Resource Allocation: Demand and Supply

Demand: Demand for a good is the amount of a good that consumers are willing and able to purchase at each price over a given period of time.

Law of Demand (Downward-sloping):

- Law of Diminishing Marginal Utility: Additional satisfaction from marginal unit decreases.
    - Due to income effect
        - Increase price → Real income fall (decrease in purchasing power) → Fall in Qd
    - Due to substitution effect
        - Increase price → Switch to close substitutes, income is a constraint → Fall in Qd

Non-price determinants of demand **(TIGER PIE)**:

- Taste and preferences
- Income
- Government policies (e.g. direct tax/direct subsidies)
- Expectations of future price changes
- Related goods' prices
- Population size
- Interest Rate
- Exchange Rate

Consumer Surplus: Consumer surplus refers to the difference between the maximum price consumers are willing and able to pay to consume a certain quantity of a good, and what they actually pay. It is a measure of consumer welfare.

Supply: Supply of a good is the amount of the good that producers (firms) are willing and able to produce and sell at each price over a given period of time.

Law of Supply (Upward-sloping):

- Higher marginal cost as output increases → Higher price needed for profit incentive

Non-price determinants of supply **(ECONNS GP)**:

- Expectations of future change in prices
- Cost of production
- Natural factors
- Number of firms
- State of technology
- Government policies
- Price of inter-related goods

Producer Surplus: Producer Surplus refers to the difference between the minimum amount that producers are willing and able to receive for a given quantity of a good, and the amount they actually receive.

Allocative efficiency is guaranteed when the sum of producer surplus and consumer surplus is maximized. It is the situation where no one can be better off without making another person worse off. Assumption: No source of market failure.

Market adjustment process:

- Shortage (Qd > Qs)
    - Shortage exerts upward pressure on prices.
    - Consumers who are unable to purchase all the want of the good will ask for higher prices.
    - Producers are willing and able to increase production at higher prices.
    - Prices increase until new equilibrium where Qd = Qs, shortage eliminated.
- Surplus (Qs > Qd)
    - Surplus exerts downward pressure on prices.
    - Producers compete with each other to sell of their excess supplies.
    - Consumers, recognizing surplus, also ask for lower prices.
    - Prices decrease until new equilibrium where Qd = Qs, surplus eliminated.

Functions of price mechanism:

- **Signalling** – informs producers (employers) of shortage/surplus, informs consumers (workers) of increased/decreased price (wages)
- **Incentive** – increase/decrease production (hiring), decrease/increase consumption (make available)
- **Rationing** – consumers with enough money can consume the product.

Signalling and incentive functions lead to allocative efficiency as they answer the question what and how much to produce (for product market), and productive efficiency as they answer the question how to produce (for factor/labour market).

Rationing function lead to distributive efficiency as they answer the question for whom to produce.

Price Elasticities of Demand (PED): PED is a measure of the degree of responsiveness of the quantity demand for a good to a change in its price, ceteris paribus.

Determinants (SHIT):

- Substitutes availability
- Habitual consumption
- Income proportion
- Time

Applications:

- Pricing policy of firms (assume total costs constant)
    o SR: pricing policy
    o LR: product differentiation (may incur cost)
- Taxation revenue
- Effectiveness of trade unions

Income Elasticity of Demand (YED): YED measures the degree of responsiveness of a good's demand to a change in the consumers' income, ceteris paribus.

Determinant:

- Degree of necessity → Depends on income level

Applications:

- Plan future output and modify products based on expectations of changes in income
    o Household income falls
        ▪ Make goods less income elastic (shift from luxury goods to necessities or even inferior) to reduce fall in DD
        ▪ Anticipate reduction in demand by reducing production
    o Household income increases
        ▪ Make goods more income elastic (shift towards luxury goods) to increase extent of increase in DD

Cross Elasticity of Demand (CED): CED measures the degree of responsiveness of a good's demand to a change in the price of another good, ceteris paribus.

Determinant:

- Closeness of substitute (CED > 0) or complement (CED < 0)

Applications:

- Pricing policies (CED > 0)
    o Fall in competitor's price → Must reduce own price, if not will suffer huge loss of customers
- Substitutes
    o Product differentiation (real, imaginary, conditions of sale) to reduce substitutability
- Complements
    o Collaboration/package deal (e.g. airline collab with hotels), since both goods likely to be consumed together

Price Elasticity of Supply (PES): PES measures the degree of responsiveness of a good's quantity supplied to a change in its price, ceteris paribus.

