# GDP Growth

Where:

* = real-time GDP
* = GDP at previous calculations period

**Real-Time GDP**

1. **Expenditure Approach**

**Where:**

* = household consumption
* = gross investment
* = government spending
* = exports
* = imports
* = net exports

1. **Income Approach**

Where:

* = wages and salaries
* = corporate profits
* = tax receipts
* = government subsidy disbursements

1. **Production Approach**

Where:

* = gross output of sector *i*
* = intermediate consumption

Therefore:

**Inputs:**

**Household Consumption**

* Retail sales (POS, card transactions)
* Online spending (e-commerce platforms)
* Utility payments (electricity, water bills)
* Ride-hailing, delivery, and service usage (Uber, Glovo, etc.)
* Mobile money transactions (like M-Pesa or similar platforms)

**Gross Investment**

* Construction permits (approved and initiated)
* Construction activity (building starts, materials use)
* Cement sales
* Construction Electricity
* Imports of equipment and machinery
* Business formation data (new company registrations)

**Government Spending**

* Budget execution reports
* Procurement data (government contracts, purchases)
* Public payroll (government salaries)
* Government transfers (e.g., social grants, pensions)
* **Net Exports**
* Customs and port data (imports/exports logged at borders)
* Shipping and freight volumes
* Real-time trade balances
* Satellite-based trade activity
* AIS (Automatic Identification System) data for ship tracking
* Port congestion monitoring via satellite imagery
* **Wages and salaries**
* Payroll data (aggregated wage/salary payments)
* Job postings and hiring rates (from recruitment platforms)
* Wage growth indices (e.g., average earnings trends)

**Corporate Profits**

* Earnings reports (quarterly or monthly, from large firms)
* Corporate tax filings (when accessible in real-time)
* Stock market earnings estimates (analyst reports, forward guidance)

**Net Taxes on Production and Imports**

* Real-time tax receipts (VAT, import duties, business taxes)
* Government subsidy disbursements (energy subsidies, agriculture aid, etc.)
* Fuel consumption
* Subsidy rate

**Gross Output of each sector**

* Electricity consumption by industry and commercial users (proxy for factory or commercial activity)
* Satellite imagery:
* Nighttime lights (activity levels)
* Construction (new buildings, infrastructure)
* Mobility data (Google/Apple maps, traffic, foot traffic)
* Agricultural output (via remote sensing, crop monitoring)
* Manufacturing indices (e.g., PMI — Purchasing Managers’ Index)

**Intermediate consumption**

* Input-output ratios (from national accounts, used as a baseline)
* Commodity and input prices (e.g., oil, grain, metals)
* Sector-specific cost indices (e.g., construction materials, fertilizer, transport)

**Estimated Inputs**

# Consumer Price Index(CPI)

Where:

* proportion of consumer’s total expenditure on item *i*
* = price of basket item *i* at time *t*
* price of basket item *i* at time *t*

**Inputs**

Real time prices for:

* Rent & lodging​
* Grocery & restaurant prices​
* Fuel & transport fares​
* Vehicle prices​
* Medical services & drug prices​
* Clothing & footwear​
* Electronics & streaming​
* Internet & mobile plans​
* Water, electricity & gas​
* Alcohol & tobacco​
* Furnishings and household equipment maintenance ​
* ​Public service fees​
* Card transaction volumes​
* Online price indices​
* Import price indices​
* Ride-hailing & delivery prices

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**Suggested Data Sources**

Real-time scanner data (e.g., POS systems)​

Web-scraped e-commerce prices​

Utility bills (as housing cost proxies)​

# Producer Price Index (PPI)

Where:

* = weight of input *i* in the total cost of production
* = price of input *i* at time *t*
* = price of input *i* at base period

**Inputs:**

* Oil and gas extraction
* Mining
* Utilities
* Basic chemicals
* Primary metals
* Agriculture and forestry support activities
* Wholesale trade
* Rail transportation
* Truck transportation
* Couriers and messengers
* Warehousing and storage
* Legal services
* Accounting services
* Advertising and related services
* Management consulting
* Advertising and related services
* Scientific research and development
* Other professional services
* Food manufacturing
* Beverage and tobacco product manufacturing
* Textile mills
* Apparel manufacturing
* Leather and allied product manufacturing
* Printing and related support activities
* Petroleum and coal products manufacturing
* Chemical products manufacturing
* Plastics and rubber products manufacturing
* Non-metallic mineral product manufacturing
* Fabricated metal product manufacturing
* Machinery manufacturing
* Computer and electronic product manufacturing
* Electrical equipment and appliance manufacturing
* Furniture and related product manufacturing
* Miscellaneous manufacturing
* Construction
* Wholesale trade (durable and nondurable goods)
* Retail trade
* Air transportation
* Water transportation
* Transit and ground passenger transportation
* Support activities for transportation
* Information services
* Finance and insurance
* Real estate and rental and leasing
* Professional, scientific, and technical services
* Administrative and support services
* Waste management and remediation services
* Health care and social assistance
* Educational services
* Arts, entertainment, and recreation
* Accommodation and food services
* Other services (except public administration)
* Public administration

# Policy Rate/Interest Rate

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Where:

= real-time interest rate at time *i*

**= baseline interest rate level when all inputs are zero

=coefficient

=2-Year Treasury Yield

= ISM manufacturing prices paid index

=commodity index

=unemployment rate

= credit spreads

=FX forward premium or real-time exchange rate pressure

**Inputs**

· **2-Year Government Bond Yield**

· **PMI Prices Paid Index**

· **Unemployment rate**

· **Credit spread**

· **FX forward premium**

# Unemployment Rate

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Where:

· = real-time unemployment rate at time *t*

· = estimated employed persons

· =estimated labor force

**Estimated Employed Persons** 

Where:

· =employed persons at time *t*

· =weight for input *i*

· =payroll data

· =workplace mobility

· =estimated tax withholdings

· =gig/freelance activity

**Estimated Labor Force**

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Where:

· =Estimated labor force at time *t*

· =estimated persons at time *t*

· = coefficient for input *i*

· = job search activity

· =resume uploads

· =unemployment claims

· =estimated social media job activity

· =estimated job vacancy rate

# 6. Gross Savings

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**Final Consumption**

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**Inputs**

1. **Household Consumption**

* Retail sales (POS, card transactions)​
* Online spending​
* Utility bills (electricity, water, gas)​
* Ride-hailing and delivery usage​
* Mobile money transactions​
* Rent (proxied via utility bills + rental listings)​
* Web-scraped prices (food, clothing, electronics)​
* Mobile app usage (Google Mobility Reports)​
* Mobile health payments​
* Health price indices (scraped)

1. **Government Spending**​

* Budget execution reports ​
* Procurement data (government contracts, purchases)​
* Public payroll (government salaries)​
* Government transfers (e.g., social grants, pensions)

**Investment Income Paid**

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Where:



· = co-efficient for input *i*

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·  foreign ownership share

·  dividend payout ratio



· = co-efficient for input *i*

· = Outstanding Foreign debt

· = Effective Interest Rate

# 7. Standardization Formula



Where:

· = normalized, unitless value of item *i* at time *t*

· = value of input *i* at time *t*

· = value of input *i* at base period