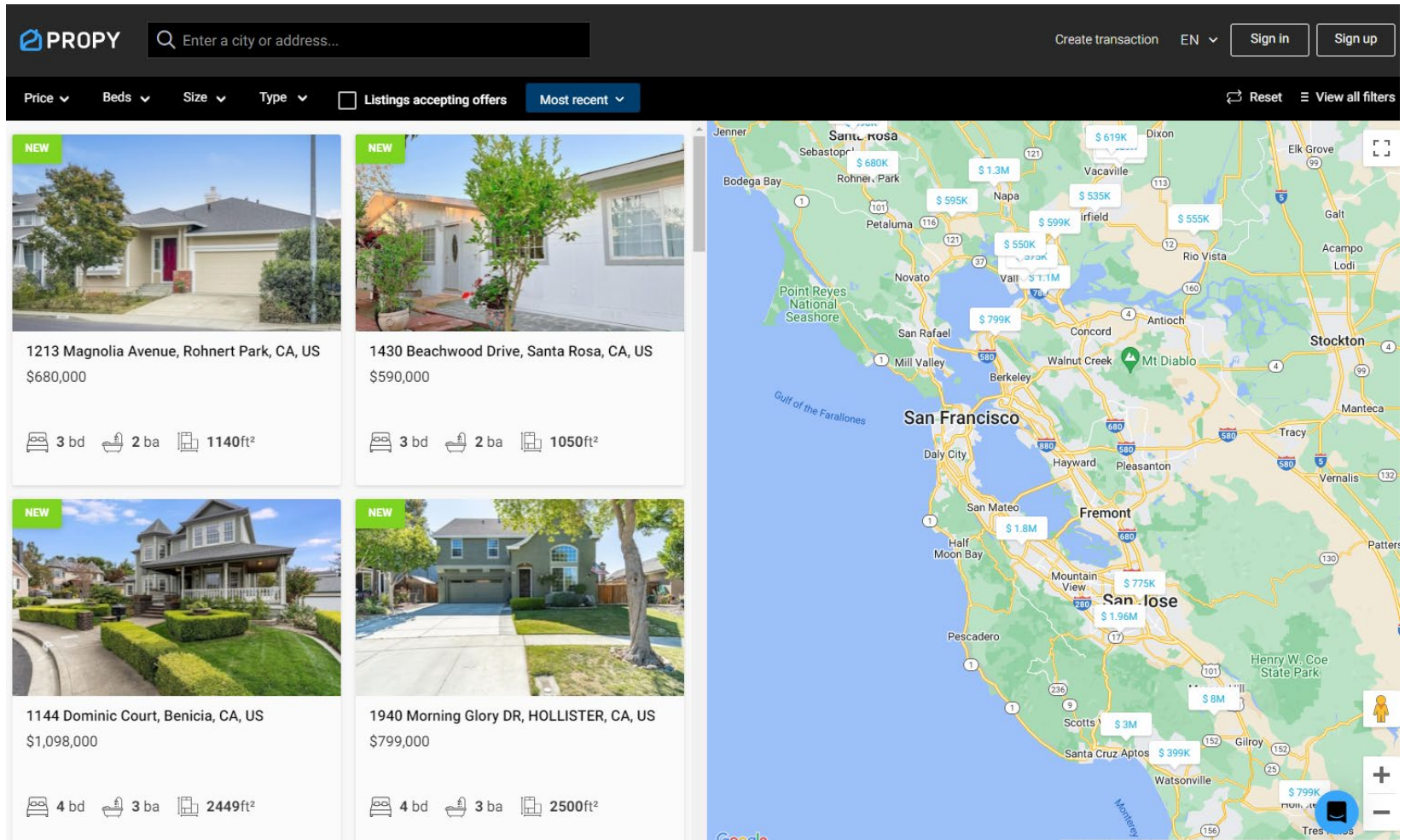
Type 3: NFT with full ownership

- NFTs can also represent full ownership of an asset
- The NFT records and verifies ownership rather than acting as an independent asset, similar to how the deed to a house records and verifies ownership of the house but is not recorded as a separate asset

Examples

- In February 2022, a house in Florida was sold via an NFT
- NFTs can represent ownership of virtual objects, such as characters or special features that can be used in online games or virtual reality experiences
- NFTs can be used as a method of selling and confirming the purchase of other services, similar to an event ticket

Platform selling real estate via NFTs



The screenshot displays the PROPY real estate platform interface. At the top, there is a search bar with the text "Enter a city or address...". To the right of the search bar are buttons for "Create transaction", "EN", "Sign in", and "Sign up". Below the search bar is a navigation bar with filters for "Price", "Beds", "Size", and "Type". There is also a checkbox for "Listings accepting offers" and a dropdown menu for "Most recent". A "Reset" button and "View all filters" link are also present.