Determinants:

- Time period
    - More time for adjustment of input → Adjustment of output easier
- Factor mobility
- Number of firms
- Spare capacity

Limitations of elasticity concepts:

- Difficulty in calculation of elasticity values
- Dynamic economy: past data cannot be used/outdated
- Ceteris paribus assumption cannot be used
- Costs incurred in product differentiation/marketing strategies

Firms and How They Operate

Short Run:

- At least one fixed factor of production
- **Division and Specialisation** of Labour → Increasing marginal output
- **Law of Diminishing Marginal Returns (LDMR)** → Overcrowding of fixed factor occurs → Each additional unit adds less output than previous units, marginal output falls.
- **Fixed cost**: Fixed cost refers to cost spent on fixed factors of production. It does not vary with output level.
  - **AFC** is a rectangular hyperbola. Continuously downward sloping.
- **Variable cost**: Variable cost refers to cost spent on variable factors of production. It varies with output level.
  - **AVC** is a U-shaped curve. Downward sloping due to division and specialization, increasing marginal returns, upward sloping due to LDMR setting in, decreasing marginal returns.
- **Total cost**: Total cost is the sum of the cost of all factors of production used in production.
  - **ATC** = AFC + AVC. U-shaped cuve.
- **Average cost**: Average cost is the cost per unit output.
- **Marginal cost**: Marginal cost is the cost of production of an additional unit of output.
  - **MC** is a U-shaped curve. Downward sloping due to division and specialization, increasing marginal returns, upward sloping due to LDMR setting in, decreasing marginal returns.

Long Run:

- No fixed factor of production
- Returns to Scale
  - Increasing (Falling unit cost)
  - Constant (Unit cost remains same)
  - Decreasing (Increasing unit cost)
- **Internal Economies of Scale (iEoS)**: Cost savings that rise from a firm's expansion, created by its own policies
  - Technical (directly relate to production process)
    - Factor indivisibility
    - Law of increased dimensions
    - Specialisation and division of labour
    - Vertically linked process
    - By-product economies
  - Managerial (employing specialists and supervisors)
  - Marking/Commercial (cheaper FoP, lowers avg cost of advertisements)
  - Financial (ease of obtaining funds)
  - R&D

- o Welfare
- o Risk-bearing
- o Scope
- **Internal Diseconomies of Scale (iDoS)**: Increase in costs that result from a firm's expansion, due to their own policies
  - o Complexity of management (extensive red-tape, time lags)
  - o Strained relationships (apathy, sloppy work attitude)
- **External Economies of Scale (eEoS)**: Cost savings to all firms that result from the expansion of the industry/concentration in certain area
  - o Economies of concentration
    - ▪ Availability of skilled labour (develop shared training facilities)
    - ▪ Well-developed infrastructure
    - ▪ Reputation
  - o Economies of disintegration
    - ▪ Smaller (subsidiary) industries cater to needs of larger industries (e.g. car industry supply smaller parts to large firms who assemble the parts)
  - o Economies of information
- **External Diseconomies of Scale (eDoS)**: Increase in costs to all firms that result from the expansion of the industry/concentration in certain area
  - o Increased strain on infrastructure (e.g. traffic congestion)
  - o Rising factor costs (competition for common resources)

Methods of growth of firm:

- **Internal expansion** (e.g. producing more of its own product)
- **Merger/Acquisition**
  - o **Vertical integration**
    - ▪ **Backward** integration (e.g. control over supply of FoP, absorb intermediate profit margin)
    - ▪ **Forward** integration (e.g. control over product quality)
  - o **Horizontal** integration (e.g. market domination, reap greater iEoS)
  - o **Conglomeration** (e.g. diversify output, reduce fluctuations in demand for its product)
- **Franchising**

Existence of small firms:

- Demand factors (small market size → small demand)
  - o Nature of product
    - ▪ Perishables → localized markets
    - ▪ Preference for variety rather than mass production of identical goods (e.g hairdressing)
    - ▪ Specialised product (e.g. items of religious significance)
  - o Prestige market (e.g. sport cars)

- o Personalised services (e.g. doctor/dentist)
- o Geographical limitations (e.g. great bulk in relation to value → high transport cost)
- Supply factors
    - o Reach MES very quickly → Large scale production only increases costs
    - o Low entry barriers
    - o Vertical disintegration (e.g. car industry)
    - o Difficulty in raising capital (cannot raise the required money to expand production)
    - o Unwillingness to take risks (high capital outlay, investment risk greater)
    - o Banding (can achieve marketing economies of scale just like large firms)
    - o Profit cycles
    - o Non-profit maximisation

Coexistence of small and large firms in same industry:

- Nature of industry LRAC
    - o iEoS quickly exhausted at low levels, then constant costs for wide range of output (e.g. F&B industry)
- Segmentation of market
    - o Small firms cater to niche market
    - o Large firms cater to pass produced common items
- Disintegration of production process
    - o Small firms supply large firms with components (complement each other)
- Joint ventures
    - o Cooperation among small firms to achieve same iEoS as large firms
- Technology changes
    - o Favours small businesses and firms

Market Structure:

	Perfect Competition (PC)	Monopolistic Competition (MPC)	Oligopoly	Monopoly
Barriers to Entry (BTE)	None; FoP freely mobile; Fixed costs minimal	None/low; Fixed costs are low and technology easily copied	High; Natural: Huge iEoS, low CoP, large MES relative to market DD → Only a few productively efficient firms	High; Natural: Huge iEoS, low CoP, large MES relative to market DD → Only 1 productively efficient firm Artificial: Legal e.g. patent/ licenses
Number of firms	Many	Relatively many	A few	One
Knowledge of product/industry	Perfect knowledge; Prices and production costs known; Type of profit made is known (super/ sub/ normal)	Imperfect knowledge	Imperfect knowledge; Serves as a BTE	Imperfect knowledge; Not fully aware; Production techniques closely guarded (e.g. through patents)
Nature of product	Homogenous; No product differentiation	Differentiated (minor)	Homogenous or differentiated (major)	No close substitutes
Market power	Insignificant market share → zero price setting ability → price taker	Some, but little → Some price setting ability	% market share, market concentration ratio → price setting ability	100% of market share → price setting ability
Decision to stop production (SR/LR)	SR: AR > AVC (shut-down condition) LR: AR < AC	SR: AR > AVC (shut-down condition) LR: AR < AC	SR: AR > AVC (shut-down condition) LR: AR < AC	SR: AR > AVC (shut-down condition) LR: AR < AC
Profitability in SR	Subnormal/ Normal/ Supernormal	Subnormal/ Normal/ Supernormal	Subnormal/ Normal/ Supernormal	Subnormal/ Normal/ Supernormal
Profitability in LR	Normal	Normal	Supernormal	Supernormal
Revenue curves	Horizontal line at prevailing price	Downward sloping (gentle)	Downward sloping (intermediate)	Downward sloping (steep)
Industry demand curve	Downward sloping	None	None	Downward sloping = Firm's AR curve

Firm's business strategies	None – price taker, no product differentiation (not willing and not able)	Less mutual interdependence, firms can do their own pricing strategy, price competition has small effect Non-pricing competition (product differentiation) (willing but not very able) (small scale) (e.g. advertisements on newspapers/off peak time slots on TV) → Increase DD and reduce PED	Mutual interdependence is very important Kinked demand curve → No impetus to increase or decrease price because that decreases total revenue Price competition (price war, initiated by largest firm with largest iEoS) Non-price competition (product differentiation) (willing and able) (huge scale) → reduces rival reaction to the firm's own pricing strategies → Increase DD and reduce PED Collusion (price leadership, formal collusion)	Since PED < 1 (lack of substitutes), can increase price and decrease output to increase total revenue Product differentiation (real, imaginary, conditions of sale) (able, and willing in contestable markets) → Increase DD and reduce PED
Allocative efficiency	Achieved. P = MC. Society's valuation of the benefit from the consumption of the last unit = Opportunity cost of producing that last unit.	Not achieved. Small extent of inefficiency. P > MC. Due to gentler MR/AR gradient.	Not achieved. Large extent of inefficiency. P >> MC. Due to intermediate MR/AR gradient.	Not achieved. Huge extent of inefficiency. P >>> MC. Due to steep MR/AR gradient.
Productive efficiency	Achieved. Social: Production at MES occurs. Firm: X-efficient (must, due to LR normal profit)	Not achieved. Social: Downward sloping part of LRAC. Firm: X-efficient (must, due to LR normal profit)	Not achieved. Social: Downward sloping part of LRAC. Firm: X-inefficiency (due to LR supernormal profit to cushion)	Not achieved. Social: Downward sloping part of LRAC. Firm: X-inefficiency (due to LR supernormal profit to cushion)