The main content area is divided into two columns. The left column shows four property listings, each with a "NEW" badge, a photo, address, price, and specifications (beds, baths, and square footage). The right column shows a map of the San Francisco Bay Area with price tags overlaid on various locations.

| Address | Price | Beds | Baths | Sq. Ft. |
|--|-------------|------|-------|---------|
| 1213 Magnolia Avenue, Rohnert Park, CA, US | \$680,000 | 3 | 2 | 1140 |
| 1430 Beachwood Drive, Santa Rosa, CA, US | \$590,000 | 3 | 2 | 1050 |
| 1144 Dominic Court, Benicia, CA, US | \$1,098,000 | 4 | 3 | 2449 |
| 1940 Morning Glory DR, HOLLISTER, CA, US | \$799,000 | 4 | 3 | 2500 |

The map overlay shows various locations with price tags, including: \$619K (Dixon), \$680K (Sebastopol), \$1.3M (Napa), \$595K (Napa), \$535K (Vacaville), \$599K (Irfield), \$555K (Rio Vista), \$550K (Vallejo), \$1.1M (Vallejo), \$799K (Concord), \$775K (Mountain View), \$1.96M (San Jose), \$8M (San Jose), \$3M (Scotts Valley), \$399K (Santa Cruz Aptos), \$799K (Watsonville), and \$399K (Watsonville).

- A wide range of rights are embedded in NFTs associated with a wide variety of assets, goods, and services
 - No single way to classify all these diverse NFTs
- The 2008 SNA already discusses the treatment of most assets and products associated with NFTs
 - E.g., physical artwork, housing, event tickets, club memberships
 - Digital artwork: can be recorded as valuables as defined in the 2008 SNA
- What is an asset?
 - An asset “is a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time” (2008 SNA 10.8)

Type 1: NFTs with personal use and display rights

- **Do not meet the asset boundary** because they are not used in production and do not represent a store of value
- Should be **classified as consumption**
 - The exact classification of each NFT purchase depends upon the associated asset, which likely has an existing category in the SNA
- E.g., purchase of an NFT that grants personal use and display rights to a piece of digital artwork may be recorded as the purchase of artwork
- Resales are second-hand trade
- **Could become a valuable** over time if they begin to meet the definition
 - Similar to how a stamp may become a valuable over time

Do NFTs meet the asset boundary? (2)

Type 2: NFTs with commercial rights

- **Could meet the asset boundary** because they can be used in production
- NFTs that convey partial rights to works of art or video clips may be an asset if the owner **can derive economic benefits** from these rights
 - E.g., some form of royalties

Type 3: NFTs with full ownership rights

- **Do not meet the asset boundary**
- These NFTs only record and verify ownership—they are **indistinguishable** from the associated asset or product
- Comparable to the deed to a house, which is not recorded separately from the house

- These NFTs seem **most similar to contracts, leases and licenses** because they record specific rights conveyed to the NFT owner
- Two key conditions:
 1. The terms specify a price for the use of an asset or provision of a service that differs from the price in the absence of the contract, lease, or license
 2. One party to the contract must be able to legally and practically realize this price difference
- Many NFTs that convey commercial rights or other rights beyond personal use meet these conditions
- E.g., the owner of an NFT that conveys commercial rights to a piece of artwork may sell t-shirts printed with this artwork

- Proper measurement of NFTs requires information on:
 - Rights conveyed
 - Purchases of NFTs (separate from the purchases of the associated assets or products)
- We make a clear distinction between the NFT and the associated asset
 - But when the associated asset is poorly measured or missing from national accounts, the NFT may be only available source of information
- Platforms that facilitate NFT trading may be able to provide some of the needed information
- Measurement challenges are similar to those posed by fungible crypto assets
 - See GN on the recording of fungible crypto assets for more information

1. Does the AEG agree with the following proposed categorization of NFTs?
 - a. NFTs that only grant personal use and display rights
 - b. NFTs that grant limited commercial rights
 - c. NFTs that grant full ownership rights

2. Does the AEG agree with the following proposed recording of NFTs?
 - a. NFTs that only grant personal use and display rights: recorded as consumption
 - b. NFTs that grant limited commercial rights: recorded as assets (contracts, licenses, or leases) if the owner can derive economic benefits from these rights (e.g., some form of royalties)
 - c. NFTs that grant full ownership rights: should not be separately recorded, assuming that the associated assets or products have already been counted

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