Dynamic efficiency	Absent. Unable: LR normal profit Unwilling: Technology/innovation easily copied by other firms	Absent. (Some) Slightly able: LR normal profits, minor product differentiation Willing: Make PED less elastic.	Present. (A lot) Willing: Existing competition → Reduce fear of rival reaction to price policy (if competitive oligopoly) Able: LR supernormal profit	Present. (Some) Willing: Contestable markets → threat of potential competition → incentive to R&D and innovate Not willing: Huge BTE → Dominant position in market secured Able: LR supernormal profit
Equity (and Consumer Surplus)	Equitable. Profits spread across many small firms. Consumer surplus maximized at P = MC.	Equitable. Profit spread across many small firms.	Not equitable. Supernormal profit concentrated in hands of a few firms. Collusion → act like monopoly → further reduce equity. Price discrimination reduces consumer surplus.	Not equitable. Supernormal profit concentrated in hands of one firm. Consumer surplus need not be reduced in industries with huge iEoS → lower MC. Price discrimination reduces consumer surplus.
Consumer choice	No choice of product. Choice of producer.	Choice of product. Choice of producer.	Choice of product. Choice of producer (limited to large brands due to brand proliferation and heavy advertising)	No choice of product. No choice of producer.

Price Discrimination: Selling the same product to different consumers at different prices (3rd deg), or selling the same product to the same consumer at different prices (1st or 2nd deg), but the difference in price does not arise due to a difference in cost of production.

Conditions for PD:

- Control over market supply (**market power**)
- **No possibility of resale** between the different markets (or arbitrage results and restores price equality)
- **Able to segment market into separate and identifiable groups**. Each submarket has different PED.

First degree PD:

- Each customer is **charged the highest price** that he is willing and able to pay **for each unit**.
- All consumer surplus is captured transferred to producer.
- MR = AR → **Allocative efficiency** results, because at profit maximizing MR = MC, P = AR = MR = MC.
- Unlikely in reality
    - **Impractical** to charge each consumer different price.
    - Consumer **will not reveal maximum price** willing and able to pay for each unit.

Second degree PD:

- **Different prices are charged for different blocks of the same good**. Lower prices for additional batch of goods consumed.
- High price is charged when no substitute available → Low PED
- Low price is charged when more substitutes are available → High PED.
- Same price structure applied to all consumers.

Third degree PD:

- Same product sold at different prices to different consumers.
- Conditions:
    - Two or more distinct submarkets
    - Each has different PED
- **MR for each submarket must be equal**.
- MR = MC in each market.
- Higher price charged in more inelastic PED.

Benefits:

- Higher output → Allows consumers for lower income group to consume (esp 3rd deg PD)
- Higher profit leads to more R&D → Cost reductions, product improvement

- Provision of goods that would not otherwise be produced
  - AC > AR for this firm
  - PD allows firm to make profit still (1st deg)

Costs:

- Reduction in consumer surplus
  - Though this is seen as transfer to producer, so overall society welfare remains the same
- Inefficient use of resources
  - P > MC for 2nd and 3rd degree PD

Market Failure

Sources of market failure:

- Externalities
- Merit and demerit goods
- Public goods
- Market dominance
- Imperfect information
- Factor immobility
- Excessive income inequality

Externalities (use context as much as possible):

Negative/positive externalities of production/consumption are the

1. Incidental spillover of costs/benefits associated with the production/consumption of a particular good or service
2. On third parties, who are not directly involved in the production/consumption of the good.
3. These external costs are not compensated for by the producer/consumer.
   OR
   These external benefits are not paid for by third parties.
4. Externalities arise due to the pursuit of self-interest, in which producers maximize profits/consumers maximize utility or satisfaction, and only take into account their private costs and benefits,
5. So the external costs/benefits are unaccounted for.
6. This leads to a divergence between the marginal private cost (MPC) and marginal social cost (MSC)/marginal private benefit (MPB) and marginal social benefit (MSB).
   a. Which one is lower/higher?
   b. By distance of MEC/MEB
7. Assuming MPB = MSB/ MPC = MSC,
8. Free market equilibrium is where MPB = MPC, which is Pe and Qe,
9. While socially optimum output is where MSB = MSC, which is at output Qs.
10. Calculation of deadweight welfare loss

Demerit goods:

- Imperfect information
  - Not fully aware of the private benefits and costs associated with the production/consumption of the particular good → Consumers may not act in their own best interest
- Negative externalities in consumption
  - Pursuit of self-interest → External cost on third parties not accounted for

Merit goods:

- Imperfect information
- Positive externalities in consumption
- Excessive income inequality
    - Free market does not respond to needs and wants of individuals who have insufficient dollar votes to have any impact on market demand → inability to afford goods and services

Public goods:

- Non-excludable (e.g. radio, national defence)
    - It is prohibitively expensive or impossible to separate payers of the good/service from non-payers.
    - Leads to free rider problem where no rational consumer will be willing to pay for the good.
    - Government needs to do direct provision.
- Non-rivalrous (e.g. radio, national defence)
    - Consumption by one individual does not reduce the amount available for others.
    - Marginal cost of providing for an additional user is 0.
    - In order to be allocatively efficient, price must be 0.
    - No rational firm/producer will do this as no profits to be made
    - Government provides directly

Market dominance:

- Allocative inefficiency and deadweight welfare loss (P > MC)
- Productive inefficiency (X-inefficiency tolerated as there are LR supernormal profits)

Imperfect information:

- Merit and demerit goods
    - Unware of all benefits and costs associated with consumption of a good → not acting in their own interest
- Persuasive advertising (e.g. cosmetic surgery)
    - Producers' advertising → Misleading information → Oversell benefits → Overconsumption
- Asymmetric information (e.g. healthcare)
    - One party has better information than the other

Factor immobility:

- Geographical
    - Barriers preventing people from moving to find work

- - Family/social ties
    - Financial costs involved
    - Housing prices/cost of living
- Occupational
  - Barriers preventing FoP from moving between various sectors of the economy
  - Workers may have job-specific skills that became redundant in declining industries, and do not have the skills required for employment in the new growing industries → Mismatch of skills → structural unemployment

Excessive income inequality:

- Allocative inefficiency
  - Underconsumption due to ineffective demand of good/service
- Distributive inefficiency

Government Intervention

Public goods → Solved by **direct provision**

- Non-provision by government will result in missing market → Greatly reduces society's welfare
- E.g. national defence spending, radio broadcast, street lighting
- Limited taxpayers' money for spending on public goods → Need to determine which public goods will yield the greatest societal benefit with the given amount of money spent

Externalities → Solved by **taxation and subsidies**, **legislation and regulation** (e.g. quotas/cap and trade), **direct provision** (e.g. healthcare and education), and **education and campaigns**

Tax/Subsidy

1. Market equilibrium is at MPB = MSC, Pe and Qe.
2. Implement specific tax/subsidy (direct/indirect) equal to the MEB/MEC at Qs → MPB/MPC shifts to MPB/MPC + tax/subsidy
3. Quantity transacted falls to socially optimum level Qs where (e.g. MPC + indirect tax = MPB), also where MSB = MSC.
4. External costs are internalized.
5. Over/under consumption/production corrected → Deadweight welfare loss is eliminated.

Advantages of taxation

- Provides government revenue for expenditure on other developmental projects
- Market operates according to market forces

Disadvantages of taxation

- Accurate valuation of external cost, which is difficult in practice. Over/undervaluation of EC → Under/overconsumption of good → Welfare not maximized, deadweight welfare loss persists (though it is smaller than before)
- PED <1 → High tax required to achieve same fall in output → politically unfavourable

Advantages of subsidies

- Most effective way, easily implemented
- Flexible, adjusted in proportion to magnitude of problem

Disadvantages of subsidies

- Accurate valuation of external benefit, which is difficult in practice.
- High government expenditure, incurs opportunity cost

Legislation and regulation: Quotas

Quotas: Limit on quantity produced

Advantages:

- Simple to implement
    - Compared to valuation of external benefit and cost to calculate required tax or subsidy
- Greater certainty of achieving target output
    - Compels producers and consumers to comply due to law

Disadvantages:

- Displaces price mechanism
    - Government has to predict Qs since signaling function of price doesn't work (output not responsive to price)
- High cost of enforcement
    - Constant checking
    - Penalties must be sufficiently harsh
- No economic incentive to solve root of issue
- Imperfect information
    - Lack of technical data to determine Qs

Legislation and regulation: Cap and Trade

<insert>

Direct provision (for positive externalities)

Advantages:

- Government can control the number, quality and affordability (e.g. public schools, hospital beds)

Disadvantages:

- No profit motive → Productive inefficiency
- Difficulty in calculation of external benefit (benefit must outweigh cost of provision)
- Opportunity cost of government funds

Education and Campaigns

Inform public of externalities → Compel them to internalise the external benefit/cost.

Disadvantages:

- Expensive
- Long time period to take effect

- Costs in collecting and distributing the information

Merit and demerit goods → Solved by **taxation/subsidies**, **education** and **direct provision**

For tax/subsidies/direct provision, refer to externalities.

Education

Educate consumers on the real cost/benefit to themselves, inform them of their private costs and benefits

Market dominance → Solved by **taxation/subsidies**, **price regulations**, **legislation**, **nationalization**.

Evils of monopoly:

- Excessive profits
- Low output and high prices → Lower consumer surplus

Taxation (Lump-sum tax)

- Tax is fixed cost, shifts entire LRAC upwards.
- Output and price remain the same but this reduce monopoly profits, which becomes tax to government.

Disadvantage:

- Supernormal profits enable spending on research → Pursuing equity can compromise on economic growth and efficiency.

Per unit subsidies

- Reduces MC → Changes price and output combination → increased output, lower prices → Higher consumer surplus

Disadvantage:

- Further increase supernormal profits of monopoly. Worsen income distribution.

Price regulation (MC/AC pricing)

MC pricing: achieves allocative inefficiency. But natural monopolies face losses unless subsidies/two tier pricing is practiced.

AC pricing: monopoly can break even, but less than socially optimal level.

Legislation

- Anti-monopoly laws (e.g. 2004 Competition Act)

- o Curb collusive, anti-competitive behaviour
- Minimum quality of goods and services
  - o LTA controls standard for public transportation
  - o PTC controls fares and quality of bus services
- Minimum level of competition
  - o Telco industry

Disadvantages:

- Constant checking and enforcement is required → High cost. Penalties must be sufficiently harsh.
- Benefits may be restricted under these laws, e.g. iEoS not reaped
- Cost benefit analysis (cost of implementation must be less than benefit of laws)

<u>Nationalisation</u>

Transfer of ownership away from private sector to government.

Advantages:

- Increased consumer surplus (higher output and lower price)
- Allocative efficiency
- Quality of service is regulated

Disadvantages:

- Government funds used (incurs opp cost)
- Productive inefficiency (lack of profit motive)
- No dynamic efficiency (no profit incentive and no supernormal profit)

Income inequality → Solved by **minimum wage, demand/supply side policies, taxation and subsidies, transfer payments, provision of merit goods**

Minimum wage: could lead to efficiency loss.

Demand side policies: Increase dd for low skilled labour by increasing their productivity (e.g. Workfare Training Scheme, WTS) → Increase wage, assuming supply constant.

Supply side policies: Reduce ss of low skilled labour by tightening immigration policies. Higher levy on employment of foreign workers. Restricting issue of employment passes.

Tax the rich (progressive tax system) and subsidise the poor.

Transfer payments: subsidies and welfare benefits.

Provision of merit goods and public goods: Education and healthcare are one cause of poverty.
Education → Social mobility → Reduce income inequality.

Government failure: Government intervention worsens the situation

- Imperfect information → misguided policies → reduce effectiveness of policy
- Bureaucracy/inefficiency
    - Cost: Cost > Benefit?
    - Time lag: From recognizing to planning to implementing, situation may have changed, requiring different measures
    - Constant changes in policy → Firms and consumers cannot predict changes and may allocate resources wrongly
    - Law of unintended consequences
    - Disincentive: Increase tax on wealthier and higher income may cause them to leave
    - Policy myopia: tendency to look at short term fixes than the long run solution
    - Political self-interest: allocative inefficiency